

FINAL PROJECT BOUNDARY REVIEW REPORT

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT

FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 1417

DECEMBER 2020

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1.0 Introduction

1.1 Purpose

Central operates Project No. 1417 under license issued by FERC on July 29, 1998. Article 421 of the FERC License requires Central to develop a Land and Shoreline Management Plan (LSMP).¹

The LSMP includes a “Plan for Reviewing FERC Boundary” (Boundary Review Plan).²

The Boundary Review Plan states in part:

The purposes of review are (1) to assure that adequate lands are controlled to carry out Project operational functions, including public access to Project lands and waters for recreational purposes; and (2) to determine the extent to which the Project boundary could be changed to exclude lands used for residential or agricultural purposes without compromising Project operational needs. Based on the results of the review, if necessary, Central will propose changes in the Project boundary to the Federal Energy Regulatory Commission (FERC).³

This report describes Central’s review of, and recommended changes to, the Project boundary.

¹ Article 421 of the Project License requires that “the licensee shall file for Commission approval a plan to manage the lands and shorelines of the Project”. The current LSMP dated December 7, 2009 was approved by FERC on April 11, 2014.

² Central’s LSMP, approved by FERC on April 11, 2014 (147 FERC ¶ 62,031), Appendix D, Plan for Reviewing FERC Boundary.

³ Appendix D, LSMP.

1.2 Regulatory Requirements and Guidance

Central considered the following FERC regulations, guidance, and other documents in conducting the Boundary Review:

- Title 18, Chapter I, Subchapter B, Part 4 of the Code of Federal Regulations, including
 - 18 CFR § 4.201 regarding contents of a license amendment application, and
 - 18 CFR § 4.38 regarding consultation requirements, and
 - 18 C.F.R. § 4.41(h)(2) regarding Project boundaries
- FERC'S "Compliance Handbook" (FERC-OEP-DHAC, 2015), including
 - § 2.7 regarding amendments to licenses, and
 - § 4.1 regarding shoreline management
- FERC's "Guidance for Shoreline Management Planning at Hydroelectric Projects" (FERC-OEP, July 2012)
- Central's FERC License, issued July 29, 1998 (84 FERC ¶ 61,079), including
 - Standard Form L-3 Article 5 regarding Central's obligation to acquire and retain fee title or use rights necessary or appropriate for the construction, maintenance, and operation of the Project, and
 - Article 421 regarding Central's LSMP
- Central's current LSMP, approved by FERC on April 11, 2014 (147 FERC ¶ 62,031), including
 - Appendix D, Plan for Reviewing FERC Boundary

- Central’s annual boundary review status reports to FERC⁴
- Various correspondence between Central and FERC relating to the above items.

1.3 Project Description

Central is a political subdivision of the State of Nebraska, established pursuant to state law⁵ for purposes of providing public power and irrigation water deliveries. Central’s responsibilities include irrigation, power generation, public recreation, shoreline and land use management, natural resource conservation, environmental protection, and public land stewardship. Central operates the Kingsley Dam Project, FERC Project No. 1417, licensed in 1998 subject to the Federal Power Act.

The Project consists of two distinct segments; the Lake McConaughy area, and the Supply Canal system. The general location map of the Project is provided in Figure 1.

Lake McConaughy Area

Lake McConaughy, impounded by Kingsley Dam, is Central’s primary storage reservoir, located on the North Platte River in western Nebraska. Lake McConaughy has a surface area of approximately 30,500 acres and is roughly 21 miles long at full pool. The Kingsley Hydropower plant is located within the southern end of the dam. Lake Ogallala is the

⁴ Annual status reports filed with FERC: 01/22/2003, 07/26/2004, 08/01/2005, 08/03/2006, 08/06/2007, 08/04/2008, 07/01/2009, 10/08/2010, 07/19/2011, 07/20/2012, 06/19/2013, 07/18/2014, 07/17/2015, 07/28/2016, 07/28/2017, 07/31/2018, 07/31/2019, 07/28/2020.

⁵ In accordance with Nebraska Revised Statutes Chapter 70, Article 6.

tailwater reservoir below the dam. Lake McConaughy and Lake Ogallala provide diverse and popular public recreational opportunities. Fishing, camping, boating, and other recreational uses, as well as winter bald eagle viewing are popular activities on the lakes. A map of the Lake McConaughy area is provided in Figure 2.

Supply Canal System

Central's Supply Canal diverts water from the Platte River at the Diversion Dam, located at the confluence of the North Platte River and the South Platte River, approximately 50 miles downstream from Lake McConaughy. The 75-mile-long Supply Canal flows through 27 canyon lakes⁶ of varying sizes, and three hydroelectric power plants. At the end of the Supply Canal water is either delivered to Central's irrigation service area or returned to the Platte River. The sizes of the Supply Canal lakes vary from less than one surface acre to approximately 2,500 surface acres, with the two largest being Johnson Lake (approximately 2,500 acres) and Jeffrey Lake (approximately 575 acres). The types and intensities of uses vary significantly from location to location throughout the Supply Canal system. The Supply Canal lakes and hydropower plants, from upstream to downstream, are:

- Moran Canyon
- Box Elder Canyon

⁶ All "lakes" on Central's Project are actually artificial impoundments (i.e. reservoirs), but are commonly referred to as "lakes" by Central and the general public.

- Cottonwood Canyon
- Target Canyon
- Snell Canyon
- Jeffrey Regulating Reservoir (a.k.a Jeffrey Lake)
- Jeffrey Hydropower Plant (a.k.a Jeffrey Hydro)
- Hiles Canyon
- Midway Lake(s)
- Gallagher Canyon
- Plum Creek Lake
- Johnson Regulating Reservoir (a.k.a Johnson Lake)
- Johnson No. 1 Hydropower Plant (a.k.a Johnson No. 1 Hydro, J-1 Hydro, or J-1)
- Phillips Lake(s)
- Knapple
- Johnson No. 2 Hydropower Plant (a.k.a Johnson No. 2 Hydro, J-2 Hydro, or J-2)

A map of the Supply Canal system is provided in Figure 3.

The Project provides numerous recreational, residential, and economic benefits. It also includes diverse habitats that support plant, animal, and fish species, including species designated as threatened and endangered by state and federal agencies. The Project is increasingly attractive as a place for outdoor recreation, home sites, and the support services associated with these activities.

Continued regional growth and development and the gravitation of homeowners to waterside areas place increasing demands on the lands and waters of the Project. These lands and waters are a unique and valuable resource that, if managed effectively, can continue to provide hydropower, irrigation, recreation, and community living benefits to future generations in the region. To accomplish this, Central must give close attention to preserving shore lands with unique or special qualities, to properly manage and conserve the natural resources within the Project boundary, and to protect and balance different uses so the public can access and enjoy them in the years to come.

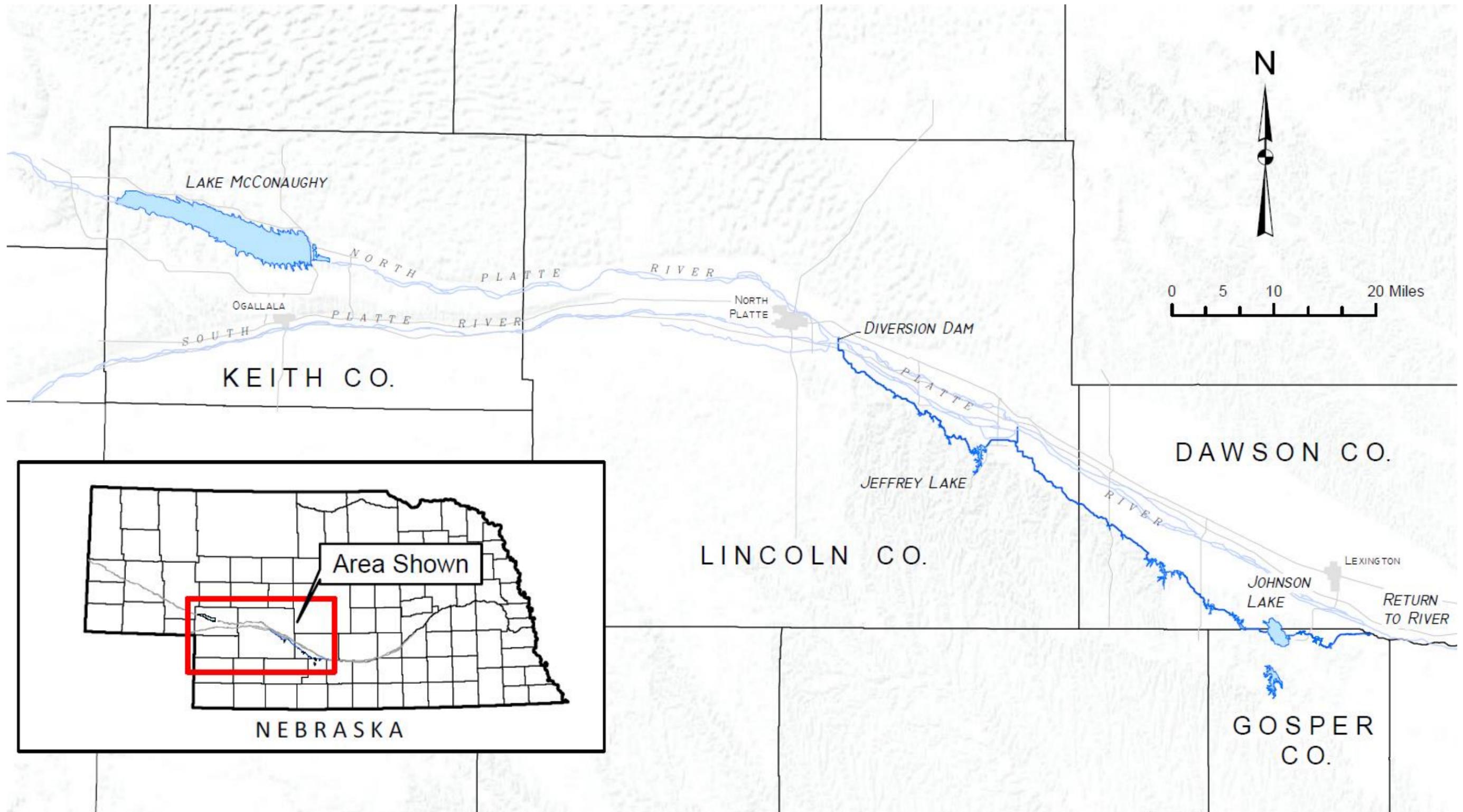


Figure 1. Project Location Map

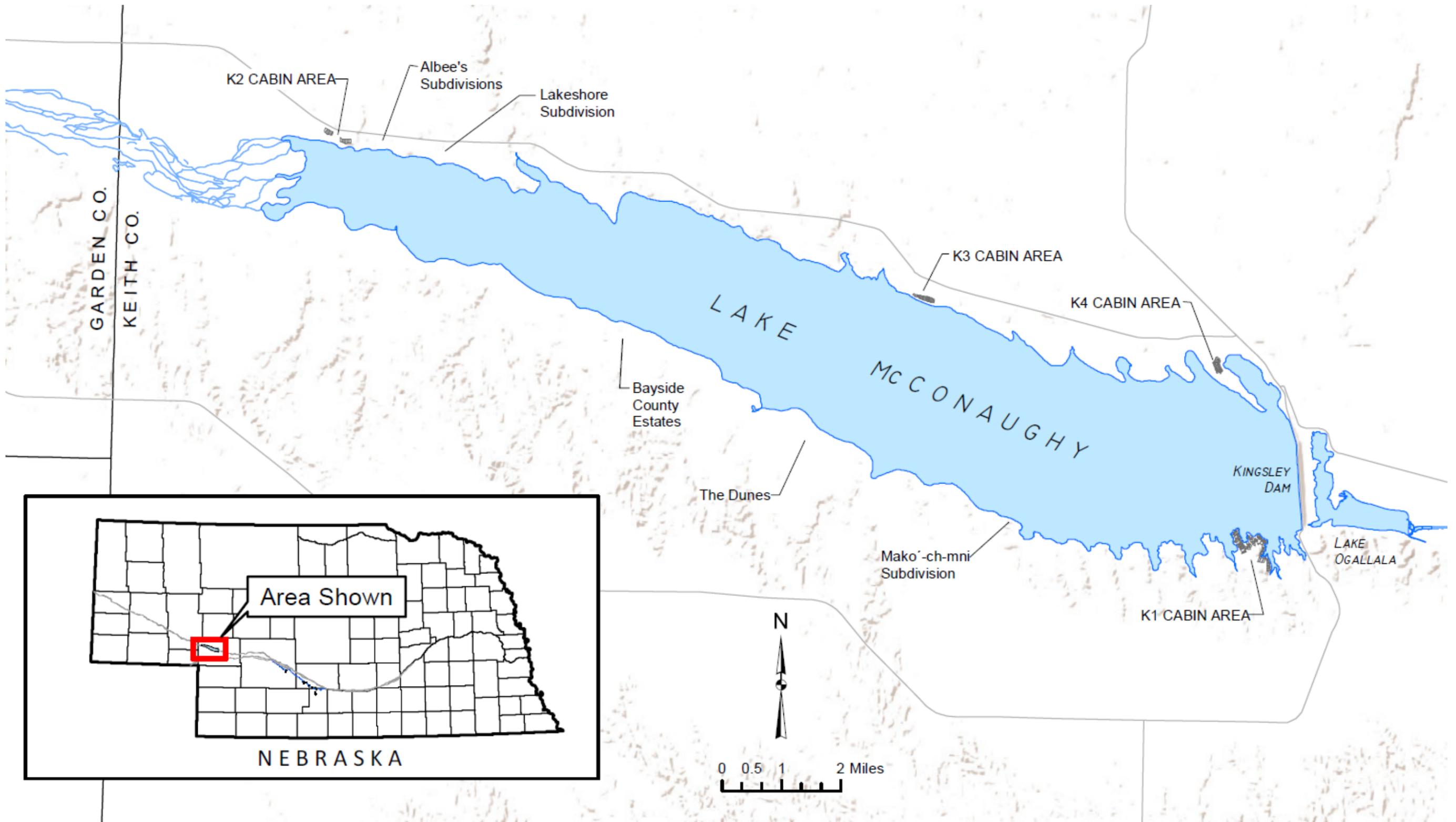


Figure 2. Lake McConaughy Area Map

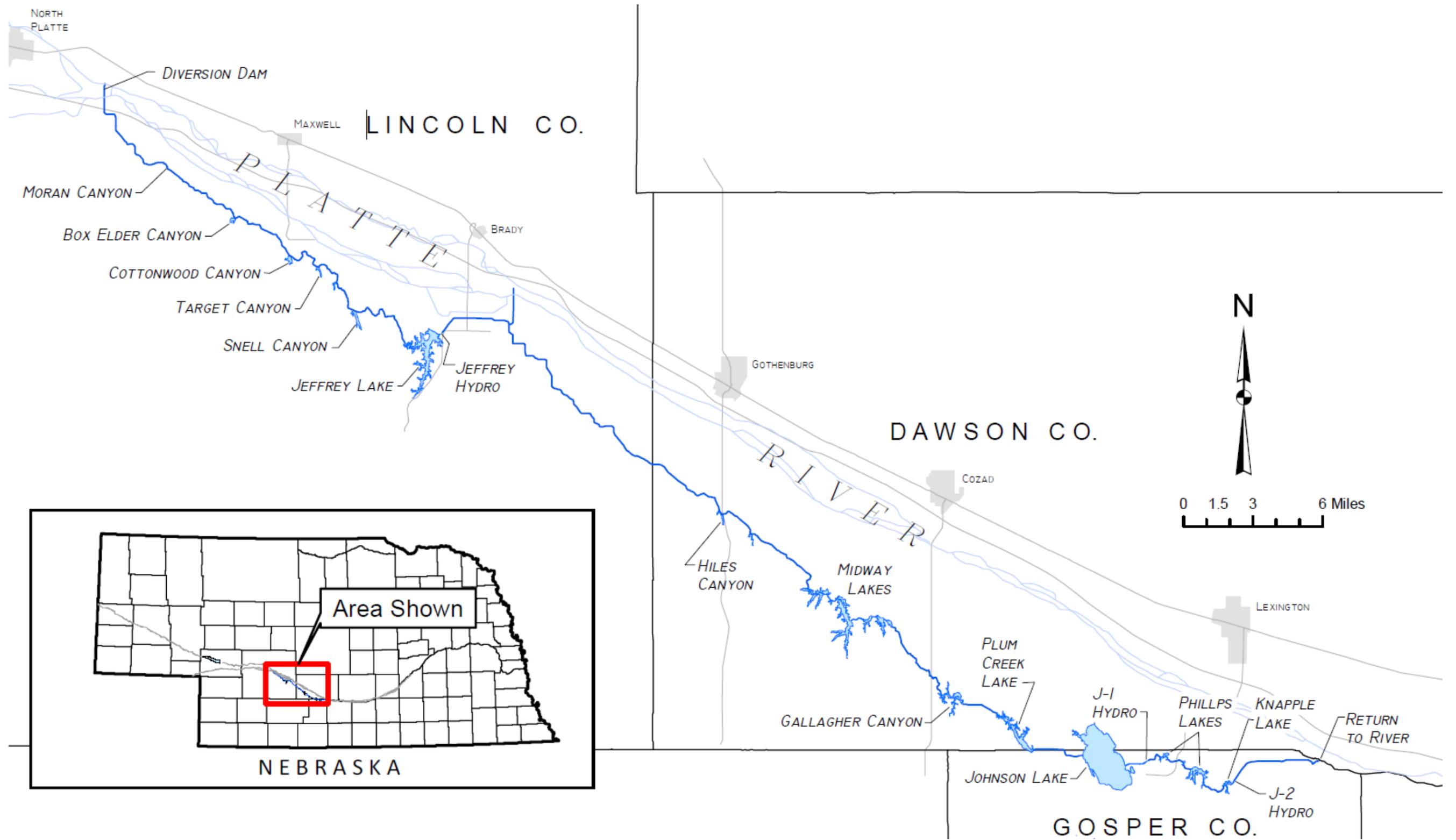


Figure 3. Supply Canal System Map

2.0 Boundary Review Process Summary

Central's review of the Project boundary followed generally the following progression:

1. Initial information gathering and review, and development of initial/draft changes to the Project boundary;
2. Resource agency and public consultations;
3. Gathering and consideration of new or additional information;
4. Final review and development of the final proposed Project boundary.

The initial reviews, consultations, and new/updated information are discussed in the subsections 2.1 through 2.4. Important considerations for the final review are discussed in Section 3.0. The final proposed Project boundary is discussed in Section 4.0.

2.1 Initial Reviews and Draft Proposed Project Boundary

Central conducted initial reviews of the Project boundary, identified initial proposed changes to the Project boundary, and submitted reports to FERC, by geographic location; first for the area around Johnson Reservoir, then for the area are Lake McConaughy and Lake Ogallala, and finally for the remainder of the Supply Canal system. The filing dates for these initial reports were as follows:

- Johnson Reservoir on June 19, 2013;
- Lake McConaughy and Lake Ogallala on December 30, 2014; and
- Remainder of the Supply Canal on June 30, 2017.

For purposes of this final review report, these three reports are referred to collectively as the Initial Boundary Review, and the proposed boundary changes described in these reports are referred to collectively as the Draft Proposed Project Boundary.

2.2 Agency Consultations

Central conducted agency and public consultations following the Initial Reviews and development of the Draft Proposed Project Boundary, and considered information and comments received in completing the Final Review and development of the Final Proposed Project Boundary.

Central consulted with relevant resource agencies on the Boundary Review in accordance with 18 CFR § 4.38(a)(1)⁷ and Compliance Handbook § 2.7.2.1. Specifically, Central consulted with the U.S. Fish and Wildlife Service, the Nebraska Game and Parks Commission, and the Nebraska State Historic Preservation Office.⁸

⁷ This is a non-capacity amendment that does not include construction of a new dam, repair or modification of an existing dam, or the installation of a new turbine, and therefore is not subject to the three-stage consultation process of 18 CFR §§ 4.38(b), (c), and (d).

⁸ Pursuant to §4.38(a)(1), and incorporated into §4.38(a)(7) by reference, Central is to consult with agencies “to the extent that the proposed amendment would affect the interests of the agencies or tribes.” Based on the type of amendment being sought (Project boundary), the resources that might be impacted by such amendment, and prior similar consultations, Central identified the U.S. Fish and Wildlife Service, the Nebraska Game and Parks Commission, and the Nebraska State Historic Preservation Office as relevant agencies for the purpose of consultations. There are no tribal lands and no known tribal religious or culturally significant sites within the Current Project Boundary, the Draft Proposed Project Boundary, or the Final Proposed Project Boundary.

Central requested resource agencies' review of the Boundary Reports and Draft Proposed Project Boundary by letter October 16, 2018. Central met with NGPC staff to discuss the Boundary Reports and Draft Proposed Project Boundary. Central received written responses from SHPO dated November 16, 2018; from USFWS dated November 20, 2018; and from NGPC dated April 3, 2019; summarized as follows:

- USFWS – Federal trust resources may be impacted. However, species protections described in the LSMP and endangered species plan provide assurances that Project operations will not impact the resources.
- NGPC – No comments or concerns at this time.
- SHPO – Potential to impact cultural properties eligible for listing on the National Register of Historic Places. Requested that locations slated for ground disturbing activities be surface surveyed/tested prior to Project start.

Central did not believe that any changes to the Draft Proposed Project Boundary were necessary as a result of these initial agency consultations.⁹

⁹ Central understands that the SHPO request regarding surveys/testing does not apply to this amendment of the Project Boundary, but rather applies to ground disturbing activities within the Project Boundary. Central notes that this issue is already addressed in Central's Cultural Resources Management Plan developed in accordance with "Programmatic Agreement Among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, And The Nebraska State Historic Preservation Officer For Managing Historic Properties That May Be Affected By A License Issuing To The Central Nebraska Public Power and Irrigation District For The Kingsley Dam Hydroelectric Power Project, Project No. 1417," executed on July 17, 1998, and Article 425 of Central's FERC License.

Central additionally requested subsequent resource agencies' review of the amendment application and this Final Project Boundary Review Report by letter dated October 27, 2020.

Central and NGPC had brief informal discussions regarding the Final Proposed Project Boundary relating to the north side of Lake McConaughy within the NGPC Lake McConaughy State Recreation Area. Central received written responses from NGPC dated December 7, 2020; and from USFWS dated December 17, 2020 summarized as follows¹⁰:

- USFWS – Federal trust resources may be impacted. However, species protections described in the LSMP and endangered species plan provide assurances that Project operations will not impact the resources.
- NGPC – No additional comments.

As a result of the informal discussions with NGPC, Central made some minor adjustments to the Final Proposed Project Boundary on the north side of Lake McConaughy within the Lake McConaughy State Recreation Area, such that it reduced the number of instances in which the boundary would deviate from the road through the park, which is selected as an easily identifiable boundary that satisfies other criteria (e.g. environmental resources, public recreation, and shoreline use management). Central does not believe that any other changes to the Final Proposed Project Boundary are necessary as a result of these final agency consultations.

¹⁰ Central did not receive a response from SHPO during the final review period. Should SHPO provide a response subsequent to the filing of the amendment application, Central will forward it to FERC.

Copies of correspondence from the resource agencies for both the initial and final consultations are provided in Appendix B.

2.3 Public Consultations

Central sought public comments following the Initial Review from adjacent landowners, identified stakeholders (primarily tenant and subtenant lessees of Central-owned lands), and the general public.

Central notified the public regarding the opportunity to review and comment on the Boundary Review by means of the following:

- Central sent informational postcards to all adjacent landowners of record¹¹, to all individual lessees of Central's at Johnson Lake, Plum Creek Lake, and Lake McConaughy, and to Jeffrey Lake Development, Inc. and Midway Wildlife and Recreation Club¹²;
- Notices published in eight local and regional newspapers; and
- Use of Central's website and social media accounts.

Central provided an initial public comment period of two months, later extended to seven months in response to stakeholder requests for additional time.

¹¹ Determined from county assessor records for each county in which the Project is located.

¹² Jeffrey Lake Development, Inc. and Midway Wildlife and Recreation Club hold "master" leases for lands at Jeffrey Reservoir and Central Midway Reservoir, from which there are a number of individual subleases.

To facilitate public review and comment, Central developed a webpage dedicated to the boundary review. The webpage included links to the Initial Reviews, an interactive map showing the Current and Draft Proposed Project Boundaries, and an online form for submitting comments. The webpage was updated during the public comment period as additional information became available, such as presentation slides from public meetings, and the Jeffrey Dam Flood Study.¹³ Additionally, members of the public not wanting or able to make use of the website also had the option to contact Central directly to view the documents, and could mail comments to Central.

Central met with stakeholder groups and individuals upon request, including three meetings with Lake McConaughy stakeholders, one meeting with Jeffrey Reservoir stakeholders, and one meeting with Midway Reservoir stakeholders.

Central received 108 written comments.¹⁴ Copies of the written public comments are included in Appendix C. The comments break down by location as follows:

McConaughy ----- 59

¹³ See “Supplement to the Jeffrey Reservoir Inflow Design Flood Study, FERC Project No. 1417” dated May 7, 2012, prepared by Mead & Hunt, Inc., filed with FERC on May 10, 2012.

¹⁴ In some instances, commenters responded multiple times, and in at least one instance it appears that the same person commented under different names. In cases where the same commenter provided identical duplicate comments, Central counts them only once, and provides only one copy. In cases where the same commenter provided similar, but not identical, comments, Central counts each separately, and provides copies of both/all. In cases where someone entered a blank response through the web comment portal (i.e. they provided only a name, or a name and location, without comments), Central does not include them in the count, or provide copies.

Jeffrey Lake -----	30
Johnson Lake -----	6
Plum Creek-----	5
Supply Canal (non-lake segments) -----	5
Midway -----	1
Box Elder Canyon-----	1
Snell Canyon-----	1

The majority of public comments can be characterized as being opposed to some aspect of the Draft Proposed Boundary, the Boundary Review, and/or criticism of Central. Central incorporated several changes into the Final Proposed Project Boundary as a result of the public review and comments.

A summary of the public comments received, and Central’s consideration and responses, are provided in Appendix D.

2.4 New or Updated Information

In addition to information received through the agency and public consultations, Central used some new or improved tools and information, and revisited some existing information in closer detail, during the Final Boundary Review, including:

- Newly acquired and more accurate topographic data
- Newly acquired orthorectified aerial imagery
- Additional site visits

Topographic Data

Following the Initial Boundary Review, Central acquired more accurate elevation data throughout entire Project area. Central processed publically available Digital Elevation Model data into highly accurate and usable contours.¹⁵ Central used survey grade real-time kinematic GPS technology to field check these newly generated contour elevations. This allowed Central to be less conservative and reduce areas within the Final Proposed Project Boundary where elevation information is critical, such as where flood surge is one of the primary considerations.

Aerial Imagery

Following the Initial Boundary Review, Central acquired Project-wide high-quality orthorectified aerial photography taken in 2018. These photos, in combination 1999, 2011 (McConaughy area) and 2016 (limited coverage of some Supply Canal lakes) orthorectified photography that Central had previously acquired, allowed Central to more accurately compare shoreline location and movement over time. This allowed Central to better assess current rates of erosion as compared to prior more conservative estimates, and reduce areas within the Final Proposed Project Boundary where erosion buffers are one of the primary considerations.

¹⁵ Contours were generated, clipped and transformed to NAD 1983 State Plane Nebraska FIPS Zone 2600 (US Feet) horizontal datum and NAVD88 vertical datum and have a root-mean-squared error of between 15 cm and 18 cm, or roughly 6" to 7" absolute vertical accuracy.

Additional Site Visits

Central conducted additional site visits during the Final Boundary Review. These were for purposes of giving additional or more focused attention to Project needs and other considerations.¹⁶

¹⁶ See section 3.0.

3.0 Project Purposes and Considerations

Central considered the following key Project purposes, needs, and other issues in conducting the Final Boundary Review and delineation of the Final Proposed Project Boundary:

- Project Works, Operations, Maintenance, and Security
- Environmental and Cultural Resources
- Public Recreation
- Shoreline Use Management
- Shoreline Erosion and Slope Stability
- Flood Surcharge
- Manageable and Identifiable Boundaries
- Ownership and Use Rights
- In-Project Private Uses

3.1 Project Works, Operations, Maintenance, and Security

The Final Proposed Project Boundary includes:

- all dams, canal embankments and other water retaining structures; the hydropower plants and their associated facilities; gates, flumes, spillways, and other water control structures; and all canals and reservoirs;
- all areas needed for conducting routine operations and maintenance, including adequate room for vehicles and equipment to work along and around the canals, reservoirs, and Project works;

- regularly used staging areas and borrow-and-deposit areas where the specific location is of importance (for example, the areas regularly used for staging of equipment and deposition of material associated with long-term sand-dredging operations at the diversion dam)
- sufficient security buffers around critical Project facilities.

3.2 Environmental and Cultural Resources

Federally endangered interior least terns and threatened piping plovers nest on the beaches at Lake McConaughy and sand piles associated with dredging operations at Central's diversion dam. Central monitors and manages these nesting sites through the nesting season, typically from the end of April to mid-August.

Bald eagles congregate in trees below Central's Kingsley, Jeffrey, Johnson No. 1, and Johnson No. 2 hydropower plants in the wintertime for purposes of feeding in the ice-free tailraces. Central operates an eagle viewing program for the public at the Kingsley and Johnson No. 2 hydropower plants.

Gallagher Canyon Reservoir has a fairly unique undeveloped and natural-looking aesthetic which Central endeavors to preserve as part of its land and shoreline management.

There are previously surveyed items of archeological significance located within the current Project boundary, including several archaeological resources identified by an August 1991

cultural resource inventory report¹⁷ and a subsequent February 2002 evaluative testing report.¹⁸ Publicly known historic resources are Central's Jeffrey Lodge and various engineering works of the Project. The identification and location of other archaeological resources within the Project boundary are kept confidential.¹⁹

The Final Proposed Project Boundary includes:

- the Lake McConaughy beaches and Diversion Dam sand piles used as tern and plover nesting areas;
- the treed areas below the hydropower plants used by bald eagles for winter feeding, and the associated eagle-viewing facilities;
- a sizable buffer around Gallagher Canyon Reservoir to protect the unique undeveloped scenic aesthetic; and
- all known archeological sites, both those that are publically known and those that are confidential in nature.

3.3 Public Recreation

The Project provides a significant amount of water-related recreation opportunities for the general public. This includes several areas managed by the Nebraska Game and Parks Commission as State Recreation Areas and Wildlife Management Areas; waters and shoreline-

¹⁷ See Central's Cultural Resource Management Plan (CRMP), May 2, 2020, section 2 Cultural Resource Inventory.

¹⁸ See Central's CRMP, section 6.3 Archaeological Sites for Further Investigation to Determine Eligibility for the National Register of Historic Places.

¹⁹ See Central's CRMP, section 6.8 Confidentiality of Archaeological Sites.

adjacent lands open to low-impact uses such as hunting, fishing, boating, and hiking; and several public boat ramps.

The Final Proposed Project Boundary includes:

- all Project waters and shorelines when operating at or below normal operating levels;
- all beach areas at Lake McConaughy;
- sufficient shoreline buffers on all reservoirs to allow for access and low-impact shoreline uses by the general public, such as hiking and fishing;²⁰
- public boat ramps at Lake McConaughy, Lake Ogallala, Jeffrey, Midway, Gallagher, Plum Creek, Johnson, and East Phillips Lakes;
- NGPC shoreline-adjacent public campgrounds at Lake Ogallala, Gallagher Canyon Reservoir, and Johnson Lake;
- NGPC wildlife management areas used for wildlife viewing and hunting at McConaughy, Box Elder, Jeffrey, Plum Creek, and East Phillips Lakes;
- Authorized routes of ingress and egress connecting from public roadways sufficient for access to recreation facilities by the general public.

²⁰ At Lake McConaughy, significant shoreline access is provided along the beaches and lakebed during periods where the pool level is below the normal maximum operating level, and along shoreline-adjacent uplands within the State Recreation Area. On the Supply Canal system, Central recommends minimum buffers of approximately 30 feet to provide for reasonable public recreation access along reservoir shorelines.

The boundary need not include areas used for undeveloped or unauthorized access points, or for private, exclusive, or semi-exclusive use or access, such as by adjacent landowners or tenants and subtenants of Central.

3.4 Shoreline Control and Use Management

Central is expected to control and manage non-Project uses of the Project shoreline and near-shoreline environment, including public and private access to the Project waters and construction and other land use activities.²¹ This allows Central to protect the Project and its resources, and to balance and address conflicts between competing uses. In many Project locations, current and anticipated uses and pressures are fairly minimal, and therefore the need to control and manage uses is relatively small. On the other hand, in locations where current and anticipated uses and pressures are more substantial, and in particular recreational and residential uses, the potential for conflicts between uses, and therefore the need to control and manage those uses, is greater.

²¹ “Typically, a licensee will own or have the necessary rights to all submerged lands and any lands that fall within the operating levels of the reservoir, as well as a shoreline buffer”. FERC. 2012. Page 8. *Guidance for Shoreline Management Planning at Hydropower Projects*. “A provision for a shoreline buffer zone that must be within the project boundary, above the normal maximum surface elevation of the project reservoir, and of sufficient width to allow public access to project lands and waters and to protect the scenic, public recreational, cultural, and other environmental values of the reservoir shoreline”. 18 CFR § 4.41(f)(7)(iii) “Licensees have a responsibility to ensure that the reservoir shorelines within their project boundaries are managed in a manner that is consistent with project purposes, license requirements, and operations”. FERC. 2015. Page 49. *DHAC Compliance Handbook*.

The Final Proposed Project Boundary includes those lands necessary and appropriate to control and manage uses of the Project shoreline and near-shoreline environment, commensurate with the types and amounts of non-Project uses existing currently or anticipated to occur. The Final Proposed Project Boundary includes all submerged lands, lands that fall within the operating levels of the various reservoirs, and a shoreline buffer to allow the public to traverse and make use of the immediate shoreline area

3.5 Shoreline Erosion and Slope Stability

The Project shoreline has numerous locations where shorelines are actively eroding. The rate, extent, and potential for future shoreline erosion varies by location, and is a function of geology and topography, reservoir size and configuration, water depths and fluctuations, canal geometry, weather, recreation-induced wave action, and any erosion control efforts.²² In some high bank and steep topography areas, there can also be upslope stability issues, such as where land may be subject to current or future sloughing, slumping, or otherwise eroding downslope toward Project waters. The greatest amount of historic and potential future erosion is at Lake McConaughy, and in particular on the south side. On the Supply Canal, erosion typically occurs in high bank areas of reservoirs due to wave action, where canal flow is cutting through ridge projections at reservoir inlets, and on the outside bends of the canal.

²² See, for example (1) Simons, Daryl B. and Fuat Sentürk. 1992. *Sediment Transport Technology Water and Sediment Dynamics*, Section 7.5.1.1 Erosion Processes. Littleton: Water Resources Publications; (2) Sentürk, Fuat. 1994. *Hydraulics of Dams and Reservoirs*, Section 8.3.1 Wave Action. Highlands Ranch: Water Resources Publications; and (3) French, Richard H. 1985. *Open-Channel Hydraulics*, Section 7 Design of Channels. New York: McGraw-Hill, Inc.

In estimating future Project erosion, Central engineers and staff considered Central's past and current experiences regarding past erosion and erosion control measures, past rates and amounts of erosion estimated from historic and relatively current aerial photographs, and observations from site visits of actively eroding areas. Central also took into consideration locations that Central currently maintains, or anticipates future implementation of, shoreline protection measures to slow or control erosion. Central proposes appropriate expansions of the Project boundary in those locations where the shoreline has already eroded beyond the current boundary, or where Central estimates it is likely to do so in the future. No boundary adjustments for purposes of an erosion buffer are proposed where current or anticipated erosion control efforts by Central appear to be adequate to prevent shoreline or canal migration.

3.6 Flood Surcharge

Sudden or rapid rise in pool elevation, or "surcharge"²³, could occur as the result of such things as precipitation events that cause significant inflows into the system, failure of a system component, or operating error. The Project boundary should include lands subject to sudden or rapid inundation, in excess of normal maximum operating levels, that would result from unplanned or emergency operations and be a threat to life, property, or Project resources. For example, at Jeffrey Reservoir a flood event smaller than the Probable Maximum Precipitation

²³ U.S. Society on Dams. Accessed December 17, 2020. Glossary. <https://www.usdams.org/resource-center/glossary/>

event would surcharge the reservoir to the point of overtopping the dam²⁴, impacting an estimated 62 houses around the edge of the reservoir. This is just an example; surcharge potential is not constrained to Jeffrey Lake, but can occur to varying degrees throughout the Project.

Acknowledging the wide range of events possible which could result in surcharge, the appropriate amount of inundation risk, in terms of rate of rise and probability of occurrence, is a subjective call. For example, if flood surcharge provisions were based on only a ten-year recurrence interval, life and property might be put at an unreasonable level of risk.

Alternatively, if flood surcharge provisions were made on a greatest possible level of inundation possible within a set period of time (for example, the greatest possible rise within 24 hours as was used in the Initial Boundary Review), then the amount of lands included and the level of risk avoidance may be viewed as being excessive. Additionally, the surcharge-causing events most likely to result in an unacceptable risk to life, property, or Project resources vary by location, and are dependent on such factors as watershed size, hydraulic capacities, relative location within the system, and types and intensities of adjacent uses.

Ultimately, Central settled on a case-by-case approach to deciding whether and to what extent the Final Proposed Project Boundary should include lands for purposes of accommodating flood

²⁴ See “Supplement to the Jeffrey Reservoir Inflow Design Flood Study, FERC Project No. 1417” dated May 7, 2012, prepared by Mead & Hunt, Inc., filed with FERC on May 10, 2012.

surcharge. Below is a summary of Central's evaluation of flood surcharge needs at various locations throughout the Project.

Lake McConaughy

Lake McConaughy is designed for intentional controlled storage up to elevation 3270 ft MSL, with a normal maximum elevation of 3265 ft MSL.²⁵ A surcharge of Lake McConaughy in excess of elevation 3270 ft MSL is possible in the event of an extremely large inflow event, in excess of Kingsley Dam outflow capacities and several times greater than anything in the historic record.²⁶ In the case of such an event the contributing drainage area and the reservoir size would combine to provide an advanced warning ranging from at least several days to a few weeks, such that sufficient opportunity would exist to remove the public from the inundation area in a timely manner. Additionally, as any such event would presumably already be carrying significant debris from upstream areas into the reservoir, there is likely little benefit to be gained in protecting the Project by controlling what items may be placed in the reservoir inundation area.²⁷ Central proposes no additional lands within the Final Proposed Project

²⁵ The Central Nebraska Public Power & Irrigation District. March, 2014. *Kingsley Dam Project, Kingsley Dam Development, Supporting Technical Information, Section 2.* (This document is classified CEII).

²⁶ The Central Nebraska Public Power & Irrigation District. March, 2014. *Kingsley Dam Project, Kingsley Dam Development, Supporting Technical Information, Section 6.* (This document is classified CEII).

²⁷ The size of the inflow event necessary to exceed outflow capacities and cause an uncontrolled rise in Lake McConaughy would be so large as to likely inundate all or portions of several towns upstream.

Boundary above elevation 3,270 ft MSL at Lake McConaughy for purposes of accommodating flood surcharge.

Lake Ogallala

Lake Ogallala is the tailwater for Kingsley Dam and Hydro, and the diversion pool for the downstream Keystone Diversion Dam.²⁸ Lake Ogallala has no appreciable runoff watershed, with inflows coming primarily through the Kingsley Hydro and morning glory spillway, and outflows managed by river gates, canal gates, and an overflow structure of the Keystone Diversion Dam. Central proposes no additional lands within the Final Proposed Project Boundary at Lake Ogallala for purposes of accommodating flood surcharge.

Diversion Dam

The Diversion Dam, located on the Platte River immediately below the junction of the North Platte River and South Platte River, has enough capacity in its river gates and overflow ogee to pass extremely large floods with minimal backwater effect. Central proposes no additional lands within the Final Proposed Project Boundary at Lake Ogallala for purposes of accommodating flood surcharge.

Supply Canal from Diversion Dam to Jeffrey Lake Inlet

The Supply Canal in the reach from the Diversion Dam to the inlet to Jeffrey Reservoir has multiple siphonic spillways which serve to quickly remove water from the supply canal system

²⁸ Part of FERC Project No. 1835, owned by the Nebraska Public Power District.

in the event of a rapid rise in water levels. The siphonic spillways are designed to self-prime when water levels rise more than two feet above normal operating levels²⁹ and remove water from the Supply Canal.³⁰ For purposes of the Final Proposed Project Boundary in this reach of Supply Canal and lakes, Central included lands for flood surcharge purposes based on contour elevations of approximately 4.5 feet below the top of each controlling spillway structure in question.³¹

Jeffrey Lake

Jeffrey Lake has a relatively large contributing drainage area, and no self-activating siphonic spillways, with the only mechanism for removing water being by release through the Jeffrey Hydropower Plant. The most recent inflow design flood studies for Jeffrey Dam indicate that Jeffrey Reservoir would likely fill to capacity and overtop the dam as a result of a flood event that is less than the probable maximum flood (PMF) event.³² However, such an event, though more likely than a PMF event, still has a very low probability of occurrence, and may not be necessary for setting the Project boundary.

²⁹ The Central Nebraska Public Power & Irrigation District. March, 2014. *Kingsley Dam Project, Supply Canal Development; Jeffrey Dam and Johnson Lake Dam, Supporting Technical Information*, Section 6. (This document is classified CEII).

³⁰ In the past 25 years, there have been only two occurrences of a siphonic spillway operating event. Water released from the siphonic spillways follows natural runoff drainage paths toward the Platte River.

³¹ This corresponds with the “Maximum Water Elevation” shown on the design drawings for the spillways. Water elevations may exceed this level for a short period of time until the activated siphon has removed excess water from the system.

³² See “Supplement to the Jeffrey Reservoir Inflow Design Flood Study, FERC Project No. 1417” dated May 7, 2012, prepared by Mead & Hunt, Inc., filed with FERC on May 10, 2012.

Jeffrey Dam was designed to accommodate a 100-year flood event, with approximately 4 feet of “freeboard”.^{33 34 35} For purposes of the Final Proposed Project Boundary at Jeffrey Lake, Central included lands for flood surcharge purposes based on a contour elevation of approximately 4.0 feet below the top of the dam.³⁶

Supply Canal from Jeffrey Hydro to Johnson Lake Inlet

The Supply Canal in the reach from Jeffrey Hydro to the inlet to Johnson Lake has three siphonic spillways to quickly remove water in the event of a rapid rise in water levels. For purposes of the Final Proposed Project Boundary in this reach of Supply Canal and lakes, Central included lands for flood surcharge purposes based on contour elevations of approximately 4.5 feet below the top of each controlling spillway structure in question.³⁷

³³ U.S. Society on Dams. Accessed December 17, 2020. *Glossary*.
<https://www.usdams.org/resource-center/glossary/>

³⁴ The Central Nebraska Public Power & Irrigation District. March, 2014. *Kingsley Dam Project, Supply Canal Development; Jeffrey Dam and Johnson Lake Dam, Supporting Technical Information, Section 6*. (This document is classified CEII).

³⁵ U.S. Department of the Interior, Bureau of Reclamation. 1987. *Design of Small Dams*, Section 6.21 Freeboard.

³⁶ 4 feet below the top of Jeffrey Dam is also approximately equal to the “freeboard contour” elevation mentioned in the 1980 lease agreement with Jeffrey Lake Development, Incorporated.

³⁷ See footnotes 30-32.

Johnson Lake

Johnson Lake occupies nearly the entirety of its watershed, with very little area to contribute to inflows from runoff, even under a PMF-level event.³⁸ Additionally, the large surface area of the reservoir means that uncontrolled events, whether from runoff or operational errors/failures would cause the reservoir levels to raise at a relatively slow rate, even if outflows were cut to zero. Central proposes no additional lands within the Final Proposed Project Boundary at Johnson Lake for purposes of accommodating flood surcharge.

Supply Canal from Johnson No. 1 Hydro to Johnson No. 2 Hydro

The Supply Canal in the reach from the Johnson No. 1 Hydro to Johnson No. 2 Hydro has no siphonic spillways, but also very little watershed area that could contribute runoff that would cause a rapid rise in water levels. Inflows to, and outflows from, this canal section and associated lakes are essentially controlled by the upstream and downstream hydropower plants. For purposes of the Final Proposed Project Boundary in this reach of Supply Canal and lakes, Central included lands for flood surcharge purposes based on a contour elevation of approximately 4.0 feet below the top of the lowest dam in the reach³⁹.

Supply Canal from Johnson No. 2 Hydro to the River Return

The Supply Canal below the Johnson No. 2 Hydro runs a very short distance before returning to the river, with little or no watershed area that could contribute runoff. Central proposes no

³⁸ May 9, 2012 FERC submittal related to the freeboard elevation remaining after a PMP event.

³⁹ See footnote 35.

additional lands within the Final Proposed Project Boundary for the Supply Canal below the Johnson No. 2 Hydro for purposes of accommodating flood surcharge.

3.7 Identifiable and Manageable Boundaries

Project boundary lines that are easily identifiable and manageable are beneficial for Central, FERC staff, the public, and stakeholders. Boundary lines that follow straight lines, have fewer course changes, follow established surveys and property lines and known lot lines, or are associated with fixed visible features are easier to manage than boundaries that curve or zig-zag, deviate from established surveys and property lines, or are not easily identified on the ground. Project boundaries that follow visible features such as roads or fences can make it much easier to determine whether something is located inside or outside of the Project boundary. Project boundaries that follow already existing recorded surveys and ownership lines reduces the needs for additional surveys and added confusion. Project boundaries that follow straighter lines with fewer bends and zig zags, or that avoid cutting across difficult terrain, can make demarcation and inspection of the boundary on the ground easier to accomplish. Project boundaries that cut through residential lots owned by Central but leased to others requires constant checking to determine whether construction or other activities are or are not subject to License-based requirements, and can lead to administrative inefficiencies and the potential misapplication of requirements.

While not always possible or practical, Central attempts to provide for identifiable and manageable boundaries in the Final Proposed Project Boundary. In considering where to set

and how to describe the boundary, Central considered the overall purposes of the boundary, the current and likely future uses in the area, and Central's past experience with managing the boundary at each location. Where shoreline-adjacent leased residential lots are located on Central-owned lands, Central included the entirety of the lots, greatly reducing the incidence of split lots and dwellings along the boundary.

3.8 Central Ownership and Other Rights

Whether or not land is owned by a FERC licensee, or owned by someone else, should not be the primary factor in determining whether or not such land is or is not included in a Project boundary.⁴⁰ In setting the Final Proposed Project Boundary, if Project purposes for including land inside the Project boundary were identified, then Central included it, regardless of whether or not Central owns or does not own rights or legal interests in the land. Likewise, if it is clear that there are no Project purposes for including land inside the Project boundary, then Central excluded it, even if Central owns or has other rights or legal interests in the land.

While Central tried to apply the criteria used in setting the boundary as objectively as possible, there are times when deciding the exact location of the Project boundary is a bit of a judgment

⁴⁰ The Project boundary is an administrative marker to delineate the geographic extent of lands and waters necessary for the operation and maintenance of a licensed Project. The identification of a Project Boundary's location does not, in and of itself, affect existing property rights. Additionally, "A licensee's property interests can range from fee simple to perpetual or renewable leases, easements, and rights-of-way. Thus, title to lands within the boundary can be owned by someone other than the licensee, so long as the licensee holds the necessary property interests" FERC 2006, *Policy Statement On Hydropower Licensing Settlements*. Page 14.

call. In these instances, Central then took into consideration ownership and land use rights held by Central; a) erring on the side of excluding lands in question if Central does not own the land or have other rights or legal interests, because it is preferable to avoid conflicts with the owner or avoid having to secure rights in the future unnecessarily; and b) erring on the side of including lands in question if Central does own the land or has other rights or legal interests, because including such lands increases the likelihood that all necessary lands have been included.

3.9 Exclusion of Residential Development and Agricultural Structures

Central has delineated the Final Proposed Project Boundary in such a way as to exclude residences or agricultural structures to the extent that excluding such lands would not conflict with other Project purposes. Where such developed lands are not needed for any Project purpose, the inclusion of such lands within the Project boundary might create unnecessary administrative and regulatory complications, burdens, and potential for conflict.⁴¹

While Central has been successful with a limited number of residential development exclusions, many other exclusions are not possible because of other Project needs. That so many of these residential developments should be within the project boundary comes as little surprise, given that their very presence is oriented around being near to, and making use of, project waters. Indeed, of the 1002 private residential and recreational living structures located wholly or

⁴¹ Residential, commercial or other structures may be included within a Project's boundary if the lands are needed for Project purposes. 18 CFR § 4.41 (h)(2).

partially within the Final Proposed Project Boundary, 943 (94 percent) are on lands that were acquired by and are owned by Central for the purpose of constructing, operating, and maintaining the Project, and another 54, (5 percent) are on lands for which Central holds erosion, flooding, or other rights needed for Project purposes.⁴²

At the same time, however, Central has shown that it can reasonably manage private residential uses on its own lands within the Project Boundary through its current LSMP Management Plan and the associated permitting procedures. As such, while Central delineated the Final Proposed Project Boundary to exclude residences where possible, Central does believe their inclusion can be accommodated in a manner that is consistent with other Project purposes.

In cases where agricultural uses of the Project's lands are taking place, Central has attempted to exclude permanent agricultural structures from the proposed boundary. Central had greater success in this effort than it did with excluding residential development, for the reasons that there are far fewer such uses to begin with, and where they do occur, they are typically not located with the purpose of making use of the Project's lake and reservoir shorelines.

⁴² The number of structures inside of the Final Proposed Project Boundary was determined using 2018 National Agricultural Imagery Program aerial photography and Central's GIS.

4.0 Final Proposed Project Boundary

The Final Proposed Project Boundary is shown in the maps in Appendix A. The Final Proposed Project Boundary encompasses 47,600 acres; 37,800 acres of land and water at Lake McConaughy and Lake Ogallala, and 9,800 acres of land and water along the Supply Canal and associated Lakes.⁴³

4.1 Final Boundary Statistics and Comparisons

Appendix E provides maps showing the Current Project Boundary, the Draft Proposed Project Boundary, and the Final Proposed Project Boundary. The Final Proposed Project Boundary contains a total of 47,600 acres, which is 2,500 acres (5 percent) more than the Current Project Boundary total of 45,200 acres, and 3,500 acres (13 percent) less than the Draft Proposed Project Boundary total of 51,100 acres. The Final Proposed Project Boundary adds 3,400 acres that are outside the Current Project Boundary, and removes 900 acres that are inside the Current Project Boundary.

Appendix F provides maps showing the acres added in the Final Proposed Project Boundary that are outside the Current Project Boundary, and identifies which of those lands Central already owns or in which it has other rights or legal interest⁴⁴ (such as erosion rights, flowage rights, etc.). Of the 3,400 acres added in the Final Proposed Project Boundary that are outside the

⁴³ Acre calculations are approximate, calculated from Central's GIS, and rounded to the nearest 100 acres.

⁴⁴ Ownership and other rights or legal interests, for the purpose of this review, were determined from Central's records.

Current Project Boundary, 2,600 (77 percent) are lands owned by Central, 300 acres (8 percent) are lands in which Central has partial rights or legal interests, and 500 acres (15 percent) on which Central currently has neither ownership nor other rights.

5.0 Conclusion

Central has completed a thorough review of the Project boundary as required by the FERC License and Boundary Review Plan.

Central hereby requests FERC approval of this non-capacity license amendment application for the modification of the project boundary to match that shown in Appendix A. Upon approval, Central will prepare and file with FERC new Exhibit G maps consistent with this application, Appendix A, and FERC's approval order.