
# ENVIRONMENTAL ASSESSMENT

## Conestoga Reservoir Maintenance and Aquatic Habitat Rehabilitation Project

## Lancaster County, Nebraska

**U.S. Army Corps of Engineers**
**Northwest Division**
**Omaha District**

# Report Documentation Page

*Form Approved*
*OMB No. 0704-0188*



| 1. REPORT DATE | 2. REPORT TYPE | 3. DATES COVERED |
|---|---|---|
| **JUN 2014** | | **00-00-2014 to 00-00-2014** |

| 4. TITLE AND SUBTITLE | 5a. CONTRACT NUMBER |
|---|---|
| **Environmental Assessment: Conestoga Reservoir Maintenance and Aquatic Habitat Rehabilitation Project Lancaster County, Nebraska** | 5b. GRANT NUMBER |
| | 5c. PROGRAM ELEMENT NUMBER |
| 6. AUTHOR(S) | 5d. PROJECT NUMBER |
| | 5e. TASK NUMBER |
| | 5f. WORK UNIT NUMBER |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)<br>**U.S. Army Corps of Engineers,Omaha District,1616 Capitol Ave., Ste. 9000,Omaha,NE,68102** | 8. PERFORMING ORGANIZATION REPORT NUMBER |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) | 10. SPONSOR/MONITOR'S ACRONYM(S) |
| | 11. SPONSOR/MONITOR'S REPORT NUMBER(S) |

12. DISTRIBUTION/AVAILABILITY STATEMENT
**Approved for public release; distribution unlimited**

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
|---|---|---|---|---|---|
| a. REPORT | b. ABSTRACT | c. THIS PAGE | | | |
| **unclassified** | **unclassified** | **unclassified** | **Same as Report (SAR)** | **70** | |

# Table of Contents

# Appendices



# List of Figures



# List of Tables

# Section 1. Project Information

## 1.1. Introduction

The U.S. Army Corps of Engineers (USACE), Northwest Division, Omaha District has prepared this Environmental Assessment (EA) to evaluate the potential impacts of Conestoga Reservoir Maintenance and Rehabilitation Project. This EA has been prepared in accordance with the National Environmental Policy Act of 1969 and the Council of Environmental Quality's Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2. This EA provides sufficient information about the potential adverse and beneficial environmental effects to allow the USACE, Omaha District Commander to make an informed decision on the appropriateness of an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). The finding of the EA determines whether an EIS is required and if no indication of significant impacts is likely, then the agency can release a FONSI completing the NEPA process. This EA also serves as a Biological Assessment (BA) for purposes of Endangered Species Act (ESA) compliance.

## 1.2. Proposed Action

The Nebraska Game and Parks Commission (NGPC) is planning a maintenance and aquatic habitat rehabilitation project at Conestoga Reservoir, Dam Site 12, (Figure 1-1) to improve water quality, reduce sedimentation and shoreline erosion, and restore aquatic habitat. The proposed rehabilitation measures include:

1) Modification of the reservoir outlet works to facilitate water level management
2) Sediment reshaping and removal to increase reservoir depth and depth-diversity, and increase the life span of the reservoir
3) Shoreline re-grading and construction of in-lake structures to restore and protect reservoir shoreline and create aquatic habitat
4) Construction of small upstream water quality sediment traps
5) Fish population renovation and restocking with desirable fish species

Construction of these measures would require a drawdown of the reservoir, which will be maintained throughout the construction phase.

## 1.3. Authority

The Conestoga Dam and Reservoir is one of ten flood control projects that were constructed under the authority of the Salt Creek and Tributaries Flood Control Project in Nebraska, authorized under Public Law 500, 85th Congress, commonly referred to as the "Flood Control Act of 1958." Authority was granted to construct flood control projects on Salt Creek and its tributaries, essentially in accordance with the report of the U. S. Army Corps of Engineers (Corps) Chief of Engineers contained in House Document 396, 84th Congress, 2d Session. In addition to flood damage reduction, other authorized purposes for Conestoga Dam and Reservoir include water quality, recreation, and fish and wildlife enhancement. The dam on the Conestoga

site was completed in the fall of 1964 and the conservation pool level was attained in 1965 by way of the creek and overland flows.

USACE owns and operates the reservoir and flood control structures at Conestoga, while the fisheries and surrounding park are managed by the NGPC. An application to divert 2,660 acre-feet of water for storage at Denton, Site 12 (currently Conestoga Lake) was submitted by the Nebraska Game, Forestation and Parks Commission (currently NGPC) on October 31, 1962 and approved by Nebraska Department of Water Resources [currently Nebraska's Department of Natural Resources (DNR)] on February 27, 1964. The water appropriation to the NGPC was authorized at an amount not to exceed 2,700 acre-feet per annum.

Limitations for the appropriation were as follows:

1) *That the rights of the owners of land bordering on streams in Water Division Number 2-3 to use water for domestic purposes, including the watering of livestock, must be respected.*

2) *That the prior rights of all persons who, by compliance with the laws of the State of Nebraska, have acquired a right to the use of the waters of this stream must not be interfered with by the issuance of this permit.*

3) *That the owners or possessors of reservoirs shall not have the right to impound any water whatever in such reservoirs during the time that such water is required in ditches for direct irrigation, or reservoirs holding senior rights, as provided by Section 46-241, Reissue Revised Statutes of Nebraska, 1943.*

## 1.4. Project Location

Conestoga Reservoir is located within the Conestoga State Recreation Area (SRA) located 2 miles north and a half-mile west of Denton, Nebraska (population 205 from the 2010 census); approximately 3 miles south and a half-mile west of Emerald, Nebraska on Spur 55A along West Pioneers Boulevard (Figure 1-1), and 20 miles west of Lincoln, Nebraska. Although no towns exist within the watershed boundary there are approximately 70 homes consisting of 150 residents.

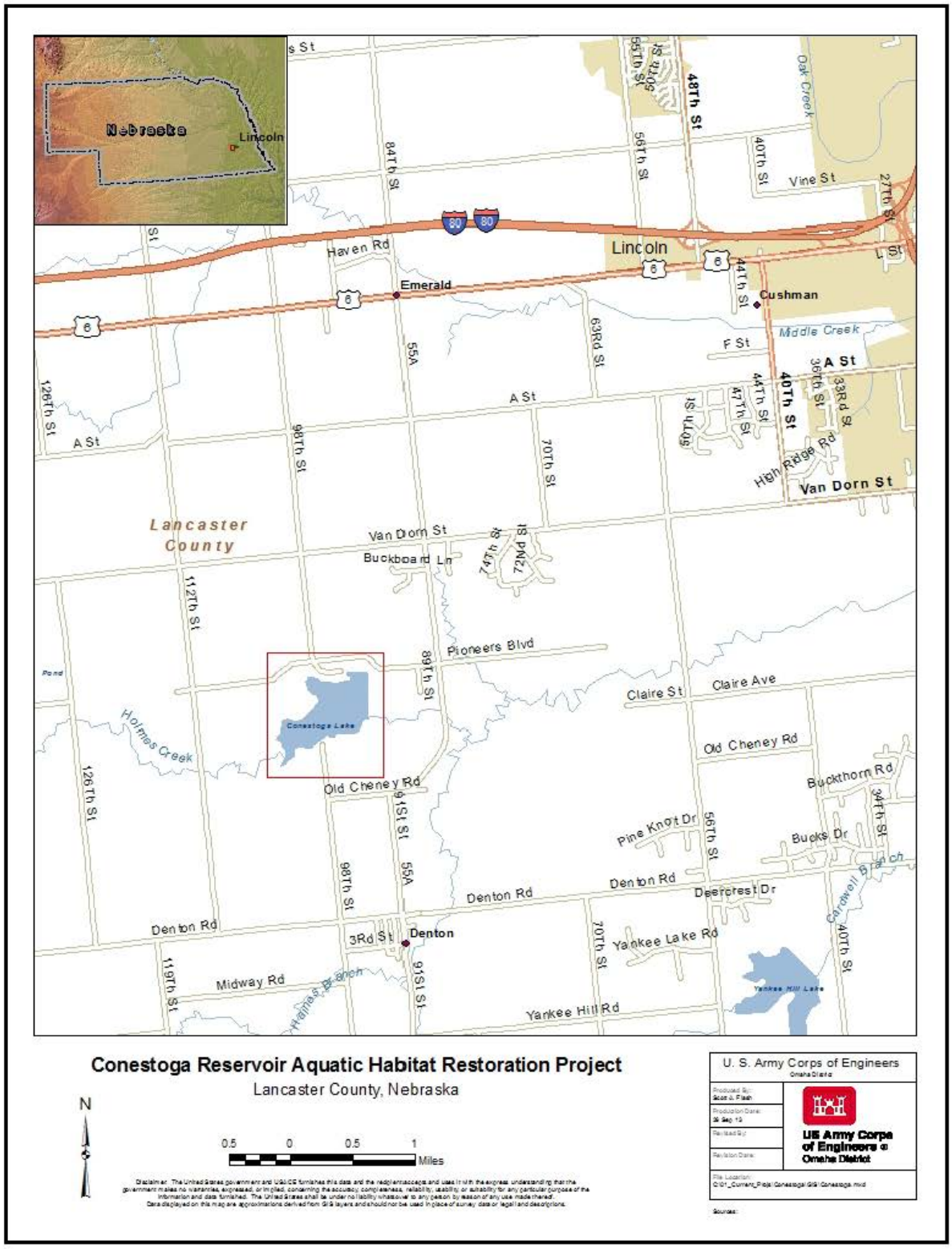



**Figure 1-1: Project Location Map**

## 1.5. Project Background

Conestoga is a 211 surface acre reservoir and flood-control structure constructed by USACE in 1963. The Conestoga Reservoir was built as one of a system of dams and reservoirs on the tributaries of Salt Creek, on the flood plain above the city of Lincoln. The permanent pool was developed and is maintained and operated for fish and wildlife conservation and recreation by the NGPC for public use. The NGPC has been allotted a specific amount of water storage right to be held in Conestoga Reservoir for the purposes of providing recreation opportunities and wildlife habitat. The NGPC has developed and maintained day use and camping facilities, a boat launch and mooring area, sanitary facilities, and wells for drinking water at Conestoga Reservoir. Additional management activities are directed towards supporting public hunting and fishing opportunities. NGPC Fisheries Division initially stocked Conestoga Reservoir in 1963, and the NGPC Wildlife Division actively manages the terrestrial habitats. The public land surrounding Conestoga Reservoir is presently designated as either a SRA or Wildlife Management Area (WMA). The SRA supported an average of 162,000 daily visits from 2000-2010. The reservoir provides a recreational fishery that supported 18,000 angler hours in 2012, a substantial reduction from the 34,000 in 1993. A degradation of the reservoir's aquatic habitat has negatively impacted the recreational fishery.

While the primary function of the dam is for flood control, the reservoir provides additional benefits in the form of recreational opportunities, fish and wildlife habitat and improved water quality. Initial construction did not contain protection against environmental impacts of sediment accumulation and nutrient loading (e.g., nitrogen and phosphorus). As the reservoir has aged, it has begun to experience degradation due to the excessive sediment and nutrient inflows from the watershed. Over the last 15 years numerous reservoirs in Nebraska have been renovated to improve water quality, aquatic habitat, and angler access. These projects have included reservoirs in both urban and rural locations as part of the NGPC Aquatic Habitat Program (AHP). Construction of projects under the AHP has provided valuable lessons learned that have been incorporated into the design of the proposed Conestoga project.

## 1.6. Project Goals, Purpose and Need

The purpose of this project is to restore aquatic habitat, water quality, and recreation opportunities. The project proposes to accomplish this by completing a lake rehabilitation, as part of project operation and maintenance (O&M), in order to recover authorized and allotted water storage by correcting sedimentation issues that have led to impacts to water quality, fish and wildlife habitat, and recreation opportunities.

Sediment and nutrient deposition negatively impact the water quality and the reservoir fishery by reducing reservoir volume, water depth, dissolved oxygen, habitat diversity, and contributes to a loss of aquatic vegetation and bottom structure. Major contributors of sediment accumulation have come from natural sediment transport, upstream tributary erosion, and shoreline degradation. Loss estimates have indicated conservation pool storage capacities have been reduced from 2,472 acre-feet in 1964 to 1,575 in 2011 for a total loss of 896.9 acre-feet or 36 percent of its original volume (The Flat Water Group (TFG), 2013). The sediment has reduced

the depth of the multipurpose pool and the western half of the reservoir is now less than 6 feet deep, with the majority of the reservoir below 2 feet deep. The deepest region of the reservoir is a small area located near the dam that ranges from 16 to 18 feet deep.

Much of the shoreline is subject to bank erosion caused by wind and wave action, and ice. This is especially true where the banks are steep. As a result, the northern shoreline of the reservoir has been armored with riprap to prevent erosion; however, this protection has become extremely degraded.

The reservoir has also been affected by excess nutrient loading. Nutrients such as nitrogen are water soluble, and others, like phosphorus, are likely to fuse to sediment particles. Of the nutrients, phosphorus has had the greatest impact on the aquatic ecology, resulting in periodic overgrowths of algae, turbidity, and water quality problems. The reservoir has experienced blooms of blue-green algae, which have produced toxins in high enough concentrations to warrant beach postings. The most severe blooms have occurred during extended dry periods.

The fish community is out of balance and incapable of sustaining a quality recreational fishery. Overall, fishing access has also become limited. The reservoir was initially stocked with red-ear sunfish, bluegill, northern pike, walleye, largemouth bass, channel catfish and flathead catfish. Other species now include golden shiner, black bullhead, green sunfish, white crappie and common carp. Common carp are highly tolerable of low water quality and are the most prevalent species. Common carp consume vegetation which sport fish are dependent on for food and cover, and additionally stir up bottom sediment further reducing water clarity.

The project is designed to address the significantly degraded water quality and aquatic habitat conditions that have been prevalent at Conestoga Reservoir for several years. In addition, the reservoir ecosystem would be improved, which is currently threatened by numerous environmental stressors including sediment and nutrient deposition, loss of habitat diversity, degraded wetland quality, and a continually degrading fishery. In order to meet the project purpose, the project should achieve these objectives:

1) Remove more than 500,000 cubic yards of deposited sediments and associated nutrients.
2) Reduce future sedimentation with sediment control structures and off-channel created wetlands.
3) Improve water quality and water clarity and remove the reservoir from the 303(d) impaired list.
4) Address shoreline erosion and bank loss.
5) Create calm shallow water and vegetated habitat areas behind structures for water quality, fish habitat, and rearing areas.
6) Eliminate shallow areas impacting the boat launch facility.
7) Increase drawdown capability and management.
8) Improve a protected boat launch facility.

## 1.7. Environmental Baseline

Resource agencies have missions, goals, and responsibilities that are nationally important but differ from those of the Corps of Engineers. While the Corps shares with the resource agencies the goal of protecting listed species, the Corps also has to ensure that the planning, designing, building, operating, and maintaining Civil Works projects that serve the purposes for which Congress authorized each project is done in a cost-effective and efficient way. It becomes critical, therefore, that the Corps work with the resource agencies to ensure that the proposed Environmental Baseline is properly defined, and that alternatives that minimize impacts and other requirements set forth in a biological opinion are appropriate and technically and economically feasible.

Since the late 1970's, the U.S. Fish and Wildlife Service (USFWS) has issued "jeopardy" biological opinions for water-depleting projects in the Platte River basin, as new or continued water depletions have been considered contributing factors in jeopardizing the existence of the target species and adversely affecting designated critical habitat. In 2006, the Platte River Recovery Implementation Program (PRRIP) began implementing actions designed to assist in the conservation and recovery of the target species and their associated habitats along the central and lower Platte River in Nebraska through a basin-wide cooperative approach. The program addresses the adverse impacts of existing and certain new water related activities on the Platte River target species and associated habitats in the Platte River basin in Colorado, Wyoming, and Nebraska above the Loup River confluence. While geographically the project does not fall within the PRRIP, the USFWS still reviews all projects in the Platte River basin on a case by case basis. This includes the determination by the USFWS of the baseline conditions.

Regulations define the environmental baseline as "including the past and present impacts of all Federal, State, or private actions and other human activities in the action area ...." (50 CFR 402.02). This does not preclude the fact that it is the responsibility of the Corps to maintain Civil Works structures so that they continue to serve their congressionally authorized purposes. The existence of a Corps Civil Works structure is part of the existing "environmental baseline" for purposes of ESA compliance.

It is the view of the Corps that the responsibility to maintain Civil Works structures so that they continue to serve their congressionally authorized purposes is inherent in the authority to construct and maintain them, and is therefore non-discretionary. Because the Corps has a non-discretionary duty to maintain those Civil Works structures for which it has O&M responsibilities, the fact that the Corps perpetuates the structure's existence is not an action subject to consultation. The how and when of the maintenance activities may be subject to Section 7 consultation if the process of maintenance could affect listed species or designated critical habitat.

The Corps has a duty to maintain Civil Works structures for which it has O&M responsibilities and is responsible for all activities, operations and studies connected with the Conestoga O&M Manual sedimentation program.

# Section 2. ALTERNATIVES

This chapter details the alternatives considered for the rehabilitation of Conestoga Reservoir. Two alternatives were considered for this project. These alternatives include the No Action Alternative and Alternative 2: Reservoir Rehabilitation (Preferred Alternative). These alternatives were evaluated against their ability to fulfill the goals and objectives as previously defined in Section 1.6. This chapter includes a description of each alternative, a comparison of the alternatives and a detailed description of the recommended alternative. Based on the overall purpose and need of the project, only the No Action Alternative and the Recommended Alternative were proposed. No other alternatives were considered in detail.

## 2.1. Alternative 1: No Action

Under the No Action Alternative, current operation and maintenance activities would occur and no structural modifications or other proposed rehabilitation measures would occur. While it is likely that the watershed conservation measure, as described in the Conestoga Reservoir Water Quality Management Plan, could potentially reduce sedimentation and nutrient inflow in the future, long-term reductions suggested by the plan would be unlikely, and problems that currently exist regarding sediment and nutrient inflows would continue to degrade the reservoir.

The continued accumulation of sediment in the reservoir would cause the eventual total loss of deep water habitat and underwater habitat micro-topography. This would adversely impact the ability of the reservoir to support healthy fish and vegetation populations. The little wetlands that do remain would continue to degrade and fill with sediment, nutrients and invasive species. The value of the wetland to fish and wildlife would continue to decline.

Shoreline erosion would continue to occur along all of the unprotected shorelines due to wind and wave action. This erosion would continue to increase sedimentation, and at the shoreline, would make the bottom too unstable for rooted plants to become established. Continued wave action would cause damage to plants that do become established or would increase turbidity that would hamper plant growth.

If carp and other benthic feeders are allowed to persist in the reservoir, their feeding habits would prevent the successful establishment of healthy littoral wetlands and shallow water habitat. Carp would continue to uproot the vegetation and stir up the bottom sediments that would adversely impact the plants that are not uprooted. Increased turbidity is expected to result in slower growth rates for sight feeding fish and other species of fish, such as bluegill and bass; these species are not as successful spawning in excessively turbid water.

Under the No Action Alternative, boating, fishing and other water-based recreational opportunities could potentially decrease. The loss of the reservoir would also have a negative aesthetic impact on many of the land-based recreational uses, including picnicking, camping and hiking.

Although the No Action Alternative does not meet the project purpose, it was carried forward for consideration to serve as a baseline of comparison for the Preferred Alternative.

## 2.2. Alternative 2: Reservoir Rehabilitation (Preferred Alternative)

The Preferred Alternative is the product of a long planning process coordinated by the NGPC Fisheries Division. The proposed action is considered to fall within normal project operation and maintenance. The final determination is to address the reservoir rehabilitation using a multi-phase approach. Phase I will address modifications to the existing outlet structure to improve functionality and allow for more flexibility in long-term seasonal water level management. The outlet modification will include a low level or bottom draw opening to facilitate the passing of nutrient loads during water level management. Phase II will include a comprehensive reservoir rehabilitation project following completion of Phase I. Phase II will include large scale sediment removal of deposited sediment and construction of sediment control and wetland features. Additional components of the rehabilitation project (see Appendix A for full concept map) include the construction of breakwaters or other shoreline protection features, selective excavation and basin sculpting near the boat launch area, improved boat launch facilities, angler access improvements, and construction of fish habitat/attractor features.

Plan components were developed through an iterative process that included on-site assessments to determine the most critical areas for renovation. The development of the proposed project components will improve water quality, create fishery habitat and will be compatible with existing reservoir uses. Additionally, as part of O&M (USACE, 1981), sedimentation issues would be corrected that have reduced the original conservation pool gross storage capacity from 2,472 acre-feet to 1,575 acre-feet. The project will remove sediment from the multipurpose pool to restore approximately 75 percent of the original storage volume as authorized by Congress and provide the NGPC the ability to store approximately 75 percent of the 2,472 acre-feet water storage right allotted to the NGPC (A-10121) by the Nebraska Department of Natural Resources (DNR).

This alternative includes five main elements:

1) Modification of the reservoir outlet structure to facilitate water level management.
2) Reservoir basin sediment removal and reduction.
3) Construction of water quality sediment traps and re-connection of adjacent wetland areas.
4) Construction of in-lake structures to restore and protect reservoir shoreline and create aquatic habitat.
5) Construction areas and on-site disposal.

### 2.2.1. Reservoir Outlet Structure Modification

This element contains the modification of the reservoir outlet structure to allow for more efficient water level management to increase the reservoir managers' ability to control unwanted aquatic vegetation, promote desirable vegetation, and siphon off deep water having characteristic low dissolved oxygen. The ability to more effectively draw down and maintain the pool elevation facilitates a more successful establishment and management of lake perimeter emergent wetland vegetation by creating seasonal inundation and drying of shallow areas, which stimulates germination of existing wetland vegetation. Normal pool elevation will be returned after seed stock germination to reduce the impact on other reservoir uses such as boating. Water

level management will be guided by a water level manipulation plan developed by NGPC. This will promote higher water quality. In addition, reservoir levels can more easily be drawn down, if necessary, for maintenance activities. See Appendix B for detailed description of the Structure Modification.

#### 2.2.1.1. Outlet Works Modification

The reservoir outlet structure would be modified to give NGPC fisheries managers a greater range of water level control. The outlet modification will include a new bottom outlet control to drain water from the bottom of the reservoir. This will allow lake managers to drain nutrient loaded water from the reservoir and conduct a complete drawdown in the future if necessary. In addition, the implementation of the modification is necessary for the completion of the rehabilitation. In the outlet structure's current state, a complete drawdown would require pumping or a siphon tube, which is ultimately cost prohibitive.

Construction methods include the draining of the reservoir to a required elevation to complete or construct a coffer dam around the inlet structure to allow for "work in the wet." Earthen fill would be excavated from the face of the inlet while ensuring excavation methods do not damage or adversely impact the structure or integrity of surrounding water control structures. The inlet structure would be modified to allow installation of a water level control device, and the area around the structure would be restored.

#### 2.2.1.2. Install Long Inlet Pipe to Maximize Extents of Lake Drawdown

Concurrently with lake sediment removal, a long inlet pipe would be connected to the new lake bottom outlet structure modification. The inlet pipe will allow greater lake drawdown capacity.

Construction methods for the placement of the inlet pipe include the draining of the reservoir through the new outlet structure to allow for construction, excavation to the appropriate elevation at the footprint of the pipe location and trench, and installation of a drain pipe. The trench would then be backfilled with rock or compacted earth for protection and stability. A low water drawdown hole would be cut into the existing outlet structure and the drain pipe would be connected to the opening and sealed.

### 2.2.2. Sediment Removal

Sediment comes into the water body via two inlet streams, especially during high runoff events that tend to mobilize sediment in the watershed. There has been much emphasis on reducing sediment contributions from watersheds through implementation of various best management practices (BMPs) as stated in the Conestoga Reservoir Lancaster and Seward County, Nebraska 2011 Water Quality Management Plan. BMPs have been implemented in a significant portion of the watershed and additional sedimentation control at the reservoir will further reduce sediment contributions into the reservoir.

Excavation of sediment is one of the key components for rehabilitation of distressed reservoirs. Many reservoirs, such as Conestoga, were constructed primarily for flood control; sediment management was not considered adequately in the design because it was thought that the reservoir would function to trap sediment, without specific provisions for sustained long-term use. Over time, as sediment continues to accumulate in the reservoir, this function becomes

diminished as well as other ancillary functions, e.g. fishing, boating, and swimming. A component of excavation is the use of "Selective Excavation." This method is used in areas where more variation in elevation is desired to provide alternating deep and shallow areas for better diversity.

#### 2.2.2.1. Lake Bed Sediment Removal Area

Lake bed removal construction methods would include the removal of accumulated sediment using large earth moving equipment to include excavators, scrapers, dozers and loaders. Sediment would be transported to onsite spoil locations using off-road dump trucks or offsite spoil locations using over the road trucks. Onsite spoil areas would be maintained during construction and restored at the end of the project to establish terrestrial wildlife habitat. The use of erosion control BMPs to control sediment runoff would be included during construction. The use of Selective Excavation would be directed to areas for the inclusion of elevation diversity to provide shallow, as well as deeper areas, which provides over-wintering areas. See Figure 2-1 for lake bed removal areas.


**Figure 2-1: Lake Bed Sediment Removal**

#### 2.2.2.2. Near Shore Boat Ramp Bay Sediment Removal Area

Near shore removal construction methods are similar to the sediment excavation discussed above but are generally directed towards smaller areas closer to shore that would provide a higher degree of depth variability through use of Selective Excavation. See Figure 2-2 for near shore removal areas.

**Figure 2-2: Near Shore Sediment Removal**

### 2.2.3. Sediment Control Structures

Sediment control structures are generally constructed in the upper end or just upstream of the reservoirs to slow incoming runoff and settle out sediment before it reaches the main body of the reservoir. Perpendicular sediment dikes are constructed across the incoming stream or other localized runoff drainages to slow down and temporarily store water behind them (Figure 2-3). Water passes over the structures in a controlled manner, usually through one or more low elevation areas (notches) in the top of the dike. As water slows down, sediment is deposited behind the structure rather than in the reservoir. Perpendicular sediment dikes are armored to prevent them from eroding as flow over tops them.

#### 2.2.3.1. Near Shore Sediment Control Structures

Sediment control structure construction methods would include the construction of temporary access roads as necessary. Large earth moving equipment similar to the excavation equipment would be used for construction. Two sediment control structures would be constructed to direct flow over armored portions of the structure to prevent head cutting, and sediment behind the structure would be excavated to allow for more capacity (Section 2.2.4). They would be either earthen core structures with an armored top or solid core structures. Earthen core structures would be constructed using alternating layers of compacted earth capped with 2-3 feet of riprap or other hard armoring to include concrete or fabric. The use of appropriate in-lake material would be used for construction of earthen structures. These structures could be finished with smaller material on top to provide walking surface if angler access is desired. See Figure 2-4 for sediment control structures.

**Figure 2-3: Perpendicular Breakwaters**

### 2.2.4. Water Quality Sediment Trapping Basins and Improvement Cells

Sediment basins are generally constructed in the upper end or just upstream of the reservoirs to slow incoming runoff down and settle out sediment before it reaches the reservoir. Basins are created by constructing a sediment dike (Section 2.2.3) perpendicular across an influent drainage and excavating off-channel shallow depressions adjacent to the influent stream that fill with sediment loaded runoff as influent stream water elevations rise. Sediment basin construction methods would include using large earth moving equipment similar to lake bed excavation to create the basins. These off-channel basins would be constructed by creating shallow excavation areas that are separated from the channel by a parallel berm using appropriate excavated lake bed material from a designated onsite spoil area. These shallow areas are typically designed so they can be periodically cleaned following operation and maintenance guidelines developed by the NGPC.

#### 2.2.4.1. Sediment Basins

Water quality improvement cells use a combination of shallow excavations and vegetation establishment to slow influent runoff and allow sediment to settle out prior to entering the reservoir. They are generally constructed off channel in the upper end of the reservoir and upstream of the reservoir inlet channels. Improvement cells generally are constructed in conjunction with, and similar to off-channel sediment basins as discussed above.

**Figure 2-4: Sediment Basin and Wetland Cells**

### 2.2.5. Shoreline Re-grading and Stabilization

Emphasis has been placed on shoreline stabilization to further reduce sediment loading to reservoirs. This is particularly effective in reservoirs where BMPs have been established in the watershed. Shoreline stabilization measures also have the benefits of increased and improved aquatic habitat, improvement of near shore habitat, and increased shore angler access. Protecting the banks from erosion will further enhance water quality at Conestoga Reservoir. Stabilization would be conducted through various methods including bank shaping, toe armoring, breakwaters and groins.

#### 2.2.5.1. Bank Reshape and Armor Toe Bank Protection

Bank shaping and toe armoring will provide a more stable and accessible shoreline in the high use areas at Conestoga. In addition, angler access shelves could be incorporated into the groin fields on the north and south bank by placing smaller crushed material on the tops to provide better access.

Toe armor consists of bands of rock designed to protect the shoreline at specific water elevations. "Toe" refers to the base or bottom of a bank or a structure indicating a change from a steeper to a flatter slope. Toe armoring is generally used where water fluctuations are within a fairly narrow range or when the vulnerable areas along a bank are limited to a fairly narrow elevation band. Toe armoring is appropriate in areas when reshaping of the entire bank is not desired or feasible; where the near-shore bathymetry approaches a beaching slope and consequently most wave energy is already dissipated; and where specific elevation is targeted for protection within the normal pool operation levels.

Bank shaping and toe armoring construction methods include earth moving equipment (dozers or

excavators) to shape the bank to an acceptable stable slope. The bank shape will provide a level base for the armoring. Riprap would be placed on filter fabric on the prepared slope at a depth of 2 to 3 feet thick depending on the level of protection needed.


**Figure 2-5: Shoreline Rehabilitation and Stabilization**

There are two general types of breakwaters, perpendicular and off-shore (Figures 2-6 and 2-7). Perpendicular breakwaters usually tie into the shore and protect out into the reservoir for a specified distance. Groins are generally shorter types of perpendicular breakwaters being less than 50 feet long. Offshore breakwaters may or may not tie into the shoreline and those breakwaters constructed some distance off the shoreline generally parallel the shore. There are numerous shape and style combinations of breakwaters that can be used, and different sizes and configurations can be used alone or in combination. Groins are often used in a series of multiples creating what is called a "field."

Special attention is needed when designing breakwaters near toe armoring to prevent the undermining of the toe structure when the water is drawn to its lowest elevation. For this reason, breakwaters are generally designed and constructed to have rock protection to >3 feet below normal low water levels.

Breakwater construction methods consist of the construction of temporary access roads as necessary. Large earth moving equipment would be used for construction, usually working from the shoreline out to maintain appropriate access. These breakwaters would be earth core constructed using alternating layers of compacted earth and then capped with 2 to 3 feet of riprap or other hard armoring. Solid core breakwaters would be constructed entirely of rock or other hard armor.

### 2.2.5.2. Breakwaters

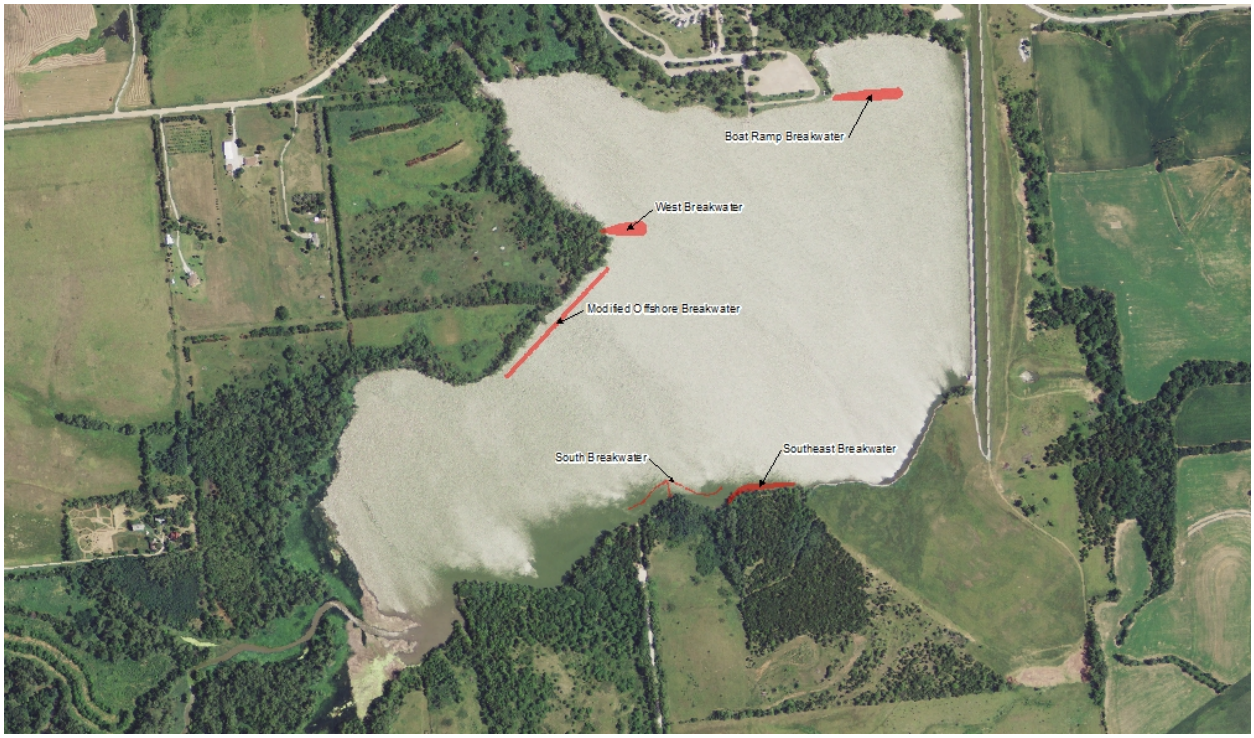



**Figure 2-6: Offshore Breakwaters**

### 2.2.5.3. Groin Fields


**Figure 2-7: Groin Breakwaters**

### 2.2.6. Construction Areas and On-site Disposal

This option consists of only excavating the material from the proposed construction sites with land-based equipment such as excavators, dozers and scrapers, stockpiling the material on site, and hauling the material to a designated spoil location and on-site disposal area. Staging areas will be onsite on existing paved parking areas (Figure 2-8).


**Figure 2-8: Construction Staging and Spoil**

## 2.3. Alternatives Comparison

The No Action Alternative would not provide any improvement to Conestoga Reservoir, and does not fulfill the purpose and need of the proposed project. Given Conestoga's recreation potential, a negative socioeconomic effect of the reservoir's filling with sediment would be the loss of water-based recreation provided by the reservoir. Water and wetland quality would continue to degrade and the quality of fish and wildlife habitat would continue to decline.

Under the Preferred Alternative, implementation of each project component would cumulatively add to the achievement of the stated objectives, as listed in Section 1, including an overall benefit of a balanced and diverse aquatic ecosystem. Water clarity would improve with a decrease in sediment and nutrient inflow, reduction of shoreline erosion, and the removal of benthic fish that disturb bottom sediments. Improved water clarity would result in better quality habitat for an increased diversity of aquatic plant life, vertebrates and invertebrates. Constructing shoreline structures to reduce wave action would decrease the inherent forces resulting in bank sloughing, bank instability, continual suspension of sediments, and turbidity. Combined, these structures coupled with the enhanced water level drawdown control, would encourage greater establishment of aquatic vegetation in the littoral zone, which provides food and substrate for

invertebrates, habitat for fish spawning, and rearing and feeding for adult and juvenile fish. The preferred alternative meets the purpose and need as stated in Section 1 "Purpose and Need of the Project." Refer to Table 2-1 for a comparison of alternatives.

**Table 2-1: Alternatives Comparison**

| Measure | Alternative 1 No-Action | Alternative 2 Reservoir Rehabilitation |
|---|---|---|
| **Reservoir Outlet Structure Modification** | | |
| | • Would maintain current reservoir control capabilities. | • Would improve reservoir water level management.<br>• Would improve shoreline vegetation management with water level control.<br>• Would improve bottom drawdown of reservoir for nutrient loading drainage.<br>• Would allow reservoir managers to drain nutrient loaded water from the reservoir and conduct a complete drawdown in the future if necessary.<br>• Extended inlet pipe into deeper water would help prevent reservoir bottom material from limiting reservoir drawdown capacity.<br>• Would improve capacity to drain nutrient loading on reservoir bottom. |
| | | |
| **Sediment Removal** | | |
| | • Would not reduce sediment accumulation and reservoir would continue to have limited bottom diversity.<br>• Vegetation and fisheries would continue to degrade. | • Would remove nutrients bound to sediment.<br>• Would improve reservoir depth benefits for fisheries.<br>• Would improve boating access.<br>• Would improve near shoreline depth diversity and fish habitat.<br>• Would create quality shoreline angler opportunities.<br>• Would promote a variety of aquatic vegetation establishment. |
| | | |
| **Sediment Control Structures** | | |
| | • Would continue to have increased sediment accumulation in the reservoir.<br>• Water quality would continue to degrade. | • Would collect sediment outside the reservoir providing an improvement to in-lake water quality.<br>• Could be periodically cleaned out to prolong efficiency.<br>• Would have minimal disruption to reservoir activities.<br>• Would provide opportunity for diversified habitat (e.g., wetland plants).<br>• Could be used to provide access drainages as part of a trail system. |
| | | |
| **Water Quality Sediment Trapping Basins and Improvement Cells** | | |

| | | |
|---|---|---|
| | • Would continue to have increased sediment accumulation in the reservoir.<br>• Water quality would continue to degrade.<br>• Would not promote vegetation and fisheries communities. | • Would intercept incoming sediment prior to it entering the reservoir.<br>• Could be periodically cleaned out extending the life of the structures.<br>• Would promote establishment of wetland plants which provide additional sediment control benefits.<br>• Could be configured to provide access across incoming streams (e.g., used as trail crossings).<br>• Would have minimal disturbance to main body of reservoir.<br>• Would provide re-connection of adjacent wetlands and floodplain to creek.<br>• Would reduce sediment inflow into reservoir.<br>• Potential to create wetland habitat through re-establishment of vegetation.<br>• Would diversify overall habitat around reservoir.<br>• Could provide protected areas for young fish. |
| | | |
| **Shoreline Re-grading and Stabilization** | | |
| | • Wave action would continue to erode banks and deposit sediment into reservoir.<br>• Boat launch would continue to be vulnerable to wave action. | • Would protect banks from erosion by frequent perennial wave action at elevations near normal pool elevation.<br>• Would provide improved near-shore fish and animal habitat.<br>• Would protect vulnerable banks with minimal disturbance.<br>• Would arrest bank erosion by intercepting and diverting wave energy as perpendicular breakwaters protect a length of adjacent shoreline approximately 4 to 5 times the length of the breakwater on its downwind side.<br>• Off-shore breakwaters protect shore directly behind structures.<br>• Off-shore breakwaters provide calm water habitat behind structures which provide fish habitat and promote aquatic and wetland vegetation establishment.<br>• Would provide diverse aquatic habitat for fish species.<br>• Would protect vulnerable coves and boat launch facilities. |

# Section 3. AFFECTED ENVIRONMENT

## 3.1. Background

Conestoga is a 211 surface acre reservoir and flood-control structure constructed by the USACE in 1963. The reservoir and flood control structures are owned and operated by USACE while the fisheries and surrounding park area are managed by the NGPC. Facilities include primitive and improved campsites, electrical hookups, picnic areas, playground, a fish cleaning station, boat ramp, dump station, vault toilets, and fire pits.

Approximately 486 acres surrounding the reservoir are also open to the public. The reservoir is located less than 20 miles west of Lincoln, Nebraska (population 258,379 from the 2010 census), and park visitation is estimated at 139,191 visitors annually based on data collected from 1990-2010. Recreational activities include boating, camping, fishing, hiking and hunting. A majority of the water recreational use is devoted to fishing, comprising 67.4 percent of use in 2009 and increasing to 74.5 percent in 2010 although fishing opportunities are currently limited as degraded aquatic habitat conditions have negatively impacted the fish community. Hunting opportunities exist for small game, pheasant, bobwhite quail and deer. Waterfowl hunting is not currently permitted.

An emergency spillway is located 200 feet south of the right abutment. It consists of an uncontrolled 750-foot wide channel with 1 on 3 side slopes. The channel crest at the upstream end is flat for 260 feet at an elevation of 1252. The bed slope downstream of the crest is a nominal 0.2 percent for precipitation run-off. The spillway channel ends in the natural drainage course approximately 800 feet downstream. The bottom and side slopes of the channel are protected by a grass cover. The spillway channel represents an excavation quantity of 270,000 cubic yards of earth. Overflow from the spillway is remote.

## 3.2. Reservoir Multipurpose Zone

Figure 3-1 depicts the current storage zones of Conestoga Reservoir based on the 1996 survey data and estimated sedimentation. It is estimated that 31 to 38 percent of the “as-built” volume to the top of the conservation pool has been lost to sedimentation as of 2010. The annual volume loss is estimated to be 0.65 to 0.81 percent. Based on the state of Nebraska’s impairment assessment criteria, these values indicate that Conestoga Reservoir’s water quality dependent uses are impaired due to sedimentation.

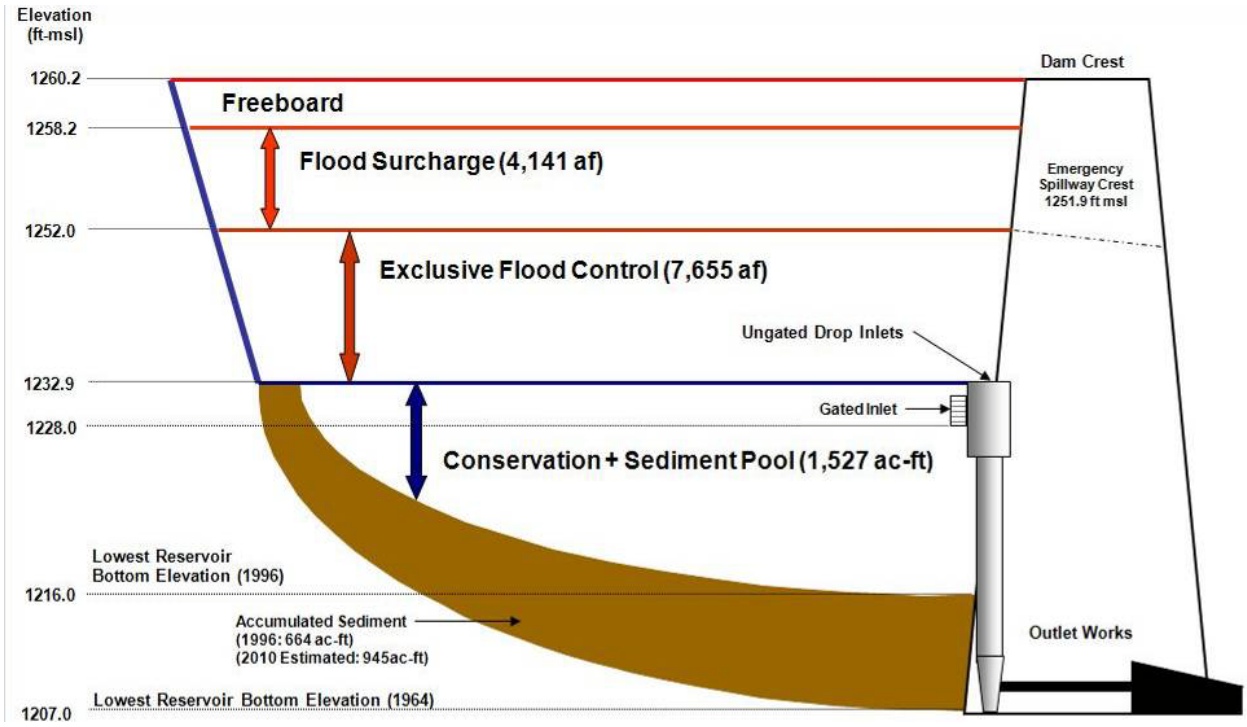



**Figure 3-1: Current Storage Zones of Conestoga Reservoir and Estimated Sedimentation.**

## 3.3. Physical Geographic Resources

### 3.3.1. Watershed

The Holmes Creek watershed of Conestoga Reservoir comprises 9,520 acres or 15.1 square miles. The watershed falls within the Lower Platte River Basin which drains into the Platte River then eventually the Missouri River. The watershed contains one primary perennial stream named Holmes Creek. Other unnamed tributaries in the watershed only flow during runoff events.

Within the project area there are three main tributaries feeding the reservoir (Figure 3-2). Holmes Creek is the largest followed by unnamed tributary 2 then unnamed tributary 1. Tributary 1 feeding the reservoir is the smallest of the three and is routed through a narrow low lying area adjacent to the reservoir that is comprised primarily of woody vegetation. Before entering the reservoir this tributary first passes through an existing concrete box culvert. The box culvert is a remnant of a historic road that could be modified to function as a detention structure. This area could include shallow excavation in the adjacent upland area, and removal of woody vegetation and planting of emergent wetland vegetation to improve sediment trapping capabilities.

Tributary 2 is comprised primarily of cultivated cropland and riparian drainage ways. The tributary enters the reservoir in the northwest cove, which has an average depth of 2.5 feet. Prior to entering the reservoir, the tributary passes through a low lying area that has developed a natural levee along the reservoir shoreline and is comprised primarily of woody vegetation. This area could be enhanced through shallow excavation in the adjacent upland area, removal of

woody vegetation and planting of emergent wetland vegetation to improve sediment trapping. The natural levee could also be enhanced to perform as an additional or alternative detention structure.

Holmes Creek tributary is comprised primarily of pasture land and riparian drainage ways. Cultivated cropland is also present to a lesser extent. The tributary enters the reservoir in the southwest cove, which has an average depth of 1.5 feet. Holmes Creek does have some serpentine characteristic before entering the reservoir; however, this tributary has sustained substantial head cutting and bed degradation. Upstream along the tributary, areas adjacent to the channel banks could be considered for targeted excavation to create wetland cells and bank rehabilitation.

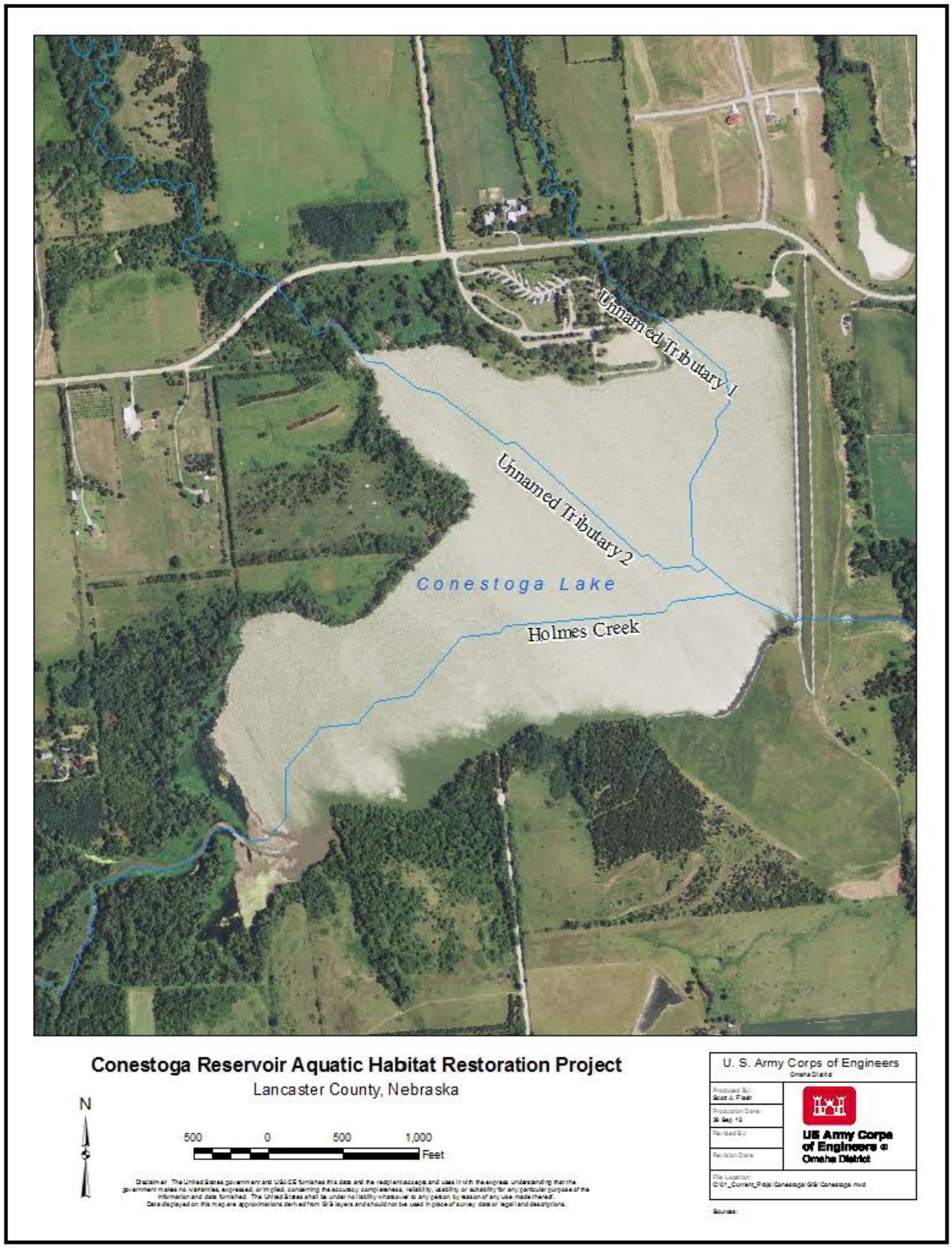



**Figure 3-2: Conestoga Tributaries within the Holmes Creek Watershed**

### 3.3.2. Climate

Winters in the watershed are cold with precipitation mainly occurring as snowfall. Summers can be hot but with occasional cold spells. Average temperatures range from highs in the upper 80's during the summer to the lower 20's during the winter. Humidity in the summer months ranges from 60-80 percent. Annual precipitation in the area is approximately 31 inches.

### 3.3.3. Topography

The basin is located primarily in Lancaster County in eastern Nebraska and lies entirely within the Dissected Till Plains of the Central Lowlands Physiographic Province. Pleistocene deposits of glacial, interglacial and eolian origin overlie bedrock, which is at a maximum depth of over 200 feet, although in some localized areas in the bedrock occurs at relatively shallow depths. Bedrock under the greater portion of the basin is the Dakota Group sandstone and shales of Cretaceous age with some Permian limestone and shales in the southeastern portion of the basin and Pennsylvanian limestone and shales in the northeastern portion of Lancaster County. The aspect is mostly eastward through Salt Creek to the Platte River.

### 3.3.4. Soils

The major soil association present in the watershed is the Steinauer-Pawnee-Burchard association, representing 71 percent of the watershed. Three other associations also occupy the watershed to a lesser degree; Sharpsburg (12 percent), Steinauer-Sharpsburg-Pawnee-Burchard (7.4 percent), and the Wymore association (7.3 percent). Soils of the Steinauer-Pawnee-Burchard association are deep, gently sloping to very steep, well drained, loamy clay soils that formed in glacial till. The Sharpsburg series is a deep, moderately drained soil found on uplands and terraces. The Wymore association is a deep, moderately drained soil found on side slopes of loess upland along drainage ways.

### 3.3.5. Water Quality

Conestoga Reservoir is approximately 211 surface acres in size and has an average depth of approximately 6.8 feet. This shallow, well-mixed reservoir can exhibit short-term thermal stratification during the early summer months. The reservoir has experienced blooms of blue-green algae, which have produced toxins in high enough concentrations to warrant beach postings. The most severe blooms have occurred during extended dry periods.

The Section 303(d) list of impaired waters in the 2012 Water Quality Integrated Report Nebraska Department of Environmental Quality (NDEQ) Water Quality Division, April 01, 2012 identifies aquatic life use impairments due to nutrients and chlorophyll, and aesthetic use impairments due to sedimentation. Conestoga Reservoir is also impaired by algae toxins, and as a result, Conestoga Reservoir does not support "recreation use" (NDEQ, 2013). In addition, this report identifies sedimentation, total phosphorus, total nitrogen, and chlorophyll *a* as parameters of concern.

An extensive water quality dataset was available for Conestoga Reservoir. The data sources for the water quality section come from the 2010 Report of Water Quality Conditions at Tributary Projects in the Omaha District (USACE, 2010) and the Conestoga Reservoir, Lancaster County, Nebraska Water Quality Management Plan (NGPC, 2012). Below is a summary of parameters regarding water quality.

Organic and inorganic solids suspended in the water can create problems for aquatic life as well as decrease the aesthetic qualities of a lake or reservoir. Large numbers of rough fish, along with wind and wave action, can increase suspended solids through the re-suspension of bottom sediments. Suspended solids concentrations at Conestoga Reservoir from 1978 to 2010 ranged from 2 mg/L in June 1981 to 163 mg/L in August 1990. Annual mean concentrations ranged from 10 mg/L in 1994 to 54 mg/L in 1980 with a mean concentration of 24.8 mg/L.

The clarity of water, or the depth to which light penetrates, can limit or promote the production of certain species of algae, fish, and aquatic plants. Many factors affect water clarity, in Nebraska, with the two main influences being algae and suspended sediment. Water clarity in Conestoga Reservoir from 1977 to 2010 ranged from 6 inches in July 2008 to 68 inches in May 1993. Annual mean measurements ranged from 11.6 inches in 2005 to 48 inches in 1993 with a mean measurement of 19.95 inches. The production of algae is controlled primarily by water temperature, light availability, and nutrient availability. In addition to degrading aesthetics, dense algal blooms can lead to the depletion of dissolved oxygen which can result in extensive fish kills. Additionally, low dissolved oxygen near the bottom of lakes and reservoirs can cause phosphorus to be released from the sediments providing more nutrients for algae to feed on.

In 2010, the NDEQ adopted Environmental Protection Agency (EPA) assessment targets for total phosphorus, total nitrogen, and chlorophyll. These targets are utilized to determine nutrient impairments in lakes and reservoirs. The established chlorophyll target is 10 $mg/m^3$. Chlorophyll *a* concentrations above 33 $mg/m^3$ are expected to cause taste and odor problems and concentrations above 100 $mg/m^3$ have a high potential for fish kills and excessive concentrations of algal toxins. Chlorophyll *a* concentrations in Conestoga Reservoir from 1982 to 2010 ranged from 476 $mg/m^3$ in September 2002 to 1 $mg/m^3$ in May 2007. Annual mean concentrations ranged from 3 $mg/m^3$ in 1982 to 126 $mg/m^3$ in 2002 with a mean concentration of 37.27 $mg/m^3$. Of the 85 measurements taken since 1982, a total of 68 have exceeded the target of 10 $mg/m^3$ and two have exceeded 100 $mg/m^3$.

Phosphorus and nitrogen are the two nutrients most critical for the production of algae in Nebraska lakes and reservoirs. High concentrations of these nutrients, along with warm temperatures and longer daylight, provide optimum conditions for algae growth. Total phosphorus is comprised of both dissolved phosphorus and particulate phosphorus. Dissolved phosphorus is readily available for uptake by biological organisms while particulate phosphorus must be converted to the dissolved form before it can be utilized. Total phosphorus indicates the amount of phosphorus that is "potentially available" to biological organisms, while dissolved phosphorus helps determine current productivity. Since particulate phosphorus is bound to soil particles, high nutrient concentrations can be associated with high sediment loads or suspended sediment concentrations. In 2010, EPA proposed nutrient targets for total phosphorus (50 µg/L) and total nitrogen (1000 µg/L).

Total phosphorus concentrations in Conestoga Reservoir from 1977 to 2010 ranged from 10 µg/L in May 1989 to 370 µg/L in June 1997. Annual mean concentrations ranged from 60 µg/L in 1987 and 1988 to 260 µg/L in 2007, with a mean concentration of 130 µg/L. Total nitrogen concentrations in Conestoga Reservoir from 1990 to 2010 ranged from 460 µg/L in May 2003 to 4620 µg/L in September 2006. Annual means ranged from 930 µg/L in 1995 to 2310 µg/L in 2006, with a mean concentration of 1540 µg/L.

Temperature patterns can influence a reservoir's fundamental processes such as mixing, depleting oxygen, nutrient release from bottom sediments, and algal growth. Since water density changes with temperature, water temperature differences can cause stratification that divides the upper waters from the lower waters of the reservoir. Stratification is the change in temperature at different depths of a lake, and is due to the change in water density with temperature. Stratification, which is more prevalent in deeper reservoirs, typically develops during the warm summer months while de-stratification, or turnover, typically occurs during the spring and fall. Depth profiles (surface to bottom) for temperature were collected at a deepwater site near the dam from 1996 to 2010. Conestoga typically stratifies briefly in the early summer and turns over by late summer/early fall.

For aquatic life, one of the most important constituents dissolved in water is oxygen. Sources of dissolved oxygen to a lake include: flowing water, transfer from the atmosphere, and production by plants. Oxygen is consumed or removed from these systems through chemical and biological processes causing oxygen demands. Dissolved oxygen is considered to be a concern to aquatic life when surface to bottom average concentrations are below 5.0 mg/L. Since thermal stratification is a natural process, only the water above the stratified layer, when present, is considered when evaluating dissolved oxygen data. Hypoxic conditions near the reservoir bottom can result in releases of phosphorus which contributes to algal production. Depth profiles for dissolved oxygen were collected at the deepwater site from 1996 to 2010. Average dissolved oxygen concentrations were above 5.0 mg/L for 101 of the 105 sampling dates. The lowest dissolved oxygen reading was in July 2008, where levels dropped below 5 mg/L at 3.5 meters and to 0.21 mg/L at 4.5 meters.

The influxes of pesticides are a growing concern for reservoir water quality. Contamination from these pollutants can cause both short-term and long-term concerns for human health and aquatic life. Conestoga Reservoir has been tested for alachlor, cyanazine, and atrazine. Chronic and acute water quality standards are in place for alachlor (76 µg/L, 760 µg/L) and atrazine (12 µg/L, 330 µg/L) but not for cyanazine. Although detectable concentrations of all pesticides were found, none were in high enough concentrations to exceed standards. Concentrations of atrazine ranged from 0.05 µg/L in May 2002 to 7.98 µg/L in July 1996. None of the atrazine samples exceeded the chronic standard of 12 µg/L.

Microorganisms are ever present in all terrestrial and aquatic ecosystems. Many types are beneficial, breaking down organic material in the reservoir, serving as food sources for larger animals and as essential components for nutrient cycling and biogeochemical cycles. However, some strains can cause serious human health problems. Fecal coliform and *E. coli* bacteria are indicator organisms that are primarily thought to originate from warm-blooded mammals. Unfortunately, due to the number of potential sources (sanitary wastewater, storm water,

livestock and wildlife) it is often difficult to differentiate between individual contributors. An *E. coli* bacterium test was initiated in July of 2003. Of the 192 samples collected, 13 (6 percent) exceeded the water standard of 126 colonies/100mls. When the standard was exceeded, it is considered to be a higher risk for illness through ingestion, but would not result in beach closures. Annual geometric means ranged from 3.53 colonies/100mls in 2003 to 12.59 colonies/100mls in 2008.

### 3.3.6. Sedimentation

Sedimentation has been monitored by the USACE and Nebraska Department of Environmental Quality (NDEQ) since the reservoir was first surveyed in 1964. The Lower Platte South Natural Resources District (LPSNRD) identified target sedimentation rates and deposited sediment capacity in the 2011 Conestoga Reservoir Watershed Management Plan to treat water quality impairments identified on the EPA Section 303(d) list. A target sedimentation rate of 36,000 tons/yr was determined based on a loading rate of 0.0075 percent original capacity per year. Comparison of NDEQ bathymetric survey data from 2002-2011, along with TFG's bathymetric survey in 2012 suggest a sedimentation rate on the order of 50,000 to 61,000 tons/yr. This demonstrates the need for erosion reduction and sediment capture in the watershed on the order of 14,000 to 25,000 tons/yr. A target capacity of 75 percent of original was also identified in the management plan. Loss estimates indicate conservation pool storage capacities have been reduced from 2,472 acre-feet in 1964 to 1,575 in 2011 for a total loss of 896.9 acre-feet or 36 percent of its original volume. To meet these management targets, 319 acre-feet (500,000 cubic yards) of sediment must be removed from the reservoir.

Conestoga Reservoir sits within a rural agricultural setting with potential urban development encroachment. Aesthetics, future surrounding development and access have been factored in the planning process. The banks of the reservoir suffer from wind/wave erosion and lack lacustrine habitat diversity. The sedimentation at Conestoga has created a "bowl affect" that lacks in depth diversity and reservoir bottom elevation diversity. The shallow nature of the reservoir has essentially cut off the western-most portion of the reservoir from boat access. Conestoga Reservoir has experienced blue-green algae blooms which have produced toxin concentrations high enough to warrant beach closures. A number of the bays have silted in, leaving little or no stands of rooted aquatic vegetation.

## 3.4. Environmental Resources

### 3.4.1. Aquatic Resources

#### 3.4.1.1. Wetlands

An evaluation of potential wetlands on the site was conducted through review of National Wetlands Inventory (NWI) maps and through on-site visits. Conditions observed during site visits were generally consistent with the NWI delineations at the site. The NWI depicts several different wetland types on the property including Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond and Riverine (Figure 3-3).

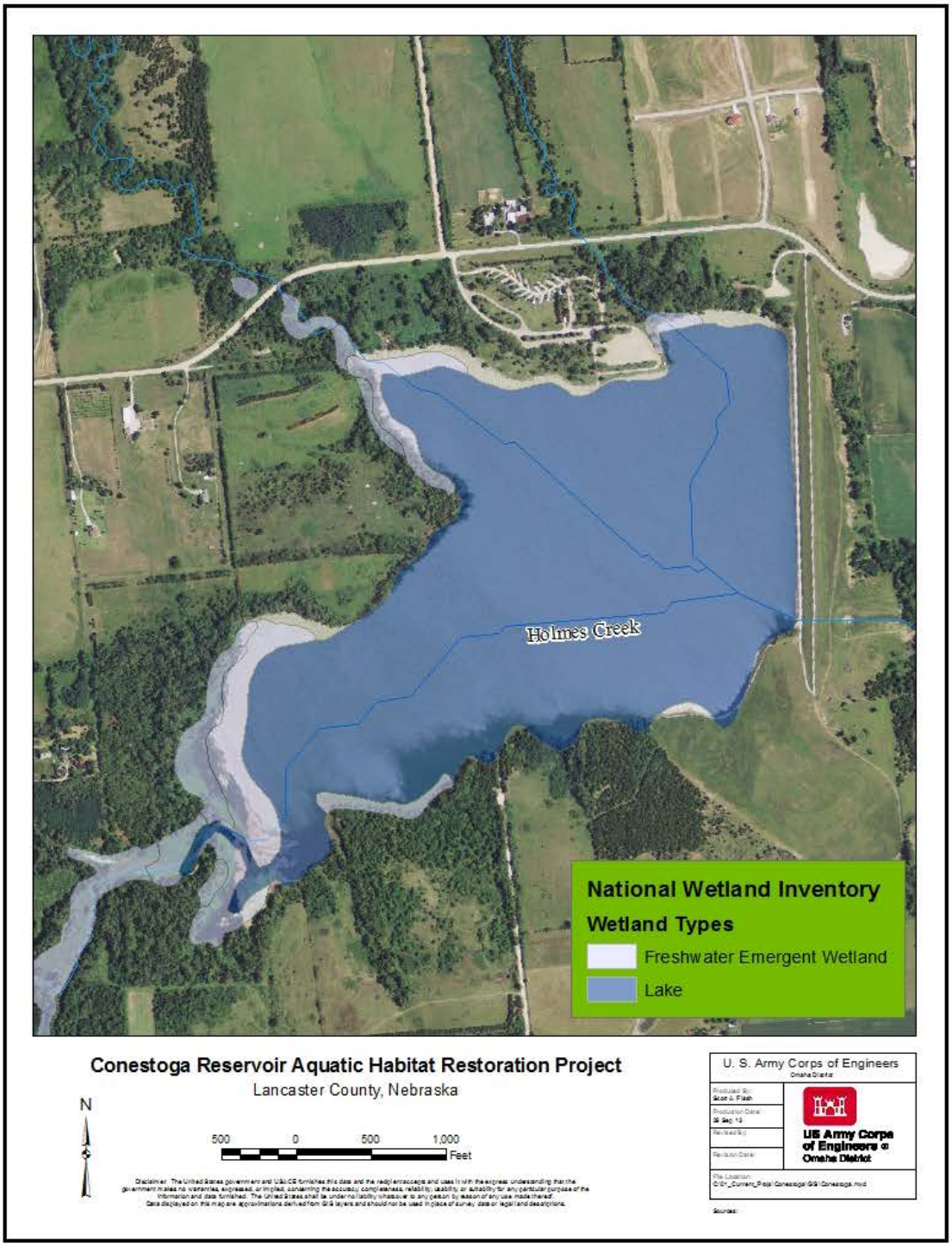



**Figure 3-3: National Wetlands Inventory**

Although there are palustrine and lacustrine wetlands created by the dam at Conestoga, the NGPC has been unable to manage the wetland component of the reservoir system due to staff and budget constraints, and the inability to manipulate water levels on a seasonal basis.

Within the shallow water along the shore (littoral zone), aquatic emergent (partly above water), aquatic submergent (underwater), and other littoral vegetation species are limited and the shoreline supports little or no woody vegetation. A few contributing factors include, (1) the destructive action of benthic feeding fish that continue to churn the bed material causing high turbidity and uprooting vegetation, (2) pounding wave action against the shoreline causing the bottom sediments to be unstable and the water near the shore to be turbid preventing adequate light infiltration, and (3) a fairly constant water level that prevents the soils in the shallow water littoral zone from ever drying and being exposed to sunlight and oxygen.

#### 3.4.1.2. Platte River Depletion

Because the proposed reservoir improvements will be on a tributary to Salt Creek, the USFWS has noted that the proposed action could result in an in-stream flow depletion to the lower Platte River, which could impact federally listed species. The USFWS is primarily concerned about any increased storage resulting from the proposed action, and requested that an engineering analysis be performed regarding the net effect (in terms of acre-feet) that may be depleted during each month on an average annual basis over the life of the project.

Based on reservoir volume surveys, between 1964 and 2011, about 900 acre-feet of conservation pool storage has been lost due to sedimentation at Conestoga. The rehabilitation project calls for the removal of 500,000 cubic-yards of sediment which will recover approximately 310 acre-feet of authorized storage appropriated to the NGPC. The 310 acre-feet translates to less than 1/2 cubic-ft/sec (cfs) of stream flow per day over the course of one year. The total acre-feet of storage after the project is estimated to be 1885 which is below the originally authorized 1964 storage total of 2,472 acre-feet. The project would not reclaim the total authorized storage capacity but rather limit the project to restoring only about 75 percent of the storage volume lost due to sedimentation. While the Conestoga project will reclaim a portion of the originally authorized storage, 25 percent of the original storage will still be displaced due to sedimentation. This 25 percent net loss of storage translates to an overall gain of water to the downstream system since original project construction. Thus, the effects of the project as it relates to ESA would be more properly measured off of the originally authorized storage levels, and as such, it would be concluded that the Platte River has seen a gain during the life of the project as a result of storage loss.

#### 3.4.1.3. Fisheries

After impoundment and before the actual filling of Conestoga Reservoir, all flowing tributaries entering the reservoir were renovated with rotenone to remove any existing fish species. Initial stocking of the reservoir included red-ear sunfish, bluegill, northern pike, walleye, largemouth bass, channel catfish and flathead catfish. Sampling efforts in 1973 fish population surveys showed species of golden shiner, black bullhead, green sunfish, white crappie and common carp.

It is likely that the common carp hindered the development potential of this fishery since they were found early after the reservoir filled. Common carp consume vegetation which sport fish are dependent on for food and cover, and additionally stir up bottom sediment reducing water clarity. The present status of the fishery reflects this reduced potential and will be hindered as long as they are present. Major fish species present within the reservoir that are considered the

best indicators of the present sport fish population include largemouth bass, bluegill, crappie and channel catfish.

Largemouth bass and bluegill have evolved together as predator/prey and provide quality sustainable balanced fish populations in many Nebraska reservoirs. Fish sampling for largemouth bass with an electroshocking boat at night, and having a catch rate of 150-250 bass/hour, is considered optimal. Surveys for largemouth bass were conducted yearly from 2000 to 2003 and resulted in very low numbers of 23.6, 0.0, 18.5 and 35.8 bass/hour, respectively.

Bluegills are primarily sampled with trap nets. This type of sampling gear catches fish species associated with shallow water habitat, and their size structure is directly related to the bass population. Healthy bass populations will result in the predation of small bluegill allowing other species to grow faster and reach a larger size. An ideal bluegill community would have many fish over 6 inches in size with 10 to 20 percent of the fish over 8 inches. At Conestoga, sampling conducted over the past 10 years has been characterized by smaller fish with few greater than 8 inches.

Channel catfish can survive and flourish in a variety of stream and lake environments. In reservoirs where largemouth bass densities are high, stocking needs to be conducted in order to maintain their populations since bass will prey on small channel catfish. Since bass numbers are low in Conestoga, the existing channel catfish are the result of natural reproduction and have not been stocked in the reservoir the past 10 years. Channel catfish are primarily sampled with gill nets which capture fish associated with open water habitat. An average catch rate in Nebraska flood control impoundments is 10 fish/gill net. Conestoga has a low density, averaging less than 5 fish/gill net since 2007.

Both white and black crappies have been sampled in Conestoga, but the population is dominated by white crappie. White crappie tends to do better in large reservoirs with reduced water clarity while black crappie thrives in smaller waters with good water quality. Crappie are primarily sampled with trap nets, and in Nebraska reservoirs an average catch rate number is about 30/net. In the past 10 years, the reservoir was sampled in 2001, 2002 and 2003 and white crappie catch rates were 130, 128 and 213 per trap net, respectively. This would indicate a population well above the state-wide averages. However, crappies at these densities usually produce few fish larger than 10 inches as they are competing for a limited amount of food resources.

#### 3.4.1.4. Aquatic Vegetation

Currently, wetland vegetation along the shoreline is limited at Conestoga Reservoir. Small patches of cattails and river bulrush can be found growing among the riprap in a few isolated areas along the north shore of the reservoir. The invasive reed canarygrass, along with native arrowhead and cattails, can be found in the mouth of the Holmes Creek tributary to the reservoir, including a short distance upstream. Reed canarygrass mixed with small patches of cattails grows relatively thick where sediment has deposited at the mouths of other small tributaries that enter the reservoir. Very little vegetation grows within the pool of the reservoir; instead, it grows at or above the water surface on recently accreted sediment. Arrowhead is scattered in the deeper water adjacent to the patches of cattail and reed canarygrass.

### 3.4.2. Terrestrial Resources

#### 3.4.2.1. Wildlife

Terrestrial cover types that occur in the project area include wooded and grass habitats; however, these are heavily invaded by invasive and weedy species. While these habitats are not optimal they do support some migrating shorebirds and waterfowl, and permanent and temporary residents including hawks, pheasants, beavers, cottontail rabbit, fox squirrel and deer. In addition, wetland vegetation, where present along the shoreline fringe, provides food, water or shelter for beaver, frogs, deer and raccoon, and is essential habitat for many types of ducks, geese, herons, shorebirds, turtles, snakes and other animals that live around or frequent the reservoir.

#### 3.4.2.2. Vegetation

Prior to Conestoga Reservoir construction, the area had been transformed from a natural landscape to land used for dry land farming and some pastureland. Native plant communities were greatly reduced. The construction of the dam and inundation of the reservoir area removed much of the existing riparian vegetation that was established along the creek and replaced the vegetation communities (within the reservoir boundary) with aquatic communities. The majority of the project lands were then replanted with various woody and herbaceous species for aesthetic, recreational, wildlife, and soil stabilization purposes. These species included, but were not limited to: oak, walnut, locust, maple, osage, bluegrass, fescue, and smooth brome.

Before the construction of the dam and reservoir, the project lands had been in cultivation, and to a lesser extent, pastureland. The construction of the dam and inundation, which formed the reservoir, eliminated all the vegetation established along the creek edge and replaced the cultivated lands in the reservoir boundaries with aquatic ones. There have been areas of native vegetation re-plantings for aesthetic, recreational, wildlife, and soil stabilization purposes. The NGPC has developed a native grassland management guide for the specific purpose of maintaining and enhancing the ecological character and biodiversity of native grasslands on the state's Wildlife Management Areas (WMAs). The Conestoga Reservoir SRA has been delineated into management types for use in the management of Conestoga Reservoir SRA.

### 3.4.3. Threatened and Endangered Species

In accordance with Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service's web pages (www.fws.gov) for listed species occurring in Nebraska were consulted to determine which federally-listed threatened, endangered, or candidate species could potentially occur in the proposed project area. An endangered species is the classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range. A threatened species is the classification provided to an animal or plant likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Table 3-1 lists the federally-listed and endangered and threatened species found in the Lancaster County.

**Table 3-1: Federally Listed Threatened and Endangered Species**

| Scientific Name | Common Name | Status | Habitat |
|---|---|---|---|
| *Sternula antillarum* | Interior Least Tern | Endangered | Coastal beaches and river sandbars |
| *Charadrius melodus* | Piping Plover | Threatened | Coastal beaches and river sandbars |
| *Scaphirhychus albus* | Pallid Sturgeon | Endangered | Large, turbid, warm-water rivers |
| *Cicindela nevadica lincolniana* | Salt Creek Tiger Beetle | Endangered | Saline wetlands |
| *Platanthera praeclara* | Western Prairie Fringed Orchid | Threatened | Wet prairies and sedge meadows |
| *Grus americana* | Whooping Crane | Endangered | Open expanses and wetlands |

#### 3.4.3.1. Protected Plant Species

##### 3.4.3.1.1. Western Prairie Fringed Orchid

The western prairie fringed orchid (*Platanthera praeclara* - Threatened) inhabits tall-grass calcareous silt loam or sub-irrigated sand prairies. Declines in western prairie fringed orchid populations have been caused by the drainage and conversion of its habitats to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and the application of herbicides. Populations are known to occur in Boone, Cherry, Dodge, Garfield, Grant, Greeley, Hall, Holt, Lancaster, Loup, Madison, Otoe, Pierce, Rock, Saline, Sarpy, Seward, and Wheeler counties, and may occur at other sites in Nebraska.

#### 3.4.3.2. Protected Fish & Wildlife Species

##### 3.4.3.2.1. Interior Least Tern

Least terns (*Sterna antillarum* - Endangered) are colonial birds that occupy coastal beaches and barren to sparsely vegetated sandbars along rivers, sand and gravel pits or lake and reservoir shorelines for nesting and chick rearing, which occurs from late April through August. Least tern uses several major river systems of the United States including the Missouri and Platte Rivers during the breeding season. Stabilization for navigation, flood control, hydropower generation, and irrigation has led to a loss of much of the sandbar habitat the species requires and led to the degradation of the remaining habitat.

##### 3.4.3.2.2. Pallid Sturgeon

The pallid sturgeon (*Scaphirynchus albus* - Endangered) was officially listed as an endangered species on September 6, 1990. In Nebraska, the pallid sturgeon is found in the Missouri and Platte Rivers. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that provided macrohabitat requirements for the pallid sturgeon, a species that is associated with diverse aquatic habitats. These habitats historically were dynamic and in a constant state of change due to influences from the natural hydrograph, and sediment and runoff inputs from an enormous watershed spanning portions of ten states. Navigation, channelization and bank stabilization, and hydropower generation projects have caused the widespread loss of the diverse array of dynamic habitats once provided to pallid sturgeon on the Missouri River, resulting in a precipitous decline in populations of the species.

#### 3.4.3.2.3. Piping Plover

The piping plover (*Charadrius melodus* - Threatened) is a shorebird that favors coastal beaches, alkali wetlands, lakeshores, reservoir beaches and river sandbars for nesting and chick rearing, and utilizes the Missouri and Platte Rivers' sandbars and shorelines. Nesting and chick rearing occurs from April to August. In 1985, the USFWS listed the Northern Great Plains population as threatened. The USFWS designated critical habitat for the Northern Great Plains population of the piping plover, including the Missouri River, in September 2002. Designated areas of critical habitat include prairie alkali wetlands and surrounding shoreline; river channels and associated sandbars and islands; and reservoirs and inland lakes and their sparsely vegetated shorelines, peninsulas, and islands.

#### 3.4.3.2.4. Salt Creek Tiger Beetle

The Salt Creek tiger beetle (*Cicindela nevadica lincolniana* - Endangered) is confined to eastern Nebraska saline wetlands and associated streams and tributaries of Salt Creek in the northern third of Lancaster County. It is found along mud banks of streams and seeps, and in association with saline wetlands and exposed mud flats of saline wetlands. Four areas have been designated as critical habitat and include (1) Upper Little Salt Creek North in Lancaster County, (2) Little Salt Creek – Arbor Lake in Lancaster County, (3) Little Salt Creek – Roper in Lancaster County, and (4) Rock Creek – Jack Sinn Wildlife Management Area in Lancaster and Saunders Counties. Saline wetland and stream complexes found along Little Salt Creek and Rock Creek comprise the critical habitat designation. The primary reason for its decline includes its need for the previously mentioned specific habitat which now has become limiting.

## 3.5. Cultural Resources

A cultural resources literature search was conducted in consultation with the Nebraska State Historic Preservation Office (SHPO). A March 2014 database search confirmed that no historic properties are recorded in the project Area of Potential Effect (APE). Concurrently, the SHPO reviewed the USACE files related to this project and concluded that a survey for unrecorded cultural resources would not be required. SHPO determined that the proposed undertaking would have no effect for archaeological, architectural, or historic properties. Appendix A contains the Nebraska SHPO documentation.

## 3.6. Socioeconomics

Conestoga Reservoir is located in Lancaster County, Nebraska. The population of Lancaster County was 293,407 in 2012; however, 90 percent of that population is within the city of Lincoln the second largest city in Nebraska. In 2012, 83.9 percent of Lancaster County residents reported their race as Caucasian alone, while the remaining 16.1 percent consisted of other races or a mixture of races (U.S. Census Bureau).

In 2007-2011, Lancaster County had a per capita income of $26,557 and had a median household income of $51,059; this is compared to $26,113 and $50,695 respectively for the state of Nebraska (U.S. Census Bureau, 2010). For the state of Nebraska the percent of persons below

poverty level was 11.8 (U.S. Census Bureau, 2010) while Lancaster County is 14.3 percent. The major sources of employment in Lancaster County in 2005-2009 were 38.6 percent management, business, science, and arts occupations; 16.5 percent service occupations; 25.8 percent sales and office occupations; 11.0 percent production, transportation, and material moving occupations; and 8.1 percent natural resources, construction, and maintenance occupations (U.S. Census Bureau, 2010). The unemployment rate for Lancaster County was 4.3 percent compared to the statewide unemployment rate of 3.8 percent (U.S. Census Bureau, 2012).

### 3.6.1. Recreation

The recreational, aesthetic, economic, and environmental values of the reservoir will become increasingly important in the future as development in the watershed continues and due to its close proximity to Lincoln, Nebraska. Park visitation is estimated at 139,191 visitors annually based on data collected from 1990-2010; however, there are no estimates for income produced. Recreational activities include boating and fishing along with hunting. A majority of water recreational use is angling with 67.4 percent in 2009 and 74.5 percent in 2010. Fishing opportunities include largemouth bass, walleye, channel and flathead catfish, bluegill, and crappie. Permitted hunting opportunities include pheasant, bobwhite quail, and deer. Waterfowl hunting is not permitted in the SRA.

### 3.6.2. Prime Farmland

The United States Department of Agriculture (USDA) considers prime farmland to be land that has the best combination of physical and chemical characteristics that is readily available for producing crops. Prime farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods. These lands are not excessively erodible or saturated with water for a long period, and they either do not flood frequently or are protected from flooding. Prime farmland soils are located in the project vicinity but are limited to locations of potential spoil areas. Non-prime farmland soils on the project site are classified as Burchard clay loam, Mayberry silty clay loam, Steinauer clay loam, Judson silt loam, Wymore silty clay loam, and Pawnee clay loam. Burchard clay loam, Mayberry silty clay loam and Steinauer clay loam soils are moderately to well-drained soils. Prime farmland soils including Judson silt loam and Wymore silty clay loam are moderately to well-drained soils. Mayberry silty clay loam and Pawnee clay loam are moderately-drained soils and are considered Farmland of Statewide Importance.

The construction area consists of work within the Conestoga Reservoir and on land that is not classified as prime farmland. As this area is currently owned by the USACE and or managed by the NGPC, and no existing agricultural activities are taking place within the project boundary or spoil areas, no Prime Farmland will be taken out of production.

## 3.7. Air Quality

Sources of suspended particulate matter and air pollutants in the project area include agricultural, industrial, and recreational boating activities near the dredging site. Lancaster County complies

with the National Ambient Air Quality Standards (NAAQS) and is not listed on the EPA's Currently Designated Nonattainment Areas for All Criteria Pollutants website (http://epa.gov/oaqps001/greenbk/ancl3.html).

## 3.8. Noise

Sources of noise in the project area result from recreational boating, hunting, and agricultural activities. These activities are seasonal. In the spring and fall, farm tractor and truck use increases near the project site. Background noise levels are generally low.

# Section 4. ENVIRONMENTAL CONSEQUENCES

This section outlines the anticipated environmental effects from implementation of the Preferred Alternative as compared to the No Action Alternative.

## 4.1. Physical Geographic Resources

### 4.1.1. Watershed

No change in watershed condition is expected from the No Action Alternative or Preferred Alternative.

### 4.1.2. Climate

No change in climate condition is expected from the No Action Alternative or Preferred Alternative.

### 4.1.3. Topography

The project would require removal of accumulated sediment, and the spoil (See Section 2.2.2) would be deposited in designated upland areas within the Conestoga Reservoir SRA boundary as part of the rehabilitation project. The spoil sites would be graded to the existing topography and re-vegetated with native grasses and trees. Sediment removal actions are dependent on amount of sediment removed and cost of work, which could determine which spoil sites may or may not be utilized.

The No Action Alternative would not require the removal of sediment and therefore would not result in changes in the existing topography of the reservoir or the surrounding park area.

### 4.1.4. Soils

Currently, soils in the watershed are carried in overland runoff upstream of the reservoir, moving from the uplands to the bottomland areas. Sediment is deposited in the stream and eventually into the reservoir. Sedimentation removed from the lakebed and associated shorelines would be placed in upland areas within the park boundary. The sediment would be stabilized, graded to level it with existing topography. Native grasses, trees and shrubs would be planted which help to stabilize the soil and to help reduce surface runoff. These areas would also serve to enhance habitat for native flora and fauna. No impacts to soils are anticipated.

The No Action Alternative would not require the measures to reduce sediment accumulation, and the reservoir would continue to receive large amounts of sediment. Changes in the existing topography of the reservoir or the surrounding park area would remain the same.

### 4.1.5. Water Quality

Implementation of the Preferred Alternative may cause temporary increases in sediment load, and erosion may occur during the construction of the project. To decrease water quality impacts, BMPs would be implemented and include erosion control blankets. Long-term water quality would improve due to the construction of sediment and erosion control structures as a result of this project. The reduction of bank erosion would provide ancillary benefits to the littoral zone and to reservoir water quality by reducing turbidity and sediment suspension.

The No Action Alternative would see a continued accumulation of sediment in the reservoir which would eventually cause the complete loss of all deep water habitat and underwater habitat micro-topography. This would likely adversely impact the ability of the reservoir to support a healthy fish and native vegetation population. As wetlands fill with sediment and nutrients, invasive species would become more dominant and the value of the wetland to fish and wildlife would continue to decline. Shoreline erosion would continue to occur along unprotected shoreline areas due to wind driven wave action, making the bottom unstable for rooted plants to become established. Increased turbidity would further hinder plant growth. In addition, if the current fish community, which is currently dominated by carp and other benthic feeders, is allowed to persist, healthy littoral wetlands would not become established. These species would continue to disturb the vegetation and mix the bottom sediments creating turbidity that would adversely impact rooted plants. The increased turbidity would result in slower growth rates for sight feeding fish and affect some species of fish that do not spawn in excessively turbid water.

## 4.2. Environmental Resources

### 4.2.1. Aquatic Resources

#### 4.2.1.1. Wetlands

The creation of additional wetlands is a component of the Preferred Alternative and would serve many purposes, with the primary purpose of increasing the health of the area's existing ecosystem. Wetlands provide many functions including stabilizing the shorelines and lakebeds located in shallow water; providing shelter for spawning and rearing, as well as habitat for feeding and shelter for all ages of fish and terrestrial fauna capable of using these areas. These areas help to sequester nutrients such as phosphorous, which reduces algal blooms. Littoral wetlands at Conestoga Reservoir would ideally consist of a diverse composition of native wetland plants and not the current composition of invasive species. The proposed project would enhance and increase wetland areas by providing shoreline protection from wave action, managing water levels, improving submergent and emergent aquatic species, and reducing plant uprooting by less desirable fish. Littoral wetlands also provide extra protection from erosion by creating a natural wind wave break.

The No Action Alternative would result in the continued degradation of the present wetlands. Invasive species would continue to dominate, forming monotypic areas in most areas.

#### 4.2.1.2. Platte River Depletion

Due to the loss of reservoir volume and subsequent impact to the NGPC's authorized water allocation, the project will require the removal of sedimentation that will bring these back to within the as-built project conditions. This action may have temporary short-term biological impacts resulting in the draining and re-filling of the reservoir, but once the reservoir has reached designed capacity, normal reservoir operation and outflow will resume.

As mentioned in Section 1.6 "Project Goals, Purpose and Need," sedimentation has led to declining conditions at Conestoga Reservoir and affected the ability to effectively meet some of the authorized purposes, namely recreation and fish and wildlife enhancement. The proposed action to rehabilitate the reservoir is meant to maintain the ability of the project to provide the benefits for which it was originally intended by congress.

As part of O&M, the project would correct sedimentation issues that have reduced the original conservation pool storage capacity from 2,472 acre-feet to 1,575 acre-feet. The proposed action will remove sediment from multipurpose pool to restore approximately 75 percent of the original storage as authorized by Congress. This action will also restore NGPC's ability to make use of approximately 75 percent of its original 2,700 acre-foot water right that has been displaced by sediment over time. Therefore, the proposed action does not increase storage capacity nor capture any additional water than it was originally designed to capture. The proposed action to rehabilitate the reservoir results in less storage than was originally intended.

The current restoration plan is to remove about 310 acre-feet (13.5 million cubic feet) of sediment from the conservation/sediment pool at Conestoga Lake (Salt Creek No. 12). This represents 3.2 percent (310/9,567) of the gross storage in Conestoga and 16 percent (310/1,912) of the storage available in the conservation/sediment pool.

It should be noted that no new storage is being created. Rather, a portion of the original storage is being restored by removing the accumulated sediment. This should be considered normal project maintenance and will be within the existing water storage permits and agreements. An estimate of a onetime depletion to the Platte River due to restoration of 310 acre-feet of storage in Conestoga can be made as follows. First, the pool would be drawn down during the excavation of the sediment. Therefore, any depletion would not show up until the pool refilled which would likely occur during a relatively wet period during the spring months of March through June. Assuming the porosity of the sediment is 50 percent, only 155 acre-feet (0.5*310) of water would be required to refill the area where the sediment is excavated, assuming the disposal area would be within the Platte River watershed. Using one month as a rough estimate to refill the pool after the restoration, this would translate into a depletion of 2.6 cubic feet per second (cfs). Assuming a 10 percent conveyance loss to flows reaching the Platte River, the depletion below the mouth of Salt Creek would be 2.3 cfs. The average monthly flow of the Platte River at Louisville, Nebraska during the March through June period ranges from 9,770 cfs in April to 11,900 cfs in June. Therefore, the depletion would represent from 0.019 percent to 0.024 percent of the flow in the river. Based on this reasoning it is anticipated that removing 310 acre-feet of sediment from Conestoga would have a negligible impact on Platte River flows.

It is therefore determined by the Corps that there will be no new water depletion associated with the proposed action. Although the original Conestoga project was responsible for some amount of depletion when it was built, this was the original intent of Congress, and clearly a part of the environmental baseline condition. Over time, the authorized storage limit and water right have been impacted as storage has been slowly displaced by sediment. This has resulted in an increasing loss of water from the project to downstream flows. While the proposed action will partially reclaim some of the storage (and water) of the Conestoga project, it is much less than that which has already been lost.

#### 4.2.1.3. Fisheries

A drawdown of the reservoir would occur and the existing fish community would be removed. After rehabilitation, the reservoir would be stocked with desirable fish although restocking of the reservoir will not be a part of this project. The various components of the preferred alternative would address the sediment and water quality problems and would create habitat appropriate for desirable fish species.

The No Action Alternative would result in a continued decline in the quality of the fishery at Conestoga Reservoir. The reservoir would continue to decline in volume, water quality, depth-diversity, wetland diversity and the increase of less desirable fish.

#### 4.2.1.4. Aquatic Vegetation

Currently, the reservoir lacks large areas of rooted aquatic vegetation, which serve as habitat for a variety of wildlife and is vital to reproduction and survival of aquatic and terrestrial species. Removal of accumulated sediment, decreasing shoreline erosion, reducing sediment and nutrient load potential and removal of less desirable fish will help to decrease turbidity and improve lake water clarity. By improving water clarity the amount of vegetation a reservoir will support would increase. Sunlight does not penetrate highly turbid water and prevents growth of aquatic plants.

The No Action Alternative would result in a continued decline in the quality and quantity of aquatic vegetation.

### 4.2.2. Terrestrial Resources

#### 4.2.2.1. Wildlife

Some animals may be temporarily disturbed or displaced during construction. After construction is complete, the rehabilitation project would attract and provide food and cover for a diversity of waterfowl and other wildlife, especially for those species that rely on aquatic ecosystems for part of their life cycle. This includes the potential to disturb or displace amphibians, reptiles, and other wetland species during the construction of the proposed project. Monotypic stands of reed canary grass are thought to have little value to wildlife; however, some species of amphibians and reptiles may utilize reed canary grass monocultures for breeding, foraging, and cover. It is anticipated that impacts to amphibians and reptiles would be minimized by providing gradual slopes in selected areas along the new bankline to encourage wetland development.

Due to the temporary nature of the construction activity and the availability of similar habitat surrounding the project area, long-term impacts are not expected. Some clearing and grubbing is anticipated (preparing spoil sites, haul roads) before dredging begins. If clearing and grubbing is required it would occur outside of the primary nesting season. Impacts to riparian wildlife due to construction activities are anticipated to be minor and short-term due to the availability of similarly structured vegetative communities and habitat in the project area.

The No Action Alternative would result in a continuing deterioration of aquatic habitat and the continued erosion of the shoreline.

#### 4.2.2.2. Vegetation

Due to the temporary nature of the construction activity and the availability of similar habitat surrounding the project area, long-term impacts are not expected. No clearing and grubbing is anticipated prior to dredging. However, if it is required this would occur outside of the migratory bird nesting season. All terrestrial construction, access road, staging and spoil areas will be either brought back to pre-existing conditions or replanted with species as per Conestoga Management Plan specifications.

Under the No Action Alternative, shoreline erosion will continue along many parts of the lake, preventing a riparian zone from developing.

### 4.2.3. Threatened and Endangered Species

The following sub-sections provide effect determinations and associated reasoning for each of the listed species of concern. Impacts to listed species are also addressed in the Cumulative Impacts Section of Chapter 4.

#### 4.2.3.1. Protected Plant Species

The project area is a previously disturbed area and managed for wildlife and recreation. Construction and disposal of removed sediment from the lake bottom consists of excavating material from the proposed construction sites with land-based equipment such as excavators, dozers and scrapers, stockpiling the material on site, and hauling the material to a designated on site spoil location located in an upland location. Construction staging areas would be located onsite on existing paved parking areas. In general, the contractor would confine all activities to areas defined by NGPC plans and specifications. Where practical, existing roads and the dewatered reservoir basin would be used for temporary access to the construction area. Access through wetlands, water crossings or treed areas would be avoided. Best management practices will be implemented to minimize potential impacts from fuels, lubricants, and hydraulic fluid from the equipment.

##### 4.2.3.1.1. Western Prairie Fringed Orchid

Affect Determination: *No affect*. There are no known records of western prairie fringed orchid at the Conestoga project. Prior to any construction activities, the NGPC will perform surveys within the area of the potential construction footprint to ensure no plants would be impacted by construction. If plants are found onsite, measures will be taken to avoid these areas and buffer the area from any potential indirect effects of construction with construction BMPs.

There is no anticipated increase of authorized storage capacity or surface area being included in this project. The total acre-feet after the project is estimated to be 1,885 which is well below the 1,964 acre-feet total of 2,472 and the NGPC's allocation of 2,660 acre-feet. Changes to Platte River hydrology due to the proposed project are anticipated to be negligible.

#### 4.2.3.2. Protected Fish & Wildlife Species

The current restoration plan is to remove about 310 acre-feet (13.5 million cubic feet) of sediment from the conservation/sediment pool. This represents 3.2 percent (310/9,567) of the gross storage in Conestoga and 16 percent (310/1,912) of the storage available in the conservation/sediment pool. The average monthly flow of the Platte River at Louisville, Nebraska during the March through June period ranges from 9,770 cfs in April to 11,900 cfs in June. Therefore, the depletion would represent from 0.019 percent to 0.024 percent of the flow in the river. Based on this reasoning it is anticipated that removing 310 acre-feet of sediment from Conestoga would have a negligible impact on Platte River flows and no affect on associated endangered species.

##### 4.2.3.2.1. Interior Least Tern and Piping Plover

Affect Determination: *No affect.* The project area is a previously disturbed area and managed for wildlife and recreation. There have been no known sightings at the proposed project site. There is no known habitat on site. There would be negligible hydrologic effect to the Platte River as a result of releasing water from the reservoir and recapturing water during refill. As mentioned previously, there is no anticipated increase of storage capacity beyond that which is previously authorized.

#### 4.2.3.2.2. Pallid Sturgeon

Affect Determination: *No affect.* The pallid sturgeon is a large river obligate, and as such, is not found on site and would not be affected by the proposed renovation project. In general, it is conceivable that the pallid sturgeon may be impacted by water depletions to the Platte River system; however, there is no anticipated increase of authorized storage capacity or surface area being included in this project. There has been an increase in flows to the downstream watershed as a result of sedimentation of the originally authorized project. Some portion of this net increase in downstream flows will continue as there will still be a net loss of storage in the project even after the rehabilitation.

#### 4.2.3.2.3. Salt Creek Tiger Beetle

Affect Determination: *No affect*. The Salt Creek tiger beetle is confined to eastern Nebraska saline wetlands and associated streams and tributaries of Salt Creek in the northern third of Lancaster County. The insect is believed to have disappeared from the southern margin of Saunders County. There have been no known sightings at the proposed project site. There is no known habitat on site, and there is no known potential habitat in the vicinity of the downstream areas that could be affected from minor short-term changes in flow.

### 4.2.4. Finding of Affect

After evaluating the potential effects of the proposed action, the Corps of Engineers concludes that the proposed actions described for the Conestoga Reservoir Maintenance and Aquatic Habitat Rehabilitation Project will have no effect to the interior least tern, piping plover, pallid sturgeon, western prairie fringed orchid, or to the Salt Creek tiger beetle.

## 4.3. Cultural Resources

In a letter dated March 28, 2014, the Nebraska SHPO concurred with the determination that no architectural or archeological cultural resources exist on the project area. It was recommended that construction workers involved in the project be aware that buried artifacts may be encountered. In the event that cultural resources are encountered during construction activities, construction would be stopped and the Corps' Missouri River Project Office would be contacted. Construction would not be resumed until approval has been received from the Nebraska SHPO.

## 4.4. Socioeconomics

Overall, the aesthetics of the Conestoga SRA would be enhanced due to the rehabilitation regarding water clarity, water quality, stabilized shorelines, and boat launch facilities. This should increase visitor satisfaction and be a social benefit to the surrounding communities. Shoreline stabilization and habitat structures will benefit the public by improving the fishery at the reservoir, along with additional recreational no-wake boating activities. Improving the water quality will provide future generations of Nebraskans the ability to experience a healthy body of water that includes an improved sport fish community and good quality fish habitat, which in turn provides Nebraska a substantial public health benefit.

### 4.4.1. Recreation

The preferred alternative would likely have minor short-term impacts to recreation due to construction activities interrupting outdoor recreational activities in areas where construction is occurring. The completion of the preferred alternative is anticipated to positively impact the Conestoga SRA by protecting and increasing water based recreational activities such as fishing, boating and wildlife viewing. After deposited sediments are removed, the sediment control structures are in place and the shoreline is stabilized, localized erosion will be minimized and water quality will improve. These actions should increase the emergent and submergent vegetation and increase water clarity and fish habitat. With the increased environmental benefits, it is anticipated that recreational day and angler use will increase. The potential for economic gain should increase not only for the Conestoga Reservoir and SRA, but for the communities of Denton, Emerald, and the greater Lincoln area. Implementation of the proposed project is projected to greatly improve the overall depth diversity, provide access to previously cut off bays, stabilize shorelines to improve angler access, and upgrade boat launch facilities. Improved water quality will promote aquatic vegetation and fish habitat. Reshaped and sloped banks will allow for easy foot traffic, while selected riprap armored structures will be designed with surfacing that also allows for similar foot traffic. The upgraded boat launch facility will have accessibility for handicap, disabled, and/or elderly visitors as a priority. The proposed project is mindful of the contextual setting and will maintain the rural nature of the existing landscape.

The No Action Alternative would likely have a small negative impact on the local economy due to the continued decline of reservoir quality and aesthetics making recreation less desirable.

### 4.4.2. Prime Farmland

No conversion of prime farmland is expected from the No Action Alternative and Preferred Alternative.

## 4.5. Environmental Justice

There would be no impacts to minority or low-income populations as a result of the No Action or the Preferred Alternative.

## 4.6. Air Quality

Minor increases in dust and equipment exhaust are expected during construction of the Preferred Alternative. These increases would be temporary and localized and would not be expected to be high enough to result in Lancaster County becoming a non-attainment area for any NAAQS parameters. Therefore, the proposed project would have no significant impacts on air quality.

The No Action Alternative would have no impact on air quality.

## 4.7. Noise

Short-term noise levels would be increased temporarily due to construction activities on the site. Noise impacts will be mitigated by restricting these activities to daylight hours. There are no sensitive receptors in the vicinity of the site and no long-term noise impacts are expected. Background noise levels would increase due to anticipated recreation use of the reservoir.

The No Action Alternative would have no short-term impact on noise.

## 4.8. Summary

The removal of deposited sediments will increase the overall depth diversity in the reservoir and improve water quality and water clarity, thus improving overall fish habitat. Shoreline stabilization structures will create fringe wetlands and be armored with rock riprap, providing high quality and unique habitat substrates necessary for healthy aquatic communities. Similarly, the wetlands will provide substrate for fish spawning and nursery areas. A number of species of birds, fish, mammals, reptiles, and amphibians are dependent on wetland habitat for breeding, foraging, and cover. Wetland conditions provide unique habitat for species that cannot survive elsewhere. The created wetland habitat environments will support these plants and animals, which in turn, support the interconnected aquatic and terrestrial communities.

The project will improve the water quality of the reservoir as well as decrease the turbidity and reduce the siltation rate. Decreases in turbidity will improve establishment and sustainability of aquatic vegetation and subsequently improve aquatic habitat. Wetland plants will aid in trapping sediments and retaining excess nutrients and other pollutants such as heavy metals. These functions are especially critical for the fish and other wildlife that inhabit these waters. Wetland plants will stabilize near shore areas and help remove pollutants by trapping the sediments and holding them. The slow velocity of water in wetlands allows the sediments to settle to the bottom where wetland plants hold the accumulated sediments in place.

## 4.1. Cumulative Impacts

In compliance with the NEPA and CEQ regulations, potential cumulative effects on the environment are required to be assessed. A cumulative effect is an effect on the environment that results from the incremental impact of the resulting action when added to other past, present, and reasonably foreseeable future actions. While actions may be insignificant independently and locally, cumulative impacts accumulate over time and can result in larger scope of impacts.

Nebraska has a significant amount of land that is irrigated using surface water diverted from streams and rivers. The hydrograph of pre-development peak flows from the Rocky Mountains was roughly three times higher than it is today (USACE, 2011). The United States Bureau of Reclamation (USBR) manages some surface irrigation and Nebraska also has private irrigation districts such as the Central Nebraska Public Power and Irrigation District (CNPPID). Irrigation development has caused declines of groundwater and surface levels in some areas of the state. The Platte River system has undergone extensive development for irrigation, power generation, and municipal water uses. The system today contains 15 major dams and reservoirs and provides water for about 3.5 million people. Existing facilities on the river provide hydroelectric power, irrigation water, flood control, recreation, and fish and wildlife habitat.

Kingsley and Keystone Dams - The reservoir behind Kingsley Dam, known as Lake McConaughy, is on the North Platte River near Ogallala, Nebraska. It holds about 1.8 million acre-feet of water storage in Lake McConaughy. Keystone Dam is a major diversion facility just below Kingsley Dam that directs cooling waters toward the Gerald Gentleman power plant. Several facilities are appurtenant to these projects and are operated in coordination with each other including Sutherland Reservoir, Maloney Reservoir, Johnson Lake, and related feeder canals. The project also supports five hydroelectric generation plants, two fossil fuel power generating plants, and about 120 miles of main canals for irrigation and water delivery. Both the CNPPID and Nebraska Public Power District (NPPD) own and operate separate dam and reservoir facilities within the Kingsley and Keystone Dams Project.

In addition to Lake McConaughy, the Interstate Canal on the North Platte River was constructed by the USBR. It runs 95 miles to Lake Alice and Lake Minatare Reservoirs northeast of Scotts Bluff, Nebraska. The 35-mile long High-Line Canal extends from Lake Alice to the southwest. The 43 mile Low-Line Canal extends from Lake Minatare southwest. The reservoirs are fed using water diverted at Whalen Diversion Dam through the Interstate Canal, which ends at Lake Alice. Lake Alice Reservoir is formed by two Lake Alice dams; the upper dam Lake Alice #1 at the west end of Lake Alice and the lower dam Lake Alice #2 at the east end. Lake Alice, with a surface area of 752 acres and nearly 6 miles of shoreline, lies almost entirely within the North Platte National Wildlife Refuge. As the reservoir is nearly drained during the non-irrigation season, there is no viable sport fishery in the lake.

The lower Platte River hydrology has been significantly altered due to the infrastructure and development projects constructed in the upper reaches of the basin. These projects include McConaughy Reservoir and USBR associated canals and other water diversion and groundwater withdrawal projects as described above. The loss of the high spring and early summer flood flows due to these projects has also significantly altered the sediment transport regime of the Platte River (USACE, 2011).

High flows and sediment transport are important for the tern, plover and pallid sturgeon. High spring flows may be particularly important for pallid sturgeon using the Platte River. Surveys have recorded eight of nine captures of pallid sturgeon in the Platte or Missouri Rivers near the mouth of the Platte River, all occurring during the May and June time frame. These eight of nine occurrences correspond with years when May-June flows in the lower Platte River were above normal for the recent period in the Platte River basin. In addition to altered high spring flows,

continuing water depletions reduce the width and/or depth of water surrounding tern and plover nest sites, and may increase predation and human disturbance. Increased depletions also allow for vegetation encroachment into nesting areas which also increase predation and human disturbance (Sidle, 1997).

Despite these projects and the changes to mean annual discharge and flood peaks in the lower Platte River, this area has managed to retain much of its braided channel morphology including shallow water and emergent sandbar habitats (USACE, 2011). In comparison to the above stated projects, the Corps believes refilling Conestoga Reservoir after project construction will have a negligible effect on the hydrology of the Platte River. Since Conestoga Reservoir has been in place since 1964, before the Endangered Species Act, the depletion has already occurred and in fact due to sedimentation these depletions have actually been reduced each year since inception. Further, the project is not bringing back the reservoir to original conditions. The Platte River would still have a gain of water resources from original project authorization and allotment.

The proposed project is consistent with a coordinated action being planned between government agencies, landowners, homeowners and other interested or concerned citizens or groups, to reduce sediment and nutrient loads and improve water quality in the Conestoga Reservoir through the application of soil and water conservation practices throughout the watershed. This Community Based Planning Process is a locally driven approach to solving water quality problems. The process utilizes technical experts and watershed stakeholders to develop local solutions to local problems. This process has been utilized to address water quality problems in several Nebraska watersheds. By involving local stakeholders in the development of goals, objectives, applicable management efforts, and the specific cost-share/incentive programs, the potential for success is much greater. The Community Based Planning Process is accomplished through a series of public meetings and watershed advisory group meetings between the Technical Advisory Group and Watershed Citizen's Advisory Group established for the project area.

Within the context of continuing development of the watershed, the preferred alternative will provide measures to cumulatively improve water quality. An example of this is the upstream sediment basins being periodically cleaned before sediment and nutrients reach the main body of the reservoir. While the Community Based Planning Process could be used to develop a watershed management plan under either alternative, the No Action Alternative would not provide the structural measures to reduce erosion and decrease the rate of sedimentation as would the proposed Preferred Alternative.

# Section 5. COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

This section describes pertinent environmental laws and regulations and serves to ensure the proposed project is in compliance.

## 5.1. Environmental Policy

**National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq**.
*In compliance.* Through NEPA [42 USC 4321 et seq.], federal agencies evaluate the environmental impacts of a proposed project and provide transparency to the project planning and decision-making process. The public is given opportunity to be involved in the environmental review and receive information about environmental impacts before any decisions are made on Federal actions regarding the proposed projects. If no significant impacts are determined, a Finding of No Significant Impact (FONSI) is prepared and NEPA compliance is fulfilled. The USACE has prepared this EA consistent with NEPA regulations and USACE planning policy and guidance. It was determined that this project would not have significant impacts on the environment and a FONSI was prepared for the proposed action. An Environmental Impact Statement (EIS) is not required.

## 5.2. Water Resources

**Clean Water Act (CWA), as amended. (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq**. *In compliance pending CWA 401 Water Quality Certification, 404 Permit, and National Pollutant Discharge Elimination System (NPDES) Stormwater permit.* The objective of this act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 U.S.C. 1251). The USACE regulates the discharges of dredge or fill material into waters of the United States pursuant to Section 404 of the Clean Water Act. This permitting authority applies to all waters of the U.S., including navigable waters and wetlands. The selection of disposal sites for dredged or fill material is done in accordance with Section 404(b)(1) guidelines, which were developed by the EPA (see 40 CFR Part 230). General permits are a type of authorization that is issued on a nationwide or regional basis for a category of activities. Activities that are authorized under general permits must be substantially similar in nature and cause only minimal individual or cumulative adverse affects on the aquatic environment. Nationwide permits are a type of general permit that authorize certain specified activities nationwide that have been authorized after meeting requirements of NEPA and extensive coordination with the EPA and other federal agencies. The proposed project meets the description of activities permitted under Nationwide Permit #27 for Aquatic Habitat Restoration, Establishment and Enhancement Activities and the recently issued General Permit 98-05 for dredging/filling activities associated with lake maintenance projects.

Federal limits on the amounts of specific pollutants that could be discharged to surface waters in order to restore and maintain the chemical, physical, and biological integrity of the water are governed by Clean Water Act [33 USC 1251 et seq., as amended], National Pollutant Discharge Elimination System. Discharge of stormwater resulting from construction activities that would disturb more than one acre of surface area requires an NPDES permit under Section 402 of the

CWA. The NDEQ authorize NPDES permits in the state of Nebraska. A Stormwater Pollution Prevention Plan (SWPPP) would be prepared prior to commencement of construction activities. The plan would address practices and measures required to control and reduce the amount of pollutants in stormwater runoff.

Section 401 of the CWA requires state agencies to certify that a project requiring a Federal permit to discharge complies with state water quality standards. Water quality certification would be obtained from the NDEQ prior to initiating the project.

## 5.3. Threatened and Endangered Species

**Endangered Species Act, as amended. 16 U.S.C. 1531, et seq**. *In compliance*. Section 7 (16 U.S.C. 1536) states that all Federal agencies shall, in consultation with the Secretary of the Interior, ensure that any action authorized, funded, or otherwise carried out by them do not jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of critical habitat.

Federal agencies are required to determine the effects of their actions on federally-listed endangered or threatened species and their critical habitats under ESA [16 USC 1531 et seq.]. Steps must be taken by the Federal agency to conserve and protect these species and their habitat, and to avoid or mitigate any potentially adverse impacts resulting from the implementation of the proposed project.

The USACE requested information on fish, wildlife, and federally-listed species in the vicinity of the proposed project area in a letter dated March 06, 2014. The USACE has determined that the proposed project would have "No Effect" on any listed threatened or endangered species. See Section 4.2.3 for a detailed description. Formal consultation would not be required for the proposed project as adverse impacts to listed species or their habitats are not anticipated.

## 5.4. Fish and Wildlife

**Fish and Wildlife Coordination Act (FWCA). 16 U.S.C., 661 et seq**. *In compliance*. The Fish and Wildlife Coordination Act (16 U.S.C. 661, et seq.) provides the basic authority for USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. The FWCA requires governmental agencies, including the USACE, to coordinate activities so that adverse affects of fish and wildlife will be minimized when water bodies are proposed for modification. Potential effects of this project on fish and wildlife have been coordinated with the USFWS and NGPC. The USFWS provided recommendations in a letter dated March 27, 2014 that were given full consideration.

**Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) as amended**. *In compliance*. The MBTA of 1918 is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possessing, transporting, and importing of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for

educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over-utilization. Executive Order 13186 (2001) directs executive agencies to take certain actions to implement the act. The clearing of vegetation will be avoided during the primary nesting season of migratory birds. A migratory bird survey would be conducted prior to vegetation clearing.

**Bald and Golden Eagle Protection Act, 16 U.S.C. Sec. 668, 668 note, 669a-668d**. *In compliance*. This act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions for the scientific or exhibition purposes, for religious purposes of Indian tribes, or for the protection of wildlife, agriculture or preservation of the species. The USACE has, and will continue to coordinate with the USFWS and the appropriate state agencies to avoid taking the species during construction activities, and will follow USFWS guidelines regarding eagle nests.

## 5.5. Prime Farmlands

**Farmland Protection Policy Act, 7 U.S.C. 4201. Et seq**. *In Compliance*. The Farmland Protection Act [7 CFR 658] minimizes the extent to which actions contribute to the unnecessary conversion of prime farmlands to nonagricultural use. The Natural Resources Conservation Service (NRCS) takes steps to ensure that prime farmlands lost to development are documented and provided to Congress in a yearly report. No impacts to farmland will occur as a result of the project.

## 5.6. Air and Noise Quality

**Clean Air Act, as amended, 42 U.S.C. 185711-7. et seq**. *In compliance*. The Federal policy to protect and enhance the quality of the air to protect human health and the environment is established under the Clean Air Act [42 USC 7401 et seq., as amended]. The purpose of this act is to protect public health and welfare by the control of air pollution at its source. Some temporary emission releases are expected during construction activities; however air quality is not expected to be impacted to any measurable degree. Impacts to air quality from the proposed project are considered insignificant. Therefore, no additional actions would be required for full compliance.

**Noise Control Act of 1972, 42 U.S.C. Sec. 4901 to 4918.**
*In compliance.* Noise emission levels at the project site would increase above current levels temporarily due to construction; however, appropriate measures would be taken to keep the noise level within compliance levels.

## 5.7. Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended June 17, 1999) requires Federal agencies to take into account the effects of their undertakings on historic properties. By definition, historic properties are eligible for or listed on the National Register of Historic Places (NRHP). Federal undertakings refer to any Federal involvement including funding, permitting, licensing, or approval. Federal agencies are required to define and

document the Area of Potential Effects (APE) for undertakings. The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.

The Advisory Council on Historic Preservation (ACHP) issues regulations that implement Section 106 of NHPA at 36 CFR Part 800, Protection of the Historic Properties. Section 106 sets up the review process whereby a Federal agency consults with the SHPO, Native American Tribes, and other interested parties including the public to identify, evaluate, assess effects, and mitigate adverse impacts on any historic properties affected by their undertaking. The Project Information Report (PIR) will be provided to the Nebraska State Historic Preservation Officer and appropriate federally-recognized Native American Tribes for comment in accordance with Section 106 of the NHPA during the public comment period.

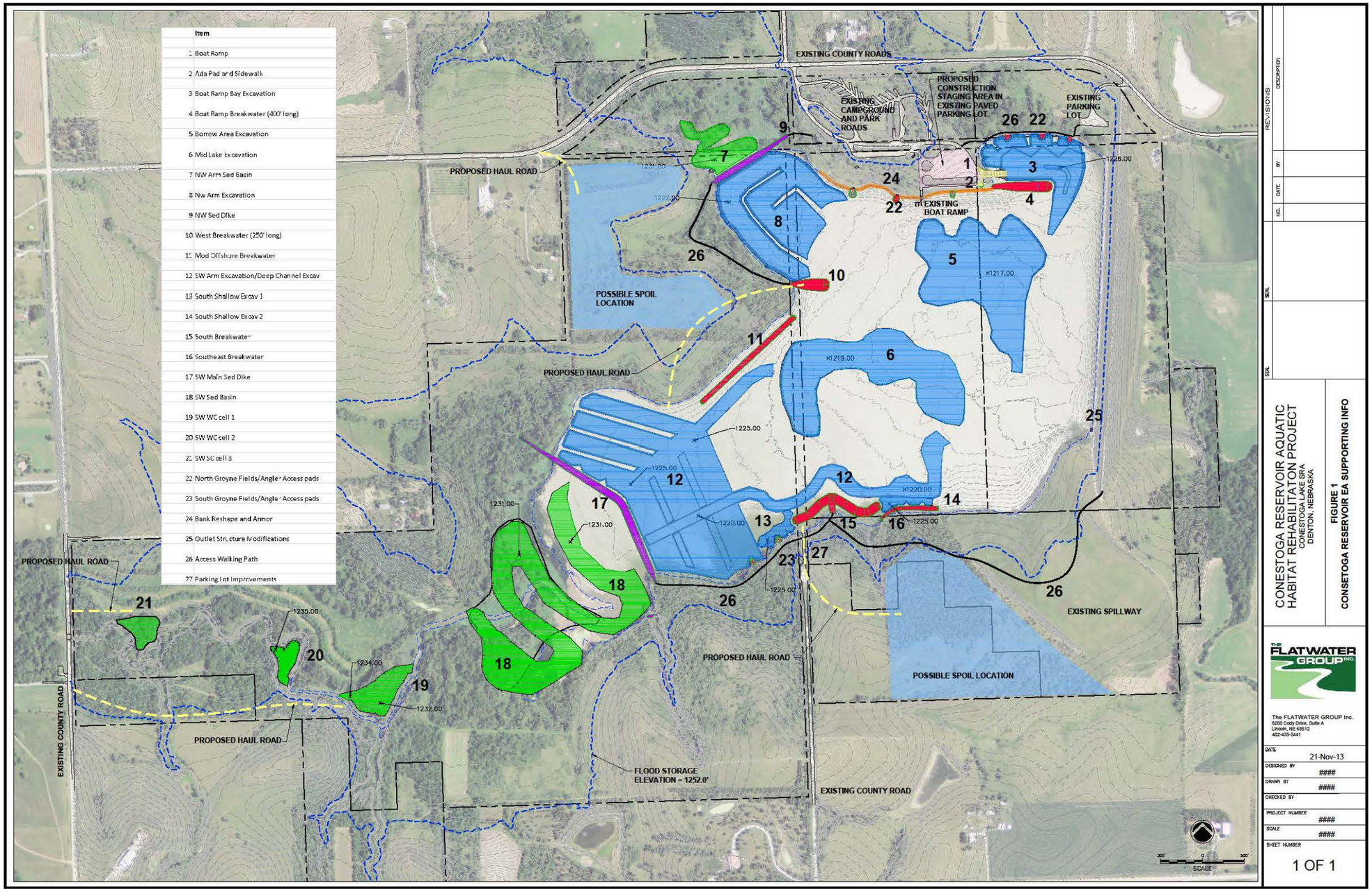
In a letter dated March 28, 2014 the Nebraska SHPO indicated that it is not likely historic properties would be affected by the proposed project.

**National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq**. *In compliance*. Federal agencies having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking shall take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places.

A cultural resources file search in March 2014 revealed no presence of recorded historic properties or cultural sites in the project area. In the event of an unanticipated discovery of cultural resources, work would be halted immediately and a district archeologist would be notified. The work would not continue until the area is inspected by a staff archeologist. If he or she determines that the discovery requires further consultation, the appropriate State Historic Preservation Office would be notified.

The USACE has determined that the proposed project would have No Potential to Affect Historic Properties. The potential for recovering cultural resources in an undisturbed context is extremely low. Caution will be exercised during all phases of work in order to minimize any disturbance to deeply buried cultural resources. The contractor will be explicitly warned about this possibility and instructed that if any resources are found, he or she shall stop work and contact the USACE immediately.

## APPENDIX A – PREFERRED ALTERNATIVE PLAN VIEW



# APPENDIX B OUTLET STRUCTURE DETAILED DESCRIPTION

**CONESTOGA RESERVOIR RISER MODIFICATION SUMMARY FOR EA - DRAFT**

Conestoga Dam and Lake Site #12 is a federal project designed and constructed by the US Army Corps of Engineers (USACE) – Omaha District. Construction was completed in 1963. The dam and lake are currently maintained by USACE. NGPC manages fisheries and park property. The dam is an earthen embankment, approximately 45 ft in height above the historic valley floor. The principal spillway for the dam includes a two-way covered riser located in the right abutment of the dam, with a 60" CSP principal spillway conduit that has been relined with a 42" RCP. The auxiliary spillway consists of an uncontrolled earthen spillway 750 ft in width. Normal pool elevation is 1233.0, with a high-level principal spillway outlet elevation of 1242.0, an auxiliary spillway crest of 1252.0 and a top of dam elevation of 1260.0.

The original USACE design memorandum (see excerpts included in **Attachment A**) and subsurface investigation in support of the design effort references the presence of a Dakota Sandstone strata in the uplands of the right abutment that appears to dip sharply downward as it enters the historic stream valley. The original designers were concerned with the potential preferential seepage path the Dakota layer provided and included mitigation consisting of a 3 ft impervious material cap topped by 1 ft of granular material along an extended area of the natural ground just upstream of the right abutment. The seepage mitigation is illustrated in SSR – Plate 1-27, and in Design Memorandum No. MSC – 7, Plate 30; both included in **Attachment B**. A sketch of the geologic profile in the vicinity of the riser is included in **Attachment C**.

The purpose of this memorandum is to describe the construction activities anticipated for the riser modification considering the presence of this Dakota layer to avoid dam safety impacts. In addition, an emergency action plan has been developed to describe actions to be taken in the event of high reservoir levels during construction to prevent dam safety impacts.

### 1.0 Description of Proposed Construction

The proposed construction sequence for the riser modification is described below. The construction contract with the contractor will stipulate construction of the riser modifications to occur in the November – March time frame to avoid the typical thunderstorm season. In addition, an internal milestone will be included in the construction contract schedule to limit the length of exposure time of construction activities near the riser.

1. A single piezometer will be installed outside the limits of the dam embankment and the proposed excavation. The piezometer will extend through the native material and have slotted openings in the Dakota formation to measure pore pressures prior to the initiation of construction activities. The piezometer will be 6 inches in diameter and be screened a length of 20 feet. This will provide the contractor with an opportunity to pump water from the piezometer should the Dakota formation need to be mechanically depressurized.
2. Reservoir pool levels will be drawn down and maintained below elevation 1215.0 ft. Temporary mechanical pumping will be required to lower and maintain the reservoir below elevation 1228.0 ft.
3. The water level in the Dakota formation and the reservoir level will be monitored on daily basis during and after reservoir draw down.
4. Following reservoir drawdown and once the water level in the Dakota formation and the reservoir level are within 1 foot of each other, the front face of the riser where the penetration for the new 24" ductile iron pipe (DIP) will be excavated using open cut methods with maximum cut slopes of 2H:1V. Excavation will occur under observation of the Engineer and materials will be selectively stockpiled based on material classification. Should the Dakota formation be encountered in the excavation, USACE will be notified.
5. The riser penetration will be constructed (see Attachment D for detail) and cast iron flange-mounted sluice gate installed.
6. The initial lengths of drawdown pipe will be placed and backfilled. The seepage mitigation over the Dakota formation (3 ft of impervious material and 1 ft of granular material) will be restored to the original extents as shown in the as-builts and observed in the field.

7. Excavation, placement and backfilling operations for the remaining sections of drawdown pipe.
8. Upon completion of the backfilling operation, the piezometer will be abandoned in accordance with NDEQ requirements.

All earthwork for the principal spillway modification will meet the requirements of **EM 1110-2-1911.**

**2.0 Emergency Action Plan and Mitigation Measure Requirements**

The construction of the riser modifications will take place immediately adjacent to the Conestoga Dam embankment. Construction and associated earthwork for the riser modification generally involves the construction of the following components adjacent to the dam embankment:

- The excavation and construction of a new penetration at the base of the existing riser
- The excavation, construction and backfilling of a new drawdown pipe extending into the reservoir from the riser

**4.1 Construction Requirements**

Preparation of Emergency Action Plan

Prior to construction, the General Contractor shall prepare and follow an Emergency Action Plan (EAP) which will address the requirements presented in this document and the requirements and procedures for high water conditions during construction. The EAP shall include emergency contact information, including cell phone numbers of the project manager, project superintendent and foreman. The names and numbers provided for the Contractor's personnel shall be available 24 hours a day, 7 days a week. The General Contractor shall complete the Emergency Action Plan at least 15 days prior to any excavation in the vicinity of the dam embankment.

Construction Activities

The work required for the construction of the principal spillway modifications will involve the excavation of the material on the reservoir side of the existing riser, construction of a penetration at the base of the new riser to facilitate a new drawdown pipe, and construction of a new drawdown pipe. The reservoir level will be lowered and maintained below at elevation 1215.0 during construction activities.

The General Contractor shall ensure that the proposed construction will not involve excavation of material in the vicinity of the dam embankment except as shown in the approved plans and specifications.

Geotechnical Information

Geotechnical information for the project is available in the following documents:

"Design Memorandum No. MSC-7 – Dam and Reservoirs Site 11 & 12," prepared by USACE, dated May 1962.

Pre-Construction Meeting

A pre-construction meeting with the Engineer and the General Contractor will be held within 30 days of the Notice to Proceed. The purpose of the meeting is to discuss the proposed construction and its impacts on the dam embankment, as well as the requirements of the Emergency Action Plan to be prepared by the Contractor.

**4.2 Contractor's Emergency Action Plan**

Contents of EAP

The contents of the Contractor's EAP will present a detailed staging plan and all provisions in the Contract Documents so that the integrity of the dam embankment and its ability to store runoff without exposing the Dakota formation as a preferential seepage path will be maintained throughout the entire duration of construction for the riser modifications. The Contractor's EAP shall be submitted at least 15 days prior to construction within the riser area.

The proposed construction will be performed during anticipated non-flood periods (from November 1 to March 1). The potential does exist for reservoir levels to rise to the level of the Dakota formation during the proposed construction and provisions will be in place to address this potential.

Requirements and Procedures
The following requirements and procedures shall be in place to address an emergency situation:

- Daily Monitoring
  The water level in Conestoga Lake shall be monitored on a daily basis by the General Contractor. The extended forecast of precipitation events shall also be monitored.
- Monitoring Agencies
  National Weather Service forecasts for the area surrounding the Conestoga Dam and Reservoir Site #12.
- Stop Work Conditions
  Construction operations will cease in the event the reservoir levels rise 5 feet (1220.0 ft); or within 5-ft of any exposure of the Dakota formation, whichever is lower.

  All exposures of the Dakota formation open shall be backfilled and compacted using the same sequence of materials as encountered in the original excavation. The backfilling of excavations shall be completed within a minimum of 12 hours. The Contractor may continue to work if there are no exposures of the Dakota formation, the reservoir elevations have started to decline, and there are no indications of distress as determined the Engineer and USACE.

List of Construction Equipment
The General Contractor shall provide in the EAP a list of all construction equipment that will be present throughout the duration of construction within the critical area.

Emergency Raising of Levee and Filling of Excavation
The Contractor will be required to provide and maintain a backhoe, bulldozer and other suitable equipment on-site at all times to fill in and compact backfill and to close the excavations as needed. The excavated material shall be stockpiled at a readily accessible location and at a safe distance away from the excavation. Moderate compactive effort with a dozer or compactor will be required during the emergency backfilling of excavations. The proposed method of backfilling the excavations (compaction equipment, lift thickness) shall be submitted at least 15 days prior to the commencement of the excavation. The Contractor shall backfill the excavations when directed by the Engineer or the USACE.

Removal and Relocation
All equipment, construction materials and stockpiled soils may require removal in the event of high water and relocated to the landside of the dam during high water events.

Notification of Ceased Construction
The Engineer and USACE representatives will notify the Contractor when the decision has been made to cease construction operations. The Engineer and the USACE representatives will be notified prior to resumption of construction.

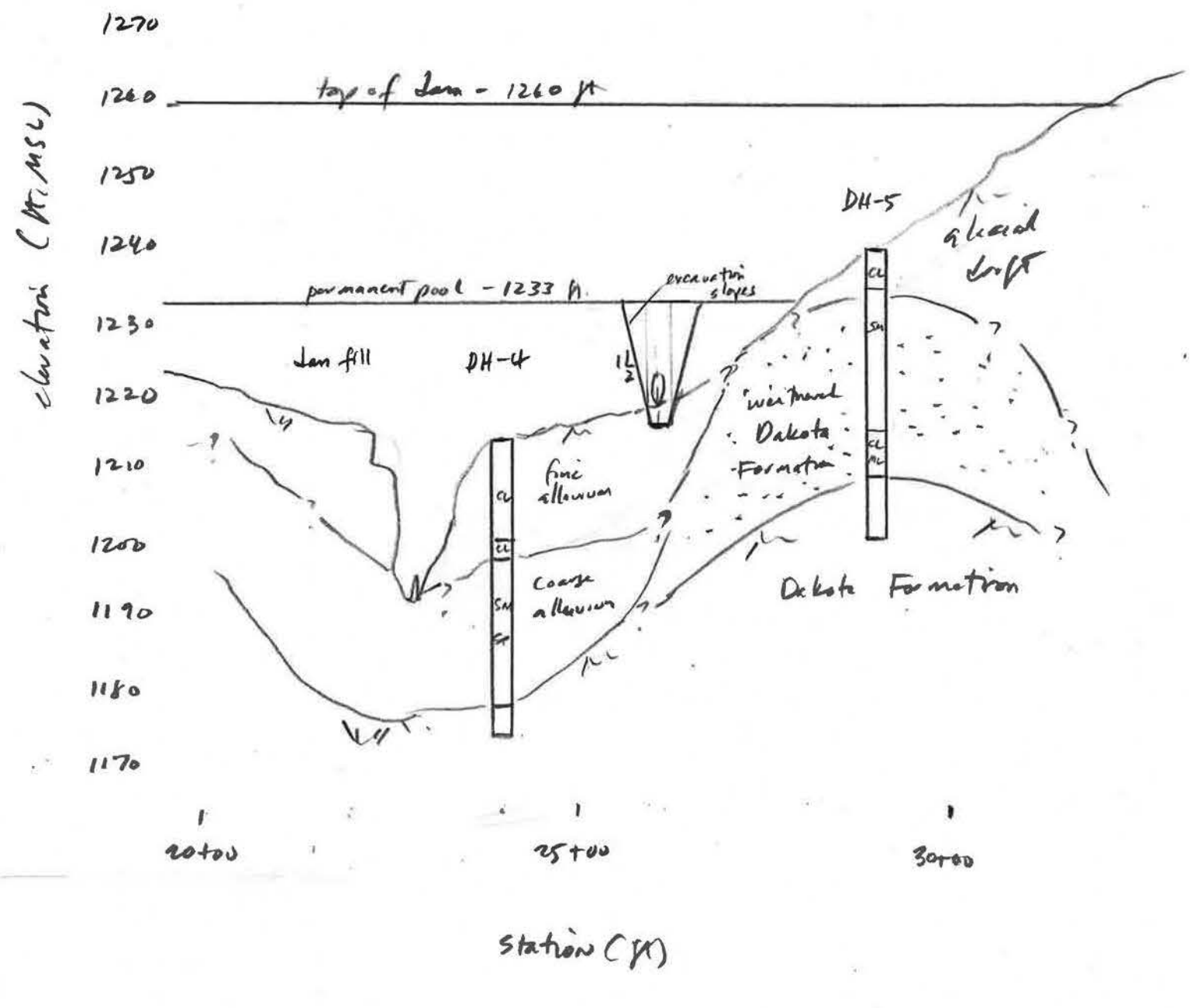
**Attachment C**

**Sketch of Geologic Profile**

HDR | ONE COMPANY *Many Solutions*

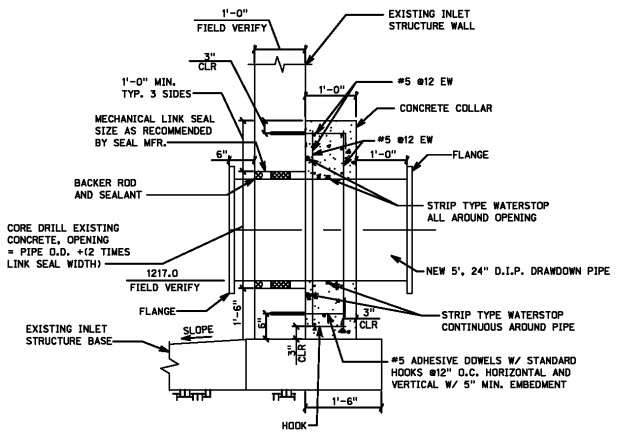
| | | | |
|---|---|---|---|
| Project: USACE Dam Site 12 | Computed: PDV | Date: 3-19-14 | |
| Subject: | Checked: | Date: | |
| Task: | Page: 1 | of: 1 | |
| Job #: | No: | | |

Generalized Subsurface Profile



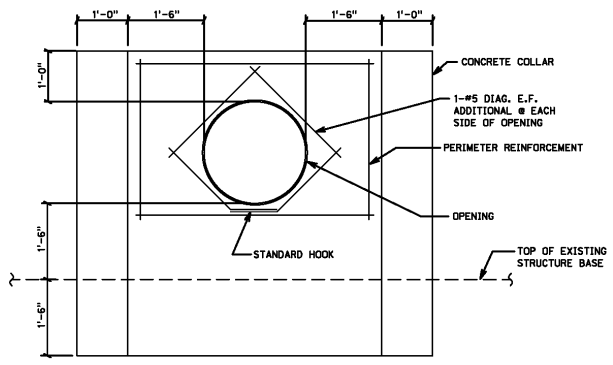
**Attachment D**

**Detail of Proposed Riser Penetration**




1 DRAWDOWN PIPE PENETRATION AT EXISTING WALL

SCALE: 1" = 1'-0"




C:\Users\csiebben\Documents\CONESTOGAANDETAIL SHEETS.dwg, Layout1, 3/20/2014 5:43:34 PM, csiebben

CONESTOGA DAM AND LAKE
DRAWDOWN REPAIRS
LANCASTER COUNTY, NEBRASKA

Designed
Drawn
Checked
Approved
Date

HDR

CAD file:

Drawing No.

PIPE PENETRATION DETAILS

x of x

**APPENDIX C AGENCY CORRESPONDENCE**

Nebraska
STATE HISTORICAL SOCIETY

7 Apr 14

28 March 2014

David A. Brandon
Corps of Engineers
1616 Capitol Ave.
Omaha, NE 68102-4901

Re: Conestoga Reservoir Rehabilitation
Lancaster Co.
H.P. #1403-090-01

Dear Mr. Brandon:

A review of our files indicates that the referenced project does not contain recorded historic resources. It is our opinion that no survey for unrecorded cultural resources will be required. Your undertaking, in our opinion, will have no effect for archaeological, architectural or historic properties. This review does not constitute the opinions of any Native American Tribes that may have an interest in Traditional Cultural Properties potentially affected by this project.

There is, however, always the possibility that previously unsuspected archaeological remains may be uncovered during the process of project construction. We therefore request that this office be notified immediately under such circumstances so that an evaluation of the remains may be made, along with recommendations for future action.

Sincerely,

Terry Steinacher
H.P. Archaeologist

Concurrence:

Robert Puschendorf
Deputy NeSHPO

1500 R Street
PO Box 82554
Lincoln, NE 68501-2554

fx: (800) 833-6747
(402) 471-3270
fx: (402) 471-3100
www.nebraskahistory.org

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

March 27, 2014

**FWS NE: 2014-183**

Scott Flash
Department of the Army
Corps of Engineers, Omaha District
1616 Capitol Avenue
Omaha, NE 68102-4901

**RE: Aquatic Habitat Rehabilitation Project, Conestoga Reservoir, Lancaster County, Nebraska**

Dear Mr. Flash:

This responds to your March 6, 2014, request for comments and concurrence from the U.S. Fish and Wildlife Service (Service) regarding the subject project. The Service has responsibility for the conservation and management of fish and wildlife resources for the benefit of the American public under the following authorities: 1) Endangered Species Act (ESA); 2) Fish and Wildlife Coordination Act (FWCA); 3) Bald and Golden Eagle Protection Act (Eagle Act); and 4) Migratory Bird Treaty Act (MBTA). Compliance with all of these statutes and regulations are required for compliance with the National Environmental Policy Act.

**ENDANGERED SPECIES ACT**

In accordance with section 7 of ESA, the Service has determined that the following federally listed species may occur or be affected by the proposed action:

| Listed Species | Expected Occurrence |
|---|---|
| Interior least tern (*Sterna antillarum athalassos*) | Migration, nesting |
| Piping plover (*Charadrius melodus*) | Migration, nesting |
| Pallid sturgeon (*Scaphirhynchus albus*) | Lower Platte River and Missouri River |

| | |
|---|---|
| Western prairie fringed orchid (*Platanthera praeclara*) | Tall-grass prairie and wet meadows |

Least Tern and Piping Plover

The least tern, federally listed as endangered, and the piping plover, federally listed as threatened, nest on unvegetated or sparsely vegetated sandbars in river channels. The nesting season for the least tern and piping plover is from April 15 through August 15. Least terns feed on small fish in the river and piping plovers forage for invertebrates on exposed beach substrates. The least tern and the piping plover may be impacted by water depletions to the Platte River system.

Pallid Sturgeon

The pallid sturgeon was officially listed as an endangered species on September 6, 1990. In Nebraska, the pallid sturgeon is found in the Elkhorn, Missouri, Niobrara, and Platte Rivers. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that provided macrohabitat requirements for the pallid sturgeon, a species that is associated with diverse aquatic habitats. These habitats historically were dynamic and in a constant state of change due to influences from the natural hydrograph, and sediment and runoff inputs from an enormous watershed spanning portions of ten states. Navigation, channelization and bank stabilization, and hydropower generation projects have caused the widespread loss of this diverse array of dynamic habitats once provided to pallid sturgeon on the Missouri River, resulting in a precipitous decline in populations of the species. The pallid sturgeon may be impacted by water depletions to the Platte River system.

Western Prairie Fringed Orchid

The western prairie fringed orchid, federally listed as threatened, inhabits tall-grass calcareous silt loam or sub-irrigated sand prairies. Declines in western prairie fringed orchid populations have been caused by the drainage and conversion of its habitats to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and the application of herbicides. Populations are known to occur in Boone, Cherry, Dodge, Garfield, Grant, Greeley, Hall, Holt, Lancaster, Loup, Madison, Otoe, Pierce, Rock, Saline, Sarpy, Seward, and Wheeler counties, and may occur at other sites in Nebraska. This plant may also be impacted by alterations to the hydrology of sub-irrigated wetland habitat areas along the Platte River resulting from depletions to the Platte River system.

## DEPLETIONS TO THE LOWER PLATTE RIVER

Since 1978, the Service has concluded in all of its section 7 consultations on water projects in the Platte River basin, that the Platte River ecosystem is in a state of jeopardy and any federal action resulting in a water depletion to the system will further or continue the deterioration of already stressed habitat conditions. Due to the cumulative effect of many water depletion projects in the Platte River basin, the Service considers any depletion of flows (direct or indirect) from the Platte River system to be significant. Consequently, the Service has adopted a jeopardy standard for all section 7 consultations on federal actions that result in water depletions to the Platte River system. The Service considers the Platte River and its associated wetland habitats to be resources of national and international importance.

Because the proposed reservoir improvements will be located near a tributary to Salt Creek, the Service is concerned that the proposed action could result in an instream flow depletion to the lower Platte River, which would impact federally listed species. The Service is primarily concerned about any increased storage resulting from the proposed action, and requests that an engineering analysis be performed regarding the net effect (in terms of acre-feet) that may be depleted during each month on an average annual basis over the life of the project. It is further requested that the lead federal agency provide the results of that analysis in support of its determination of affect for consideration by the Service in partial fulfillment of the section 7 consultation process as outlined in this letter.

Affect/No Affect Determination

The Service recommends that the lead federal agency consider the information provided above with regard to making its assessment of potential impacts of the proposed project on federally listed species and designated critical habitat, and in making the "affect/no affect determination." Further, the Service recommends that the lead federal agency not limit its consideration of affect to just the above project information, but other potential effects as they become apparent during the course of other project studies and/or project development and modification.

In addition, all federally listed species are also State-listed under the Nebraska Nongame and Endangered Species Conservation Act. Further, there may be State-listed species affected by the proposed project that are not federally listed. To determine if the proposed project may affect State-listed species, the Service recommends that the project proponent contact Michelle Koch, Nebraska Game and Parks Commission, 2200 N. 33rd Street, Lincoln, NE 68503-0370, (402) 471-5438.

**REVIEW, COMMENTS, AND RECOMMENDATIONS ON THE PROPOSED PROJECT ACTION UNDER OTHER FISH AND WILDLIFE STATUTES**

**Fish and Wildlife Coordination Act**

The FWCA requires consultation with the Service and State fish and wildlife agency for the purpose of giving equal consideration to fish and wildlife resources in the planning, implementation, and operation of federal and federally funded, permitted, or licensed water resource development projects. The FWCA requires that federal agencies take into consideration the effect that water related projects may have on fish and wildlife resources, to take action to avoid impact to these resources, and to provide for the enhancement of these resources.

If wetlands or streams will be impacted by the proposed project, a Department of the Army permit from the U.S. Army Corps of Engineers may be needed. The Service will provide FWCA comments pursuant to a permit application. The Service recommends that impacts to wetlands, streams, and riparian areas be avoided or minimized, in accordance with the Section 404(B)(1) Guidelines of the Clean Water Act (Guidelines). For projects that do not require access or proximity to, or location within aquatic environments (i.e., non-water dependant project) to fulfill its basic project purpose, it is assumed that practicable alternatives exist that

would cause less damage to aquatic resources than projects that are located in aquatic ecosystems. In addition to determining the least environmentally damaging practicable alternative, 40 CFR Part 230.10(a) of the Guidelines also states, ... no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."

**Bald and Golden Eagle Protection Act**

The Eagle Act provides for the protection of the bald eagle *(Haliaeetus leucocephalus)* and golden eagle (*Aquila chrysaetos*). The golden eagle is found in arid, open country with grassland for foraging in western Nebraska and usually near buttes or canyons which serve as nesting sites. Golden eagles are often a permanent resident in the Pine Ridge area of Nebraska. Bald eagles utilize mature, forested riparian areas near rivers, streams, lakes, and wetlands and occur along all the major river systems in Nebraska. The bald eagle southward migration begins as early as October and the wintering period extends from December-March. Additionally, many eagles nest in Nebraska from mid-February through mid-July. Disturbances within 0.5-mile of an active nest or within line-of-sight of the nest could cause adult eagles to discontinue nest building or to abandon eggs.

Both bald and golden eagles frequent river systems in Nebraska during the winter where open water and forested corridors provide feeding, perching, and roosting habitats, respectively. The frequency and duration of eagle use of these habitats in the winter depends upon ice and weather conditions. Human disturbances and loss of wintering habitat can cause undue stress leading to cessation of feeding and failure to meet winter thermoregulatory requirements. These effects can reduce the carrying capacity of preferred wintering habitat and reproductive success for the species. To comply with the Eagle Act, it is recommended that the project proponent determine whether the proposed project would impact bald or golden eagles. If it is determined that either species could be affected by the proposed project, the Service recommends that the project proponent notify this office as well as the Nebraska Game and Parks Commission for recommendations to avoid adverse impacts to bald and golden eagles.

**Migratory Bird Treaty Act**

Under the MBTA (16 U.S.C. 703-712: Ch. 128 as amended) construction activities in grassland, roadsides, wetland, riparian (stream), shrubland and woodland habitats, and those that occur on bridges or culverts (e.g., which may affect swallow nests on bridge girders) that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Nebraska occurs during the period of April 1 to July 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15, whereas sedge wrens, which occur in some wetland habitats, normally nest from July 15 to September 10.

The Service recommends that the project proponent avoid removal or impacts to vegetation during primary nesting season of breeding birds. In the event that construction work cannot be

avoided during peak breeding season, the Service recommends that the project manager (or construction contractor) arrange to have a qualified biologist conduct an avian pre-construction risk assessment of the affected habitats (grassed drainages, streamside vegetation) to determine the absence or presence of breeding birds and their nests. Surveys must be conducted during the nesting season. Breeding bird and nesting surveys should use appropriate and defensible sampling designs and survey methods to assist the proponent in avoiding the unnecessary take of migratory birds. The Service further recommends that field surveys for nesting birds, along with information regarding the qualifications of the biologist(s) performing the surveys, be thoroughly documented and that such documentation be maintained on file by the project proponent (and/or construction contractor) until such time as construction on the proposed project has been completed.

The Service requests that the following be provided to this office prior to the initiation of the proposed project if the above conditions occur.

a) A copy of any survey(s) for migratory birds done in conjunction with this proposed project, if any. The survey should provide detail in regard to survey methods, date and time of survey, species observed/heard, and location of species observed relative to the proposed project site.

b) Written description of specific work activity that will take place in all proposed project areas.

c) Written description of any avoidance measures that can be implemented at the proposed project site to avoid the take of migratory birds.

We appreciate the opportunity to review and comment on this proposed project. Should you have questions, please contact Mr. Jeff Runge within our office at jeff_runge@fws.gov or (308) 382-6468, extension 22.

Sincerely,

Eliza Hines
Acting Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Michelle Koch)
NGPC; Lincoln, NE (Attn: Carey Grell)