construction to be performed in a dry condition. Depending on the methods employed for constructing these facilities below the groundwater table, there may be some short term (4 to 6 months) impact on the local groundwater system and potentially some short term impacts to adjacent groundwater users.

Dewatering methods employed would be determined by the contractor to match his planned construction procedures. Typically, methods include deep wells, well points, water flow barriers (sheet piles) and pumping from sumps within the excavation.

Depending on the contractor's method of construction and dewatering, impacts of ½ foot or more could be experienced by up to 6 nearby wells constructed in the alluvial aquifer. Four more domestic wells are located in a transition area that may be connected to the alluvial aquifer. Actual well location and elevation, as well as construction dewatering methods, would determine if they would be impacted by the dewatering operation. Additionally, 11 wells are located in the uplands north of the plant site within 1.75 miles of the coal unloader excavation. These wells are constructed in geologic materials that are at a higher elevation than the alluvial aquifer and would not be impacted by the dewatering system operation.

Impacts to neighboring groundwater users can be addressed through a number of options including replacement water by a tanker, bottled water, connection to rural water system or redrilling a well or well point. Impacts may also be reduced through construction methodology requirements such as using techniques that limit drawdown and installation of recharge wells to maintain groundwater levels near neighboring wells. Impacts would be assessed through testing at the site to determine actual aquifer parameters, and in consideration of the contractor's selection of construction methodology.

Potential Contamination of Groundwater

Missouri regulations for utility landfills require characterization of the soil, geology, and groundwater at the site so that the landfill can be designed to prevent impact to groundwater. Groundwater monitoring systems are included to detect impacts to any aquifer from the landfill.

3.3.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action includes the following measures to reduce or prevent potential adverse environmental impacts on groundwater water:
Groundwater Withdrawal

- Construction of the wells at a location and pumping rate such that the expected impacts on other existing wells are negligible.

- If additional testing and assessment indicate that other wells may be overly adversely impacted by construction dewatering, AECI would contact the owners prior to initiating construction dewatering activities and would work with them to arrive at appropriate solutions that AECI would implement.

Potential Contamination of Groundwater

- The fuel oil unloading, piping, and storage system would be provided with containment and leak detection as required by 40 CFR 112, Oil Pollution Prevention.

- The utility waste landfill leachate collection pond would be sized to retain the flow from a 50-year, 24-hour rainfall over the largest open active area of the landfill expected during the lifetime of the landfill. The pond would have a double liner system with a leak detection and removal system.

- The plant would have a coal pile runoff treatment area with concrete-lined ditches and a concrete-lined basin and a wetland treatment area with a low permeability liner, as describe in *Section 2.4.6.2, Coal Yard Area*.

- An oily water system would be provided for potentially oily runoff, as described in *Section 2.4.6.3, Oil Areas*.

- A Spill Prevention, Control, and Countermeasure (SPCC) Plan would be provided as required for containment and control of liquids that have the potential to contaminate groundwater.

- Water from chemical cleaning would be collected and treated as described in *Section 2.4.6.4, Chemical Cleaning*.

- All runoff water that may be contaminated would be collected and treated as described in *Section 2.4.6, Wastewater Collection and Treatment*.

- A two-foot layer of clay would be provided beneath the coal piles to prevent leaching into the ground.

- Ash and FGD waste would be disposed of in a facility designed and permitted to prevent contamination of groundwater. The facility would be lined and would have a leachate collection system. The landfill would be divided into 20 to 25 cells, only two of which would be operated initially.

- Cells would be closed as they are filled to prevent infiltration of storm water. A final cover for the landfill would have a geomembrane liner, soil and a vegetative cover. A groundwater monitoring system would be included.

3.3.2.4.1 Impact Assessment

Proposed Action

Groundwater Withdrawal

Permanent Wells. Pumping from the collector wells would be expected to impact the groundwater surface as shown in Figures 3-29 and 3-30. Drawdown between wells is additive, so that the net drawdown due to more than one well pumping would be the direct sum of the drawdown caused by the individual wells pumping alone. Consequently, the simulated drawdown values predicted by the groundwater flow model represent the amount of additional drawdown that would occur in an offsite well located within the radius of influence of the proposed collector well(s). For example, a well located in the area between the 1 foot and 2 foot drawdown contours lines depicted in Figures 3-29 and 3-30 would be expected to have 1 to 2 feet of drawdown in addition to the drawdown caused by its own pumping. The amount of impact to off-site wells resulting from pumping of collector wells at the project site would be dependent on the depth, construction, groundwater levels, pumping equipment and capacity of the off-site wells. Several feet of additional drawdown could be detrimental to a shallow well equipped with a suction pump that is operating near the limits of its capacity. Conversely,

several feet of additional drawdown might go unnoticed in a deep high capacity well equipped with a submersible pump (AECI, 2006j).

The aquifer conditions in the vicinity of the project site are generally favorable, and it is likely that the aquifer properties improve to the north of the project site. Domestic wells in the area probably have low amounts of drawdown under normal use. The natural variation in the groundwater levels seasonally and with changes in the river level and recharge are likely to be larger than the amount of drawdown resulting from pumping of collector wells at the project site, except in the area less than a half-mile from the proposed collector wells.

At this site, all the wells identified from MDNR's database are more than a half-mile away, and outside the projected maximum extent of drawdown at the 0.5 feet contour line (Figure 3-29). As such, the existing wells in the vicinity of the project site have probably experienced larger changes in water level under normal conditions, than would be caused by the proposed collector wells (AECI, 2006j).

At this site, all the wells identified from MDNR's data base are outside the projected maximum extent of drawdown at the 0.5 feet contour line (Figure 3-29) (MDNR, 2006b). In general, if there were off-site wells located in the areas depicted in Figures 3-29 and 3-30 as having an estimated drawdown from the collector wells of 0.5 to 1.0 feet these wells would probably have negligible impact from the collector well pumping. If there were wells in the areas depicted in Figures 3-29 and 3-30 as having an estimated drawdown from the collector wells of 1.0 to 2.0 feet these wells would probably have slight decreases in capacity due to the collector well pumping. If there were wells in the areas depicted in Figures 3-29 and 3-30 as having an estimated drawdown from the collector wells in excess of 2.0 feet these wells would probably have some decrease in yield due to the collector well pumping, and shallow low capacity wells would have the potential for the most impact. Decreases in yield would generally not be substantial in areas that did not have at least 3 feet of additional drawdown due to the pumping of the proposed collector wells.

At present, there are no houses or existing off-site wells in the areas where the groundwater models predict 2 feet or more of drawdown from the proposed collector well. Since all known wells are outside the estimated drawdown contour of 0.5 feet, impact, if any, is expected to be negligible.

MDNR, as noted in their comments (Appendix M), has "made arrangements with AECI to obtain permanent use of a water well near the collector wells so that groundwater levels can be continuously monitored and the data made available to the public real-time."

Temporary Construction Dewatering Wells. AECI estimates the duration of impact from temporary construction dewatering wells to be four to six months. A few nearby wells may temporarily be impacted and AECI is evaluating mitigation options. The following information was provided by MDNR in comments on the draft EIS:

> Because of the depth of structure, the water table will be temporarily lowered in the vicinity of the excavation during construction. Groundwater dewatering in conjunction with construction excavation is a common and necessary practice. The impacts to groundwater levels are temporary. Water levels reduced during dewatering will recover quickly after construction ends and the dewatering wells are stopped. Groundwater modeling by Burns and McDonnell show that several nearby wells may be temporarily affected while the unloading facility is being constructed, but that the effects of drawdown can be minimized through injection wells and other techniques. Shallow sand point wells that extend only a few feet below the normal water table elevation are the most likely type of private water supply well to experience difficulties if groundwater levels decline appreciably…In addition, there are alternative water supplies including a rural water supply district that can be used to ensure continued water supply to impacted residents.

Water from dewatering will be directed to drainage ditches and will be managed to prevent downstream erosion and/or flooding.

Other Issues Related to Groundwater Withdrawal

Potential adverse impacts. If other users were overly adversely impacted, AECI would either have to reduce pumping rates, provide water to the affected party, or compensate for damages.

Development of sinkholes from pumping. The pumping from the Missouri River aquifer that AECI proposes would not cause sinkholes to develop. For surface collapse to occur, subsurface materials would need to be removed. Proper design of the collection system, including the well screen, would prevent removal of subsurface materials in excess of the small amount of suspended solids that are always present in groundwater.

Draining wetlands by lowering the groundwater level. As noted above, natural groundwater fluctuations from changing river levels are expected to be greater than the changes resulting from drawdown. Therefore, pumping would not be expected to impact a wetland by lowering the groundwater any more than a lower river level would in the absence of pumping.

Groundwater quality. Groundwater is typically more mineralized than river water. Chemical testing of groundwater was done as part of the aquifer testing. Additional testing would be done during design to determine specific treatment requirements.

Potential Contamination of Groundwater

With implementation of measures described above and included in the Proposed Action, contaminant impacts to groundwater are not anticipated.

Big Lake Site

Because of the similar setting, pumping from the Missouri River aquifer would likely be the means of obtaining water at the Big Lake Site. Potential impacts to existing wells would be expected to be similar to the Proposed Action, but site-specific studies were not done. Effects on wetlands may be greater because of the connectivity between the river, the alluvial aquifer, and many of the floodplain wetlands in close proximity to the site and Big Lake.

IGCC Alternative

Impacts would be the same for the IGCC alternative as for the Proposed Action.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed and there would be no change or disturbance of groundwater or aquifer resources within the project area.

3.3.2.4.2 Mitigation and Residual Impacts

No mitigation measures for impacts from the proposed water supply wells or from potential groundwater contamination have been identified because impacts are not anticipated. However, AECI is committed to mitigate any serious adverse impact from the water supply wells if it occurs; and AECI is required to implement corrective action for groundwater contamination impacts. If wells are impacted during construction dewatering, AECI will provide water from other sources to assure a continuous supply.

3.4 SURFACE WATER

3.4.1 Affected Environment

3.4.1.1 Regional Setting

Both the proposed Norborne Site and the alternate Big Lake Site are located within the Missouri River floodplain. All parts of the Proposed Action and the alternative actions associated with the Big Lake Site are within the Missouri River watershed. At the Waverly Station on the Missouri River, about 12 miles east of the Norborne Site, the average Missouri River flow is 51,580 cubic feet per second (cfs), and the drainage area is almost a half-million square miles. The highest recorded flow at the station was nearly twice the average (in 1993) and the lowest was less than half the average (in 1934) (MDNR, 1995a).

MDNR assesses water resources by the 19 major watersheds shown in Figure 3-31. Ten of these watersheds (shaded yellow in the figure) drain to the Missouri River and the other nine drain to the Mississippi River, which runs along the east side of the state. In Missouri, one major river, the Grand, flows into the Missouri from the dissected till plains in the north, and two, the Osage and Gasconade, flow into the Missouri from the Osage Plains, Ozark border area, and Ozarks in the south.

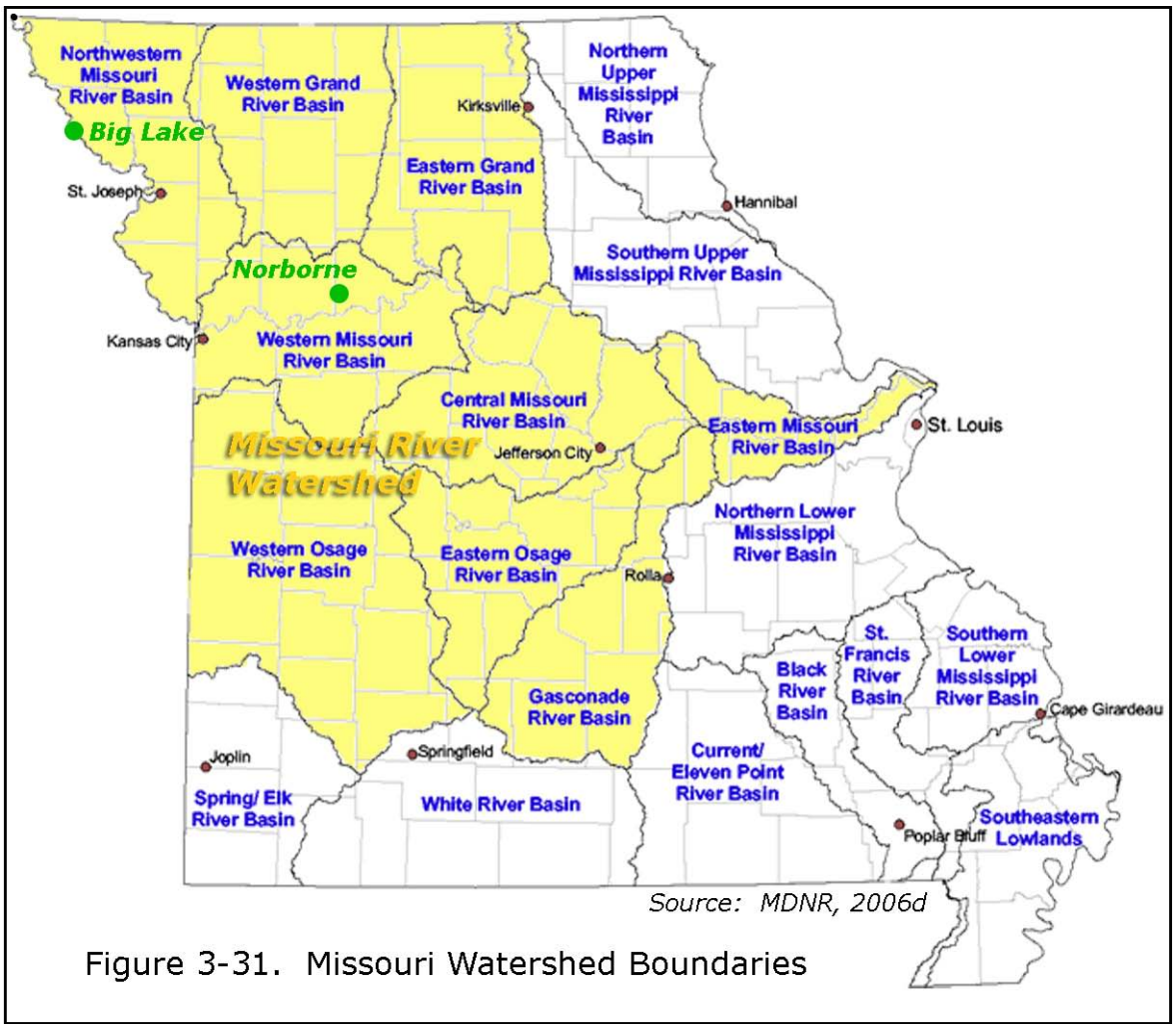


Figure 3-31. Missouri Watershed Boundaries

3.4.1.1.1 Prairie Streams

Most streams in Missouri north of the Missouri River are considered prairie type streams, as are the streams in west central Missouri, and have certain typical characteristics as a result of the geologic setting and land use.

Both the glacial till of the northern till plains and the Pennsylvanian bedrock in the Osage Plains greatly retard the infiltration of rainfall to the subsurface. As a result, almost all water falling in this area of the state quickly flows over the surface of the land and into the surface stream network. This results in very large flows in these streams during wet weather and very little or no flow in streams during dry periods. In contrast, the streams of the Ozark Plateau,

which comprise most of the southeast and south central portions of the state, have somewhat smaller high flows and considerably greater flows during dry weather than prairie streams. This is because the soils and bedrock of the Ozarks are more porous and allow more infiltration of water through the soils and into the groundwater system. This groundwater moves more slowly than surface waters. It eventually re-emerges to the surface water system as seeps or springs and acts to sustain flow in streams during dry weather. Figure 3-32 shows flow characteristics for two Missouri streams, the Grand River at Gallatin, a prairie stream, and the Current River at Doniphan, an Ozark Plateau stream. These two sites have almost identically sized watersheds and maximum flows, but the Current River, during dry weather, maintains 40-400 times more flow than the Grand (MDNR, undated).

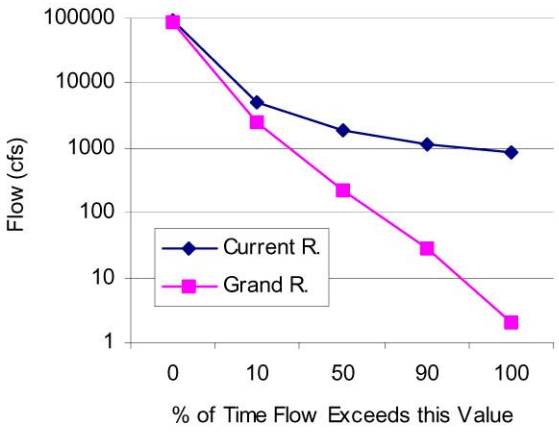


Figure 3-32. Comparison of Flows on A Prairie and an Ozark Stream

Source: MDNR, undated1

Water quality in streams reflects the geology and land use of the watershed. Missouri prairie streams flow through predominantly agricultural land. Within the general project area, row crop agriculture occupies the greatest percent of watersheds in northwestern Missouri and progressively smaller percentages of land in more eastern watersheds through the Chariton River basin. The amount of row crop land in a watershed tends to correlate well with the amount of nitrate nitrogen (NO_3N), total suspended solids (TSS), and total phosphorus (TP) in streams. This observation is consistent with the assumption that greater amounts of row crops in a watershed result in more

soil erosion and in greater amounts of fertilizer application. Fecal Coliform bacteria (FC) indicates the degree of contamination of the water by the fecal material of warm-blooded animals and also seems to be related to the intensity of agricultural land use. Other water quality constituents such as total dissolved solids (TDS), sulfate (SO_4) and chloride (Cl) are more related to the age of the geologic materials over and through which these streams flow. The younger glacial till of northern Missouri yields much more dissolvable minerals than the very old and weathered soils, subsoils and rock of the Ozark Plateau. Dissolved oxygen (DO) is needed for almost all fish and other aquatic life. Average DO levels appear to have little correlation with land use and are not of concern in prairie streams. However, during summer low flow conditions DO levels can be very low in small prairie streams and can result in conditions harmful to aquatic life (MDNR, undated1).

3.4.1.2 Region of Influence

The region of influence for surface water impacts are surface waters located downstream of activities associated with the Proposed Action, or with the Alternate Site.

3.4.1.3 Existing Conditions

3.4.1.3.1 Missouri River

From Montana to the South Dakota-Nebraska border, the U.S. Army Corps of Engineers (USACE) operates six large dams that are the centerpiece of the Missouri River water storage system, the largest in North America. The USACE's water-release schedule for the dams enhances navigation for barges by maintaining a nine-foot-deep channel from Sioux City, Iowa, downstream to St. Louis (NAS, 2002). Except for periods of extreme flood and drought, the flow of the Missouri River through Missouri is now largely dependent on the discharge from last of the six dams, Gavins Point Dam on the South Dakota-Nebraska border. The construction of these dams and others in the Missouri River basin, the channelization of the lower 735 miles of the river, the building of levees, conversion of riparian corridors to cropland, and other human activities over the past century have led to significant reductions in the natural habitat and abundance of native species along the Missouri River (NAS, 2002). For example, of the 67 fish species native to the river, 51 are now listed as rare, uncommon, or decreasing in numbers, and one is an endangered species. (NAS, 2002). The U.S. Fish and Wildlife Service (USFWS)

has suggested decreased flow during the summer to more closely simulate natural conditions for the benefit of fish and wildlife. However, lower summer flows on the Missouri could curtail commercial navigation or cause water temperatures to rise above Missouri's temperature standard (MDNR, 2006e).

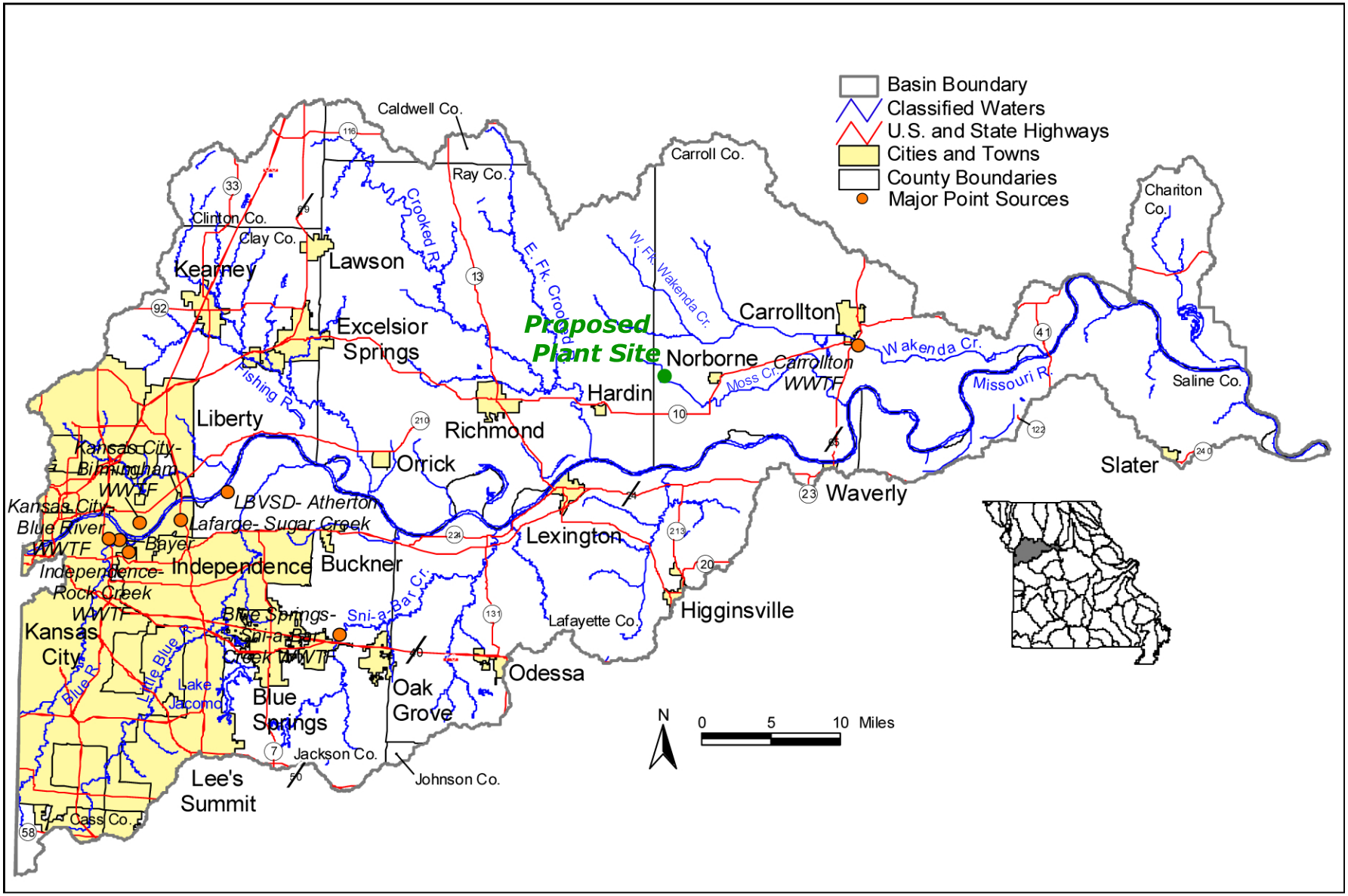
3.4.1.3.2 Norborne Area

The Western Missouri River Basin (Figure 3-33) is made up of the Missouri River mainstem and the Blackriver and Lamine River watersheds to the south. The Missouri River mainstem watershed in which the proposed Norborne Site lies is shown in Figure 3-33. The Norborne Site lies at the edge of the floodplain, and includes part of the Norborne Drainage Ditch, a drainage channel in the floodplain that flows to Moss Creek. The classified waters shown in the figure are streams and water bodies for which MDNR has identified uses and corresponding water quality standards. A classified stream is one that is either a permanently flowing stream or one that may stop flowing in dry weather but still maintains large pools of water that support aquatic life.

To the north of the plant site lies the Wakenda Creek Watershed, where the proposed coal supply rail connector would be located. The proposed transmission line to Thomas Hill would cross Wakenda Creek and the proposed line to Sedalia would cross the Missouri River south of the site.

Drainage from the proposed plant site flows into a drainage ditch that leads to Booker Slough, which is within the Missouri River floodplain area and flows into Wakenda Creek just west of Carrollton. Both Wakenda Creek and Booker Slough are largely channelized in the Missouri floodplain area.

This basin is underlain by clayey glacial till and Pennsylvanian shales that allow very little infiltration of water to the subsurface. Therefore, most water movement in the basin is through the surface stream network and baseflows to streams are very low during dry periods. Several northern tributaries of the Missouri flow for significant distances within the sand and gravel aquifer of the Missouri floodplain. Therefore, even during dry weather, these streams would often hold substantial amounts of water if the alluvial aquifer is high enough to intercept the streambeds (MDNR, 2006e).



Source: MDNR, 2006e

Figure 3-33._Watershed: Missouri River Mainstem-Kansas City to Glasgow

There are 758 miles of classified streams in the basin, about 5 miles of which have water quality impairments from point sources, meaning they do not meet their applicable Missouri water quality standards.[53] Most of the impairments from point sources are due to discharges from small wastewater treatment facilities in the Kansas City area (MDNR, 2006e).

Nonpoint source pollution occurs when pollutants enter bodies of water at many locations over a wide area rather than at specific, well-defined points. Examples include the erosion of sediments or the entrance of polluted surface runoff or groundwater into lakes and streams. Locations of nonpoint source pollution are often widely dispersed and are difficult to identify or control. In prairie streams such as the Missouri River and its tributaries in the basin, some of the major nonpoint source issues are the degradation of aquatic habitat from channelization, other streambank alterations, and loss of riparian corridors. Soil erosion, subsequent instream sediment deposition, and runoff of fertilizers, pesticides, and animal wastes are also concerns (MDNR, 2006e).

Habitat impairment is a serious concern in this basin. Of the 758 classified stream miles in the basin, 736 miles, or 97 percent, are considered by MDNR to be impaired habitat for aquatic life. Causes of this impairment may include channelization, excessive sedimentation (usually as a result of channelization), loss of aquatic vegetation or associated wetlands, and impoundment. Channelization is the process of straightening a stream or river by removing natural meanders. A channelized stream has steeper slopes, faster streamflow, higher peak flows and lower base flows, resulting in increased erosion and sediment transport when flow is high, and reduced habitat when flow is low. Twenty-seven percent of the rivers and streams in the basin have been channelized. These channelized miles may represent only 50-70 percent of the miles that were originally present. The Missouri River itself has undergone extensive modification such as narrowing and deepening for the purpose of aiding navigation. These alterations have resulted in the loss of most of the still, shallow backwaters and side channels. The population and diversity of fish and other aquatic life in the Missouri have dropped substantially due to this loss of habitat (MDNR, 2006e).

3.4.1.3.3 Big Lake Area

The Northwestern Missouri River Basin, in which the Big Lake Alternate Site is located, is made up of the Missouri River mainstem, in which the Big Lake

[53] 10 CSR 20-7.031

Site is located, and the Nodaway and Platte River watersheds to the east. The part of the Missouri River mainstem in which the Big Lake Site is located is shown in Figure 3-34.

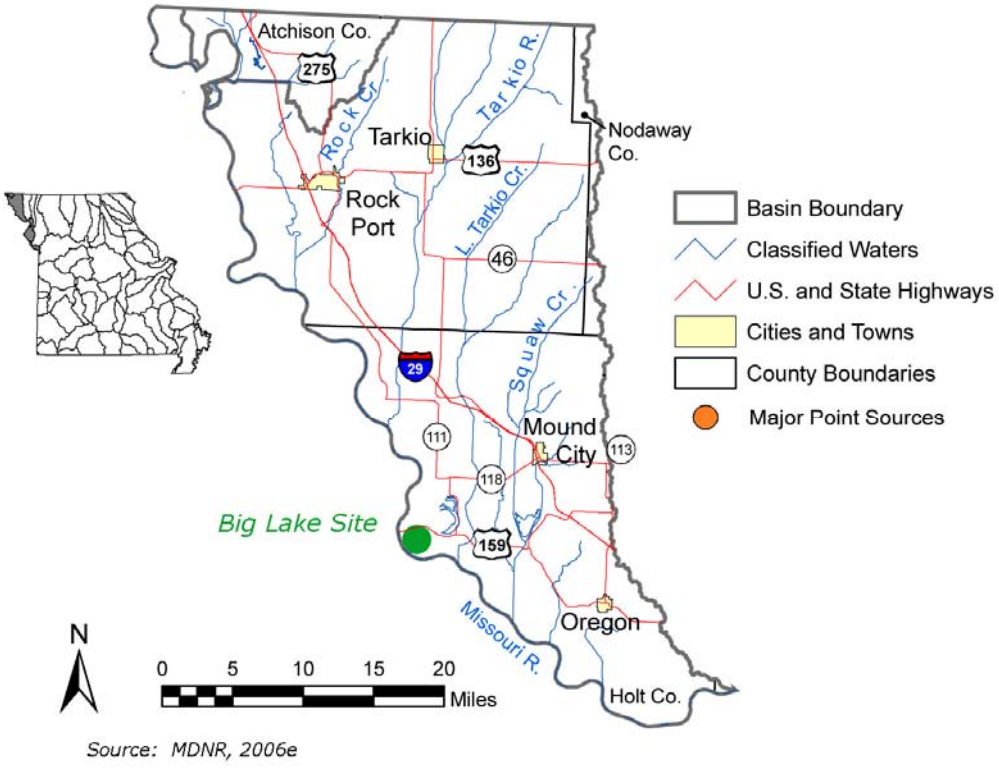


Figure 3-34. Watershed: Missouri River Mainstem Northwest

The Big Lake Alternative Site is located on a very wide part of the Missouri floodplain, close to the river. Across the Missouri River in Nebraska is the floodplain of the Big Nemaha River, which flows into the Missouri just south of the Big Lake Site. Big Lake, at 625 acres the largest oxbow lake in Missouri, is visible in Figure 3-34, in the floodplain to the east of the Big Lake Site. An oxbow is a former river meander that was cut off when the river found a shorter course. There are several other oxbow lakes in the Missouri River floodplain within this basin. The main pool at Squaw Creek NWR, located east of Big Lake on Squaw Creek, is 615 acres in size, but is a shallow manmade impoundment that sometimes contains very little water (MDNR, 2006e). There are three small springs of note in the basin. None of the springs sustain flow during dry weather. Since very little water infiltrates to the subsurface, streamflow can be very high during wet weather. For the same reason, base

flows, streamflow sustained only by the re-emergence of groundwater into the stream, are very low during the intervening dry periods (MDNR, 2006e). There are no major point sources within the subwatershed shown in Figure 3-34, but 79 percent of the classified streams in the basin are considered by MDNR to have degraded aquatic habitat from non-point sources. The prevalence of highly erosive loess soils and the large amount of row crop agriculture in the basin result in some of the highest soil erosion rates in Missouri and high levels of sediment deposition in streams (MDNR, 2006e). Surface water resources at the Squaw Creek NWR, east of the Big Lake Site, are heavily impacted by sediment deposition (USFWS, 2006a).

There are important natural surface water resources in the area east of the Big Lake Site. Big Lake Marsh, a 150-acre marsh in Big Lake State Park, is one of only three marshes in Missouri that have been designated as Outstanding State Resource Waters[54]. It is the largest of the three. The Squaw Creek NWR, east of Big Lake State Park, protects a portion of a vast historic wetland basin that contained large marshes with meandering creeks that have since been straightened for agricultural drainage (USFWS, 2006a).

3.4.1.3.4 Currently Impacted Waters

Under the Clean Water Act (CWA) requirements, the MDNR prepares periodic reports of Water Quality in Missouri (Section 305(b) reporting) and of waters that are considered impaired because of failure to meet applicable regulatory water quality standards (Section 303(d) list). Not all impaired waters are included in the 303(d) list, only those that do not meet the specific water quality standards (MDNR, 2006g). Other impairments not related to water quality standards are addressed in the Section 305(b) report.

Section 305(b) Report

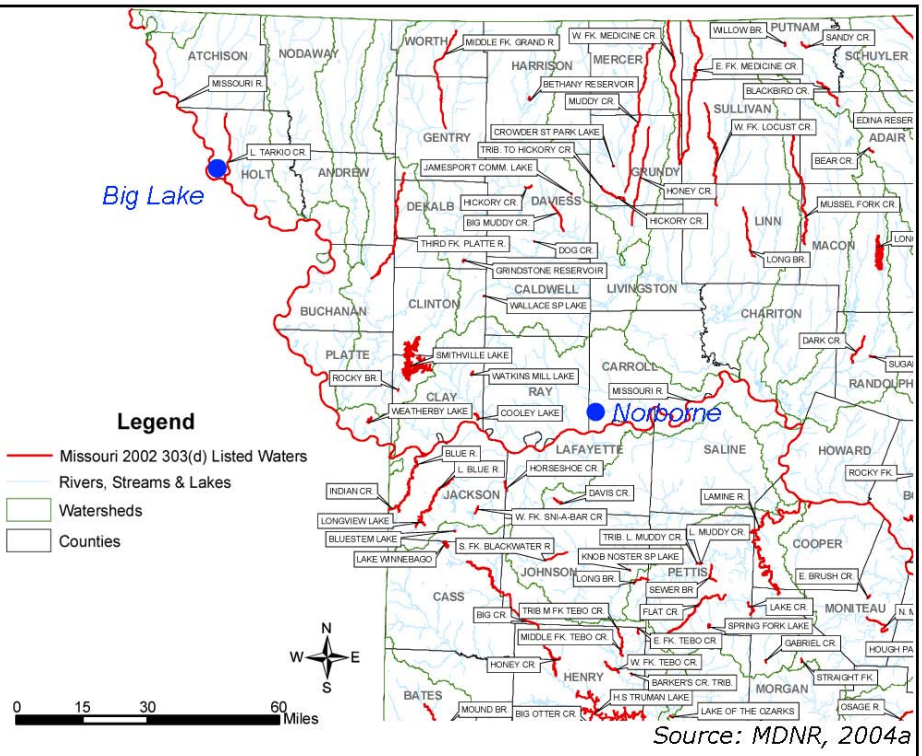
According to MDNR's 305(b) report (MDNR, 2006g), 76 percent of Missouri's classified streams are impaired. The two major sources of pollution causing impairment are crop production (causing impairment to 34 percent of Missouri stream miles) and channelization (causing impairment to 17 percent of Missouri stream miles). Other sources are atmospheric deposition (4 percent), mining tailings (one percent), and natural sources (one percent). Other sources such as municipal discharges, urban runoff, industrial point source discharges account for less than one percent each.

[54] 10 CSR 20-7.031

Section 303(d) List

Section 303(d) of the federal CWA requires that each state identify waters that are not meeting water quality standards. These waters, because of degraded water quality, do not sustain all of its beneficial uses under state regulation. Water quality standards protect beneficial uses of water such as whole body contact for swimming, maintaining fish and other aquatic life and providing drinking water for people, livestock and wildlife. These waters need to be further addressed by a Total Maximum Daily Load (TMDL) study or requirements for pollution controls to characterize the nature and causes of the impairment. Each state must compile a list biennially and submit it to the EPA for approval and proceed with further attention to correct the impairment. Not all impaired waters are included in the 303(d) list (MDNR, 2006g).

Because of regulatory changes that occurred during 2003 and 2004, a 2004 list was not issued, and the 2002 list is still in effect. Impaired waters from the 2002 list in the general project area are shown in Figure 3-35.



Source: MDNR, 2004a

Figure 3-35. Missouri 2002 Section 303(d) Listed Waters

In October 2006 MDNR published a draft 2004/2006 list for review. In the draft 2004/2006 list, many streams were deleted and some were added. Most deletions occurred either because the stream quality improved or because the standards for listing were more rigorous, or changed. For example, the Little Tarkio Creek near Big Lake is proposed for delisting for sediment impairment because there were no data to support the classification, not because the stream quality improved. The Missouri River, on the other hand, is proposed for delisting because it now meets the water quality standards for chlordane and polychlorinated biphenyls (PCBs). There are no streams within the subwatersheds for either the Big Lake Site or the Norborne Site currently on the proposed Section 303(d) list. There are streams on the draft list within the transmission corridors, shown in Table 3-13. The segments of the Grand and Chariton Rivers and their tributaries shown on the list are all crossed by the proposed Norborne to Thomas Hill transmission route corridor.

3.4.2 Environmental Consequences

3.4.2.1 Identification of Issues

As with groundwater, most surface water related issues fall into the two broad categories. With surface water these are 1) potential adverse impacts on surface water quality from discharges associated with construction and operation and 2) potential changes in the hydrology from water withdrawal or diversion. The following specific issues were identified during the scoping process and the EIS development process:

- Need for special attention to areas subject to soil erosion caused by rain and water flow
- Potential effects on river biota from heated discharge water
- Potential impacts of National Pollutant Discharge Elimination System (NPDES) discharges; where are the locations, what are the monitoring requirements
- Concern about water from Big Lake being used for water supply (Big Lake Site)

Table 3-13. Streams in Region on 2004/2006 Proposed Missouri Section 303(d) List

Waterbody Name	WBID	First Year on 303(d)	Length/Area of Impaired Segment	Pollutant	Source	Impaired Uses*	Other Designated Uses*	Upstream Endpoint of Impaired Segment		Downstream Endpoint of Impaired Segment		Primary County
								Latitude	Longitude	Latitude	Longitude	
Chariton River	640	2006	20.0 mi.	Bacteria	Unknown	WBC	FC, AQL, LWW, SCR, IRR	39.6819	-92.6928	39.4428	-92.8784	Chariton
East Fork Chariton River	682	2006	48.5 mi.	Sulfate	Multiple AMLs	AQL	FC, LWW, WBC, DWS, IRR	39.7509	-92.5158	39.3403	-92.8445	Randolph
East Fork Grand River	457	2006	25.0 mi.	Bacteria	Unknown	WBC	FC, AQL, LWW, DWS, IRR	40.4943	-94.3123	40.1977	-94.3620	Gentry
Grand River	593	2006	60.0 mi.	Bacteria	Unknown	WBC	AQL, FC, LWW, SCR, DWS, IRR	39.7410	-93.5352	39.3844	-93.1071	Chariton
Little Muddy Creek, Tributary to	3490	1998	0.4 mi.	Color, Chloride	Tyson Foods	AQL, GC**	FC, LWW, WBC	38.7680	-93.3021	38.7731	-93.2912	Pettis
Middle Fork Grand River	468	2006	25.0 mi.	Bacteria	Unknown	WBC	AQL, FC, LWW, SCR, IRR	40.5418	-94.3513	40.2186	-94.3944	Gentry
Muddy Creek	853	2006	1.0 mi.	Color	Tyson Foods	GC**	AQL, FC, LWW, WBC	38.7718	-93.2748	38.7675	-93.2582	Pettis

*Designated Use Codes: AQL-Protection of Aquatic Life (Warm, Cool, or Cold Water); FC-Fish Consumption; WBC-Whole Body Contact Recreation; SCR-Secondary Contact Recreation; DWS-Drinking Water Supply; IRR-Irrigation; LWW-Livestock & Wildlife Watering; IND-Industrial; AML-Abandoned Mine Land

**General Criteria: Although no specific designated uses have been impaired, the general water quality criteria which apply to all waters of the state [10 CSR 20-7.031 (3)] have been violated, so the water is considered impaired and eligible for the 303(d) list. In the case of unclassified waters, this includes acute toxicity.

Source: MDNR, 2006c

- Potential hydrologic impacts to local community, hunt clubs, Mallard Marsh, Big Lake State Park, and area wetlands
- Control of runoff during construction
- Control of runoff during plant operation
- Effects on Missouri River level due to water withdrawal

3.4.2.2 Significance Criteria

Impacts would be considered significant if either of the following occurred:

- Surface water quality is substantively impacted during construction or operation by runoff water or discharges that fail to meet standards established by the state.
- Surface water bodies or streams are substantively impacted by water withdrawals or by diversion of storm water runoff.

3.4.2.3 Impact Assessment Methods

3.4.2.3.1 Storm Water Runoff During Construction

Construction activities have the potential to impact surface water primarily by exposing soil which then may be eroded and deposited into streams and other water bodies. During construction at this site much of Section 17 (one square mile) would be disturbed for plant construction and much of the southwest quarter of Section 8 would be disturbed for landfill construction. The disturbed areas for other features would be much smaller. The railroad corridor right-of-way (about 150 to 200 feet wide) (AECI, 2006i) would be disturbed, plus areas for access roads, and wider areas at locations of cuts. There would be little ground disturbance for the transmission line except at support locations, access roads, and substations. All ground disturbance areas associated with the project construction would be subject to the state storm water pollution prevention requirements. Those parts of the site within loess soils (essentially all parts not in the floodplains) would require more attention because of the highly erodible nature of this soil.

Missouri requires a storm water permit for any construction activity that disturbs more than one acre.[55] Special permits are required for activities near water resources with special protection such as outstanding resource waters or losing streams. The permit requires development of a storm water pollution prevention plan (SWPPP), which is intended to reduce the amount of sediment and other pollutants in storm water and to ensure compliance with Missouri Water Quality Standards (MDNR, 2004b). Among the items that must be included in a SWPPP are:

- A description of the BMPs that would be used (e.g., silt fences, straw bales, rock dams, mulching) and where they would be installed
- Locations of sedimentation basins for each drainage area with 10 or more acres disturbed at one time
- Additional site BMPs to be used, such as solid and hazardous waste management, provision of portable toilets, proper storage of construction materials, installation of containment berms and use of drip pans at petroleum product and liquid storage tanks and containers (MDNR, 2004b).

3.4.2.3.2 Operation Discharges

MDNR achieves water quality ,management of point source pollutants through the issuance and enforcement of wastewater discharge permits. These permits limit the amount of pollutants that can be discharged. All point source wastewater dischargers must obtain a permit and adhere to its discharge limitations. All permits require at least a level of treatment equal to national wastewater treatment standards. In situations where these national treatment standards are not adequate to protect the streams or lakes receiving these wastewater discharges, stricter permit limits that do protect these waters are required. The permits require regular monitoring and reporting of discharge quality. The department also conducts regular inspection of wastewater treatment facilities and receiving waters. As described in *Section 2.4.6, Wastewater Collection and Treatment*, all potentially contaminated surface and process water from the plant would be treated prior to discharge at a single NPDES-permitted location. The discharge would be to the Missouri River at a location to be determined and included in the NPDES permit.

[55] 10CSR20-6.200

To protect the landfill from flooding by surface water runoff during operation, the active cells of the landfill would have internal dikes and external ditches. The external ditches would be sized to convey the flow from a 50-year rainfall, which AECI defined as 3.2 inches of rain in a one-hour period (AECI, 2005f).

Monitoring Requirements

Monitoring requirements would be established in the NPDES permit that would be issued for the site, based on regulatory standards and site-specific conditions. For point sources such as this facility that discharge more than one million gpd to the Missouri River, Missouri regulations require collection of a minimum of 20 samples per year to be analyzed for effluent standards, unless the applicant can show that the wastewater has a consistent quality, such as once-through cooling water, then the permit may require less frequent monitoring.[56]

Water Quality Standards

Discharges may not impact streams above water quality standards established by the state, except that in larger streams such as the Missouri River, a mixing zone is allowed.[57] For the Missouri River, the mixing zone is ¼ mile in length and ¼ the stream width, cross sectional area or volume of flow. Permit-specific modifications for lengths of thermal plumes in mixing zones may be made. Different water quality standards may be applicable for different streams, depending on the stream use. Missouri has established water quality standards for each of the following uses: irrigation, livestock and wildlife watering, protection of warm-water aquatic life and human-health fish consumption, cool-water fishery, cold-water fishery, whole-body contact recreation, secondary contact recreation, drinking water supply, and industrial. Missouri streams are classified according to these uses, and water quality standards are established for each use.[58] All use categories apply to the Missouri River except cool-water and cold-water fishery.

[56] 10 CSR 20-7.015(2)(D)1B.
[57] 10CSR20-7.031
[58] 10CSR20-7.031, Tables A and H

Thermal Effects

Standards for temperature are included in the water quality criteria for protection of aquatic life and warm-water fisheries, which are applicable to the Missouri River. Outside the mixing zone, the discharge cannot raise or lower the temperature more than five degrees Fahrenheit, or increase the temperature over 90 degrees.[59] Under Section 316(a) of the CWA, this thermal standard can be appealed if it can be demonstrated that the standards can be less stringent and still "assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water". AECI does not plan to appeal and plans to comply with the standards Missouri has established for protection of aquatic life. To ensure that river water temperatures would not be increased over 90 degrees, AECI plans to limit the temperature to 90 degrees at the point of discharge.

Potential Hydrologic Effects on Streams and Other Water Bodies

With both the Norborne Site and the Alternate Big Lake Site, AECI would obtain water for the plant from a well field located near the Missouri River. Obtaining water from surface sources is not being considered. Discharge would be to the Missouri River in either case. Therefore, no surface streams or other water bodies other than the Missouri River would potentially be impacted by water withdrawals or discharges. The drawdown curves shown in the figures in *Section 3.3, Groundwater*, show drawdown within the aquifer. The lines cross the river, but the effect shown would be in the aquifer beneath the river, not in the river water itself. The effect on the river level of pumping would not be measurable. The average Missouri River flow is about 52,000 cfs and the lowest flow measured was about half that amount. The proposed wells would be pumping at a maximum rate of 7,400 gpm, which is about 16 cfs, less than 1/1000th of the lowest measured flow of the river. A good discharge measurement on the Missouri River is within five percent of actual discharge (Kelly, 2007). Therefore, the amount removed by pumping would not be measurable in the river level.

[59] 10CSR20-7.031(4)(D)

3.4.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

Potential Hydrologic Impacts

- Use of groundwater at the Missouri River would prevent impacts from surface water withdrawals.

Potential Contamination of Surface Water

- A SWPPP would be implemented to prevent impacts to stream and other water bodies from storm water runoff during construction.
- The fuel oil unloading, piping, and storage system would be provided with containment and leak detection as required by 40 CFR 112, Oil Pollution Prevention.
- The utility waste landfill leachate collection pond would be sized to retain the flow from a 50-year, 24-hour rainfall over the largest open active area of the landfill expected during the lifetime of the landfill.
- The plant would have a coal pile runoff treatment area.
- An oily water system would be provided for potentially oily runoff.
- Discharge water temperature would be at or below the maximum allowable at the plant site, before it is discharged.
- An SPCC Plan would be provided as required for containment and control of liquids that have the potential to contaminate surface water.
- Water from chemical cleaning would be collected and treated as described in *Section 2.4.6.4, Chemical Cleaning*.
- All runoff water that may be contaminated would be collected and treated as described in *Section 2.4.6, Wastewater Collection and Treatment*.

3.4.2.4.1 Impact Assessment

Proposed Action

The large area of disturbed soil that would be exposed during construction and the use of fuels and chemicals during operation of the plant indicate the potential for surface water impacts. However, with implementation of the environmental regulatory requirements outlined in this section, no significant impacts to surface water would be anticipated.

The only streams on Missouri's proposed 2004/2006 Section 303(d) in the area of the Proposed Action are within the proposed transmission line route corridors (Table 3-13). Identified pollutants causing impairment of these streams are bacteria (from unknown sources), sulfate (from abandoned mine lands), and color/chloride (from a food processing facility). The activities associated with construction of a transmission line in the vicinity of these streams would not be expected to contribute any of the identified pollutants, and would not be expected to contribute to further impairment of these streams.

Big Lake Alternate Site

The assessment outline above for the Norborne Site would also be applicable for the Big Lake Site. No hydrologic impacts to Big Lake, the local community, hunt clubs, Mallard Marsh, Big Lake State Park, or area wetlands would be expected.

IGCC Alternative

Water requirements and other relevant features for the IGCC alternative would be similar to requirements for the Proposed Action (Amick et al, 2002). Therefore, the impacts on surface water would be expected to be similar.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on surface water.

3.4.2.4.2 Mitigation and Residual Impacts

If adopted, the following would contribute to reductions in impacts from the Proposed Action:

- Implementing Missouri's guidance for BMPs for erosion, sediment, and storm water (MDNR, 1999b).

- Requiring the top elevation of all berms for wastewater storage ponds be above the 100-year flood elevation.

3.5 FLOODPLAINS

3.5.1 Affected Environment

The following sections describe the current floodplain conditions. The description of current conditions represents the baseline for the assessment of impacts and environmental consequences.

Areas of potential flooding (100-year and 500-year floodplains as determined by the Federal Emergency Management Agency (FEMA)) have been identified in the vicinity of the Proposed Action and are presented on Figure 3-36.

The proposed power plant site, which is located mainly in Section 17, T7N, R25W, is situated at the edge of the 100-year floodplain. The proposed landfill site is not in the 100-year floodplain (Figure 3-36).

3.5.1.1 National Flood Insurance Program

FEMA, through the National Flood Insurance Program (NFIP), has primary responsibility for developing and implementing regulations and procedures to control development in areas subject to flooding. The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. FEMA describes the NFIP as follows:

> The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement

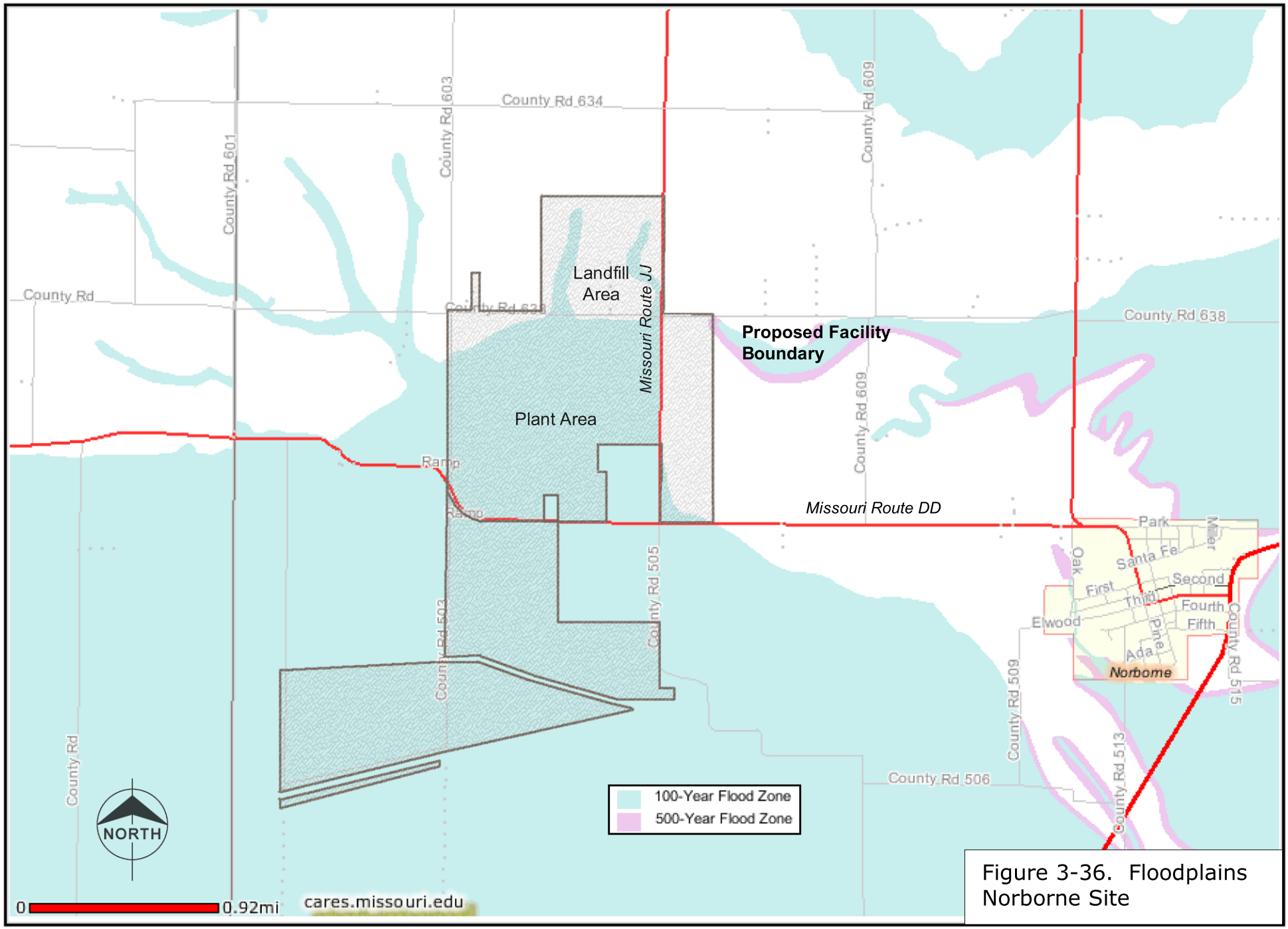


Figure 3-36. Floodplains Norborne Site

> between communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the federal government would make flood insurance available within the community as a financial protection against flood losses (FEMA, 2002).

A "community" as defined by FEMA can be a tribe, a state or any political subdivision of a state that has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction. In all parts of the project area the respective counties are the communities with authority. For example, for the Norborne Site, the NFIP is administered by Carroll County.

3.5.1.1.1 Flood Insurance Rate Maps (FIRMs)

To implement the NFIP, FEMA prepares Flood Insurance Rate Maps (FIRMs) that show special flood hazard areas (SFHAs) where flood insurance is mandatory. The 100-year flood, or base flood, is the flood having a one percent chance of being equaled or exceeded in any given year. The base flood is the national standard used by the NFIP and all federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base flood elevations (BFEs) are typically shown on FIRMs (FEMA, 2006b).

3.5.1.1.2 Regulatory Floodways

In addition to the SFHAs and applicable flood insurance rates, regulatory floodways are intended to be shown on the FIRMs. FEMA defines regulatory floodway as follows[60]:

> A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where FEMA has provided BFEs, but no floodway has been designated,

[60] 44CFR59.1

> the community must review floodplain development on a case-by-case basis to ensure that increases in water surface elevations do not occur, or identify the need to adopt a floodway if adequate information is available.

Regulatory floodways have not been identified for all areas; in particular, rural areas are less likely to have regulatory floodways identified. The Carroll County FIRMs do not have regulatory floodways shown, nor do any of the counties through which the proposed Norborne Plant transmission lines pass. Holt County does have designated regulatory floodways, at least in the area of the Alternative Big Lake Site.

3.5.1.1.3 Floodplain Ordinance Requirements

At a minimum, community ordinances must require flood insurance and must issue permits for new construction in SFHAs. They also must require that for new residential construction the lowest floor elevation is above the BFE, and for new non-residential construction, either the lowest floor elevation is above the BFE, or, alternatively, any part of structure below the BFE is floodproofed.[61]

Regarding regulatory floodways, the community's ordinance must also, at a minimum[62]:

> Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.

If FIRMs with designated flood insurance zones are available, but regulatory floodways have not been designated, the community ordinance must, at a minimum[63]:

[61] 44CFR60.3
[62] 44CFR 60.3 (d) (3)
[63] 44CFR60.3(c)

> Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, would not increase the water surface elevation of the base flood more than one foot at any point within the community.

Carroll County does not have additional requirements of its own and therefore requires only compliance with the FEMA requirements (Carroll County, 2006a).

3.5.1.2 Executive Order on Floodplains

USDA/RD's regulations require compliance with executive orders, which are issued by the President of the U.S.. An executive order on floodplain management states the following[64]:

> If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.

3.5.1.3 Region of Influence

The region of influence for assessing impacts on floodplains includes all facilities related to the Proposed Action. The Project parcels, well site, transmission lines and rail connectors were evaluated to determine the level of possible floodplain impacts.

[64] Executive Order 11988, May 24, 1977

3.5.1.4 Existing Conditions

3.5.1.4.1 Norborne Site

Proposed Plant Site, Well Field, and Rail Corridors

The proposed power plant site and substation are located within the 100-year flood zone of the Missouri River, as defined by FEMA. The current effective FIRM for Carroll County is dated October 17, 1986[65] (FEMA, 2006a). The Norborne site, south rail alternative, and well field are located within an area with BFEs determined (Zone A7), with a small portion of the site designated as within the 100-year floodplain with no BFEs determined (Zone A). The 100-year and 500-year flood elevations for the proposed Norborne facility are 687.1 feet and 689.5 feet, respectively (AECI, 2005f).

The Wakenda Creek and West Fork Wakenda Creek Floodplains are in Zone A. The north rail connector corridor is partially within the 100-year floodplain of Wakenda Creek (Figure 3-37).

Proposed Transmission Lines

The proposed transmission route would cross several 100-year floodplains. Except for the Missouri River (Zone A7) and the Grand River (Zone AE, a more recent designation, similar to A7), which have BFEs determined, all crossings are designated Zone A (within 100-year flood elevation but with no BFE determined). None of the streams had floodways designated. AECI estimates that floodplains crossings less than about 1,000 feet long can be spanned. Floodplain crossings greater than 1,000 feet are listed in Table 3-14 and shown in Figures 3-38 and 3-39. Note that the crossing length is greater than the floodplain width when the crossing is transverse (not at right angles to the floodplain). Transverse crossings may be necessary to avoid other impacts. Coordination with the respective counties would be needed regarding any requirements for placement of transmission line supports in floodplains without designated floodways.

[65] Carroll County, Missouri Map Number 29057C0175 B, panel 100 of 225 for the plant site and panel 175 for Wakenda Creek.

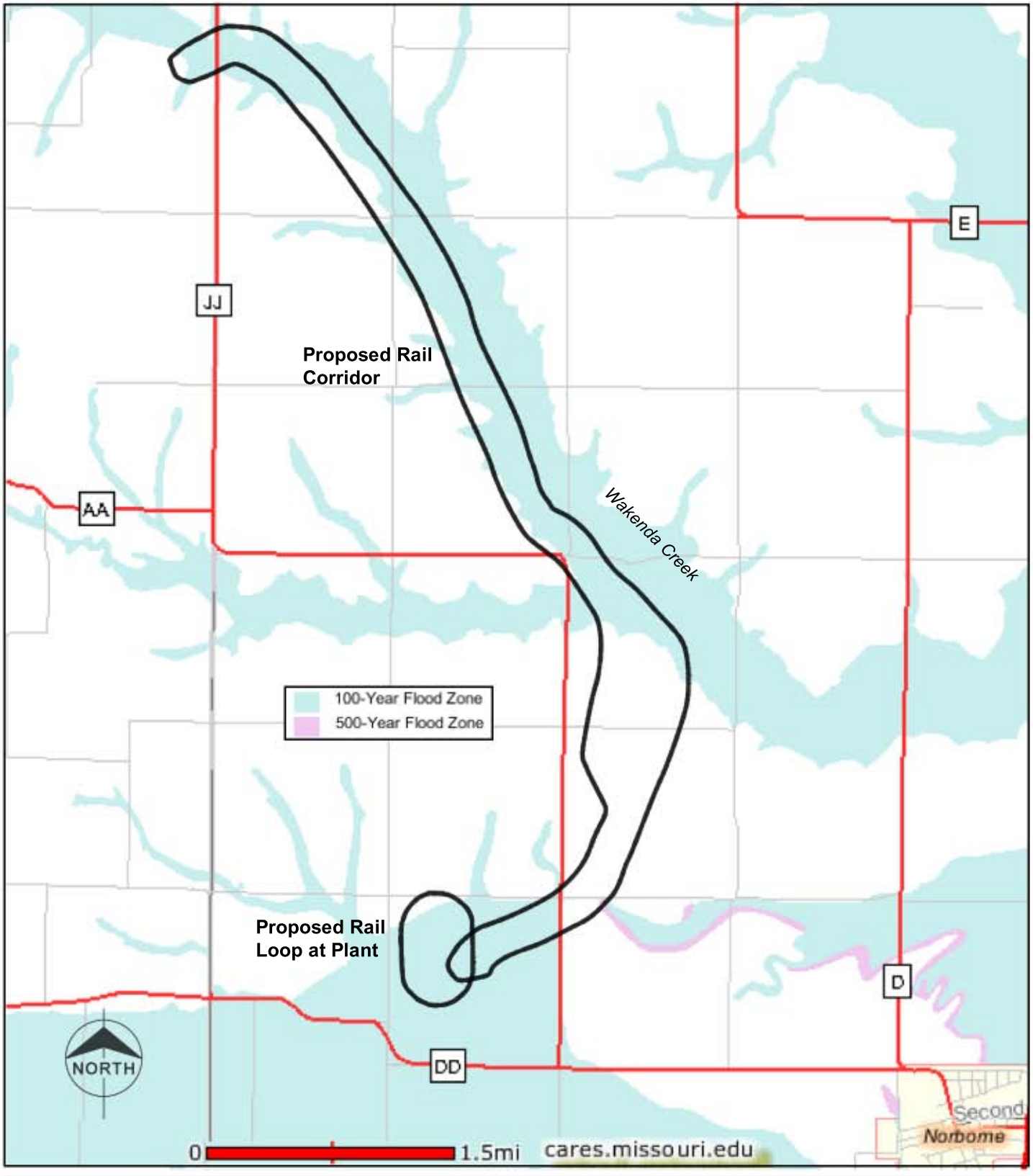


Figure 3-37. Floodplains
Norborne North Rail Corridor

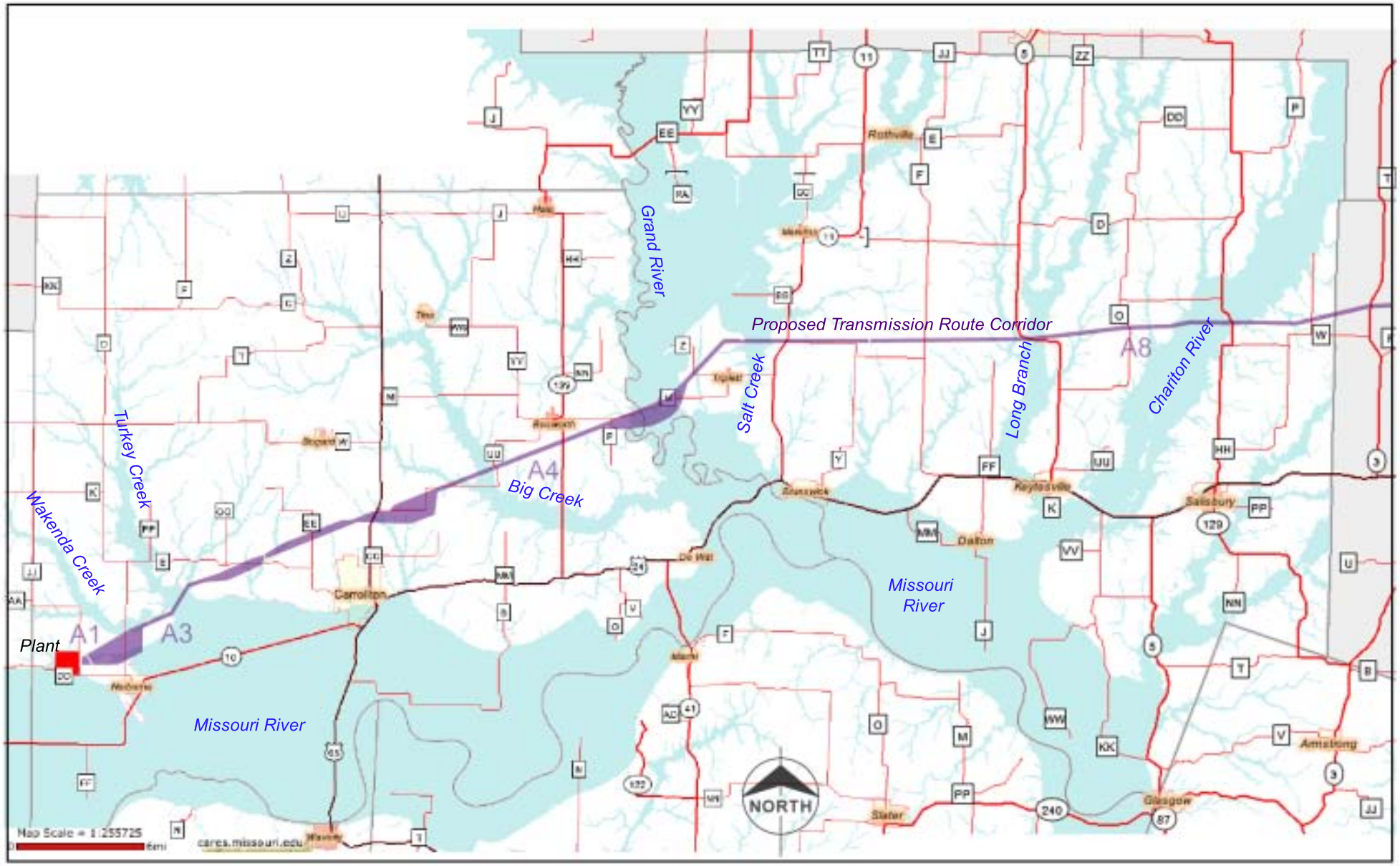


Figure 3-38. Floodplains Norborne to Thomas Hill Transmission Route Corridors

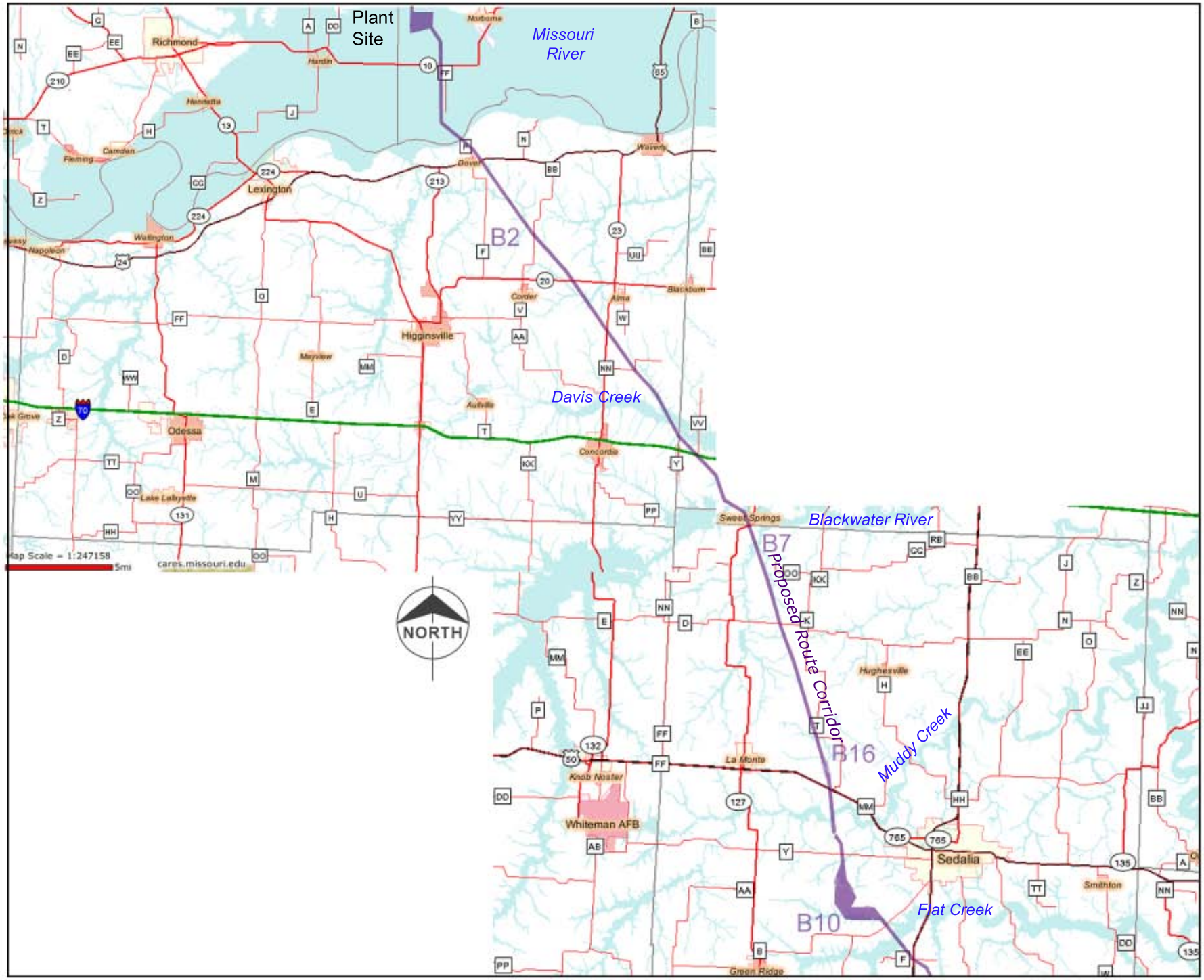


Figure 3-39. Floodplains--Norborne to Sedalia Transmission Route Corridors

Table 3-14. Estimate Lengths of 100-Year Floodplain Crossings

County	Stream	Approximate Length of Crossing, ft.	Figure Reference
Norborne to Thomas Hill			
Carroll	Wakenda Creek	10,000	3-38
Carroll	Turkey Creek	10,000	3-38
Carroll	Big Creek	5,000	3-38
Carroll/Chariton	Grand River	12,000	3-38
Chariton	Salt Creek	6,000	3-38
Chariton	Long Branch	6,000	3-38
Chariton	Chariton River	17,000	3-38
Norborne to Sedalia/Mt. Hulda			
Lafayette	Davis Creek	10,000	3-39
Pettis	Blackwater River	3,000	3-39
Pettis	Muddy Creek	2,000	3-39
Pettis	Flat Creek	2,000	3-39

3.5.1.4.2 Big Lake Site

According to the applicable FIRM, dated January 6, 1988[66], the Big Lake site is located within a 100-year floodplain with approximately 30 percent of the site along the Missouri designated as a regulatory floodway (AECI, 2005a). The site is large enough to accommodate the power plant facilities on fill material that would elevate the power plant out of the floodplain. No power plant facilities would be located in the floodway. Where determined within the site, the BFE line ranges between 858 to 862 feet.

3.5.2 Environmental Consequences

3.5.2.1 Identification of Issues

The following issues were identified during scoping and the EIS development process:

[66] Holt County, Missouri and Incorporated Areas Map Number 29087C0095 B, panel 95 of 190

- Increases in flooding on neighboring farms and other areas from raising of plant elevations in floodplains
- Potential impacts to floodway, use of USACE recalculated flood frequencies
- Compliance with Executive Order 11988 on Floodplain Management
- Loss of floodplain values
- Potential effect on possible plans to restore floodplain functions
- Potential flooding of landfill

3.5.2.2 Significance Criteria

The effects of the Proposed Action and alternatives would be considered significant if the following would occur:

- Encroachment on a floodplain or alteration of a stream, watershed, or river flow that would cause a rise in river or stream flood stage, such that the incremental water level rise caused by encroachment or alteration would cause property damage or threats to human safety that would not otherwise have occurred.
- Encroachment on a floodplain that would cause a violation of FEMA NFIP policy.
- Flooding of the landfill site during operation.

3.5.2.3 Impact Assessment Methods

3.5.2.3.1 Potential for Increased Flooding

As required by FEMA and county ordinances, AECI would conduct a study to assess the cumulative effect of the proposed development, when combined with all other existing and anticipated development, on flood levels within Carroll County and other counties as applicable. This procedure is required even though the plant would be located on the edge of the floodplain and would be expected to have negligible impact on flood levels, because regulatory floodways have not been established in Carroll County or in any of

the counties through which the transmission lines would pass. AECI commits to hold a community meeting to review the results of the floodplain hydraulic study for the Norborne facility if there is a local desire to do so and the regulatory agencies with floodplain authority participate. The work would be done in cooperation with the USACE and would use recalculated USACE flood frequency values as appropriate.

Drainage impacts including flooding can result from the disruption of natural drainages caused by activities such as construction of rail and road embankments, and construction of fill areas in a floodplain. AECI is committed to creating no adverse impacts to the existing drainage upstream and downstream of the proposed plant site. Roadway and railroad culverts and bridges will be designed to ensure the existing drainage is not restricted. Modifications to drainage that will occur as a result of raising the level of the plant site will be designed to ensure the existing drainage is not restricted.

3.5.2.3.2 Compliance with Executive Order 11988

AECI evaluated sites outside the floodplain and has found that costs would be higher primarily because of the increased costs associated with site development in the hilly terrain adjacent to the floodplain. Water delivery costs would also be higher, because of the longer transmission route from the river and the need to pump to higher elevations. AECI estimates that site development costs would be approximately $34 million dollars greater for an upland site compared to the Proposed Action. Annual additional costs for pumping water would be about $750,000 (AECI, 2007a). AECI's contractual obligation to provide power "at the lowest feasible cost" as described in *Section 1, Introduction*, makes an upland site an impracticable alternative.

In addition, assessments of other environmental impacts support the proposed site. An upland plant would create greater intrusion into the visual landscape. AECI has identified a proposed site that has been highly modified in that natural vegetation has been removed and the original hydrology has been altered for drainage and flood protection. Because of the highly modified nature of the proposed site, impacts on the natural environment, except for the impact to high quality prime farmland soils, are low. As discussed in *Section 3.10, Wetlands, Riparian Areas, and Waters of the United States*, wetland impacts are very low and may be completely avoided.

To minimize potential harm to or within the floodplain (Executive Order 11988), the facility would be located at the edge of the floodplain, where flood depths are minimal. The Norborne site was chosen in an area with minimal remaining natural floodplain values: the area is all cropland and the only stream has been channelized; a levee also impacts the natural floodplain value.

The Federal Register notices of availability for both the Draft and the Final EIS incorporated USDA/RD's required notice under Executive Order 11988. The notice will also be included in the ROD.

3.5.2.3.3 Effects on Potential Restoration Plans

Big Muddy National Fish and Wildlife Refuge

The plan for the Big Muddy National Fish and Wildlife Refuge (NFWR) could include incorporation of any areas in the Missouri River floodplain. The project authorizes the purchase of up to 60,000 acres in 25 to 30 units between Kansas City and St. Louis. The construction of the Norborne Plant would not impact USFWS' opportunity to obtain property for the refuge in the vicinity of the plant.

Wakenda Bottoms Conservation Area Opportunity

The Wakenda Bottoms Conservation Area Opportunity (CAO) is not yet at the plan stage: it is a concept for a CA in the Missouri River floodplain in the vicinity of Wakenda Creek, where the floodplain is very wide. The CAO concept is being developed by a group of agencies and private interests. The general concept area is very large and includes the Norborne Plant site area (MCC, 2005). Several communities, including Carrollton and Norborne, are also within the concept area. The presence of the Norborne Plant would not affect the opportunity for a CA in Wakenda Bottoms, as it is presently conceived.

3.5.2.3.4 Potential Flooding of the Solid Waste Storage Area (Landfill)

The landfill would not be located in the floodplain; it is outside the FIRM SFHA and also above the 500-year flood elevation. AECI is currently planning for the bottom of the landfill liner to be at least five feet above the 100-year

flood elevation, and at least five feet above the maximum 100-year groundwater elevation (AECI, 2005f).

3.5.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action includes the following measures to reduce or prevent potential adverse impacts on floodplains:

- The plant would be located at the very edge of the floodplain, approximately 6 miles from the river at the nearest point, where flood depths are shallow, which would reduce impacts. Only the necessary features would be raised out of the floodplain, minimizing requirement for fill in the floodplain.

- The proposed site has low natural floodplain values, so these impacts are low: the vegetation is cropland and the hydrology has been modified by a levee and drainage channels.

- AECI would ensure that the existing drainage is not restricted or otherwise adversely impacted through proper design of roadway and railroad culverts and bridges, and through proper design of modifications to drainage that will occur as a result of raising the level of the plant site.

- In accordance with Missouri regulation, the landfill would not be constructed in a floodplain.

3.5.2.4.1 Impact Assessment

Proposed Action

FEMA FIRM maps were reviewed to assess impacts. The Norborne Plant site would require fill to raise it above the 100-year flood elevation. Current elevations at the proposed plant site are between 685 and 689 feet, compared to the 100-year flood elevation of 687.1 feet. Fill would be added to bring the grade elevation of the power block buildings, the outlying buildings, the access road, rails, and coal pile to three feet above the 100-year flood level (AECI, 2005f). Based on the FEMA FIRM maps, this elevation would also be above the 500-year flood elevation (Figure 3-37). All fill material would come either from the landfill excavation, which is above the floodplain, or

possibly from cut areas on the railroad right-of-way north of the plant and above the floodplain (AECI, 2007b).

AECI would prepare a study to assess the impacts of the plant and associated features on flood elevations, as required by FEMA and Carroll County ordinance. If impacts on flood elevations are in excess of those allowed by county ordinances, AECI would modify its plan to comply with the ordinances. A floodplain development permit application and potentially a No-Rise certification would need to be submitted. This work would be done after the EIS is complete. For the purposes of the EIS, a very simplistic analysis was done to assess the magnitude of the displaced floodwater: the estimated elevated area is about 120 acres, or about 0.2 square miles. If the entire area to be raised is at the lowest elevation (685 feet), two feet of flood storage space would be replaced by fill, over the 0.2 square miles. If this displaced floodwater were spread out over the approximately 21 square miles bordered by the plant, the town of Norborne and the river, it would raise the flood level by 0.2 inches, a negligible amount.

AECI commits to hold a community meeting to review the results of floodplain hydraulic study if there is a local desire to do so and the regulatory authorities participate.

If the south rail connection to the NS line is constructed, it would require fill for an embankment for a bridge over the Burlington Northern Santa Fe (BNSF) line. This embankment would be in the 100-year floodplain of the Missouri River.

The north rail connection would impact the 100-year floodplain of Wakenda Creek.

There would be minor impacts of floodplains from the transmission line, at stream crossings where the floodplain is too wide to span. This would require placing supports in the floodplain.

Big Lake Alternate Site

Impacts would be similar for the Big Lake Site, except that the site is much closer to the river. Site elevations range from about 853 to 860 feet, compared with 100-year flood elevations of about 858 to 862 feet. Parts of the site may be up to nine feet below the 100-year flood elevation. The rail

connector would also be in the 100-year floodplain. Since the regulatory floodway has been determined at this site and the facility would not impact the floodway, a study to assess impacts would not be needed, nor would a No-Rise certification. A floodplain development permit would be required.

IGCC Alternative

With IGCC, the floodplain impacts would be the same as for the Proposed Action.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed and there would be no change or disturbance of floodplain resources within the project area.

3.5.2.4.2 No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on floodplains.

3.5.2.4.3 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts and there would be no residual significant impacts.

3.6 FARMLAND

3.6.1 Affected Environment

3.6.1.1 Farmland Protection Policy Act

The Federal Farmland Protection Policy Act (FPPA), enacted by Congress in 1984, established criteria for identifying and considering the effects of federal actions on the conversion of farmland to nonagricultural uses. Forms AD-1006 and NRCS-CPA-106 of the NRCS are used for this purpose (*Appendix F, Farmland Conversion Impact Rating*). The fundamental purpose of the Act is to minimize the extent of farmland conversion and impacts and to "assure that federal programs are administered in a manner that, to the extent

practicable, would be compatible with state, unit of local government, and private programs and policies to protect farmland."

3.6.1.2 Region of Influence

The region of influence for assessing impacts on farmland includes all facilities related to the Proposed Action. The Project parcels, well site, and rail connectors would all require acquisition of farmland. The transmission lines would have minimal farmland takes, but could have potential impacts on center-pivot irrigation systems.

3.6.1.3 Existing Conditions

The project area is predominantly rural and much of the land is prime farmland, used for crop farming, with corn and soybeans the major crops. In 2005, Carroll County was one of the major producers of both corn and soybeans in Missouri. Table 3-15 shows agricultural and pasture land use for Carroll County and the other two counties nearest to the Proposed Action. According to the 2000 census, 600 people in Carroll County were employed in the category of Agriculture, forestry, fishing and hunting, and mining.

Table 3-15. Agricultural and Pasture Land Use (acres)

County/State	Cropland				Pasture		Land in Farms	
	Harvested		Pastured					
	1992	1997	1992	1997	1992	1997	1997	2002
Carroll	228,553	241,641	45,478	42,417	32,689	28,251	411,158	417,080
Lafayette	231,421	241,084	40,190	34,242	35,762	31,152	362,440	363,186
Ray	152,950	144,291	41,991	36,877	40,266	46,444	293,482	292,067
Missouri*	12,158.8	12,449.0	5,402.3	5,247.6	6,134.4	5,984.6	30,202.7	29,946.0

*Source: MASS, 2006a; *Missouri acres are in thousands*

The Big Lake Alternate Site is also in farmland. Figures 3-40 through 3-42 show prime farmland within the proposed Norborne facility boundaries, the rail connectors, and the Big Lake Alternate Site.

As discussed in *Section 2, Alternatives Including the Proposed Action*, almost all the land in the route corridors is farmland, prime farmland if drained or not

Figure 3-40.

Prime Farmland

Norborne Site

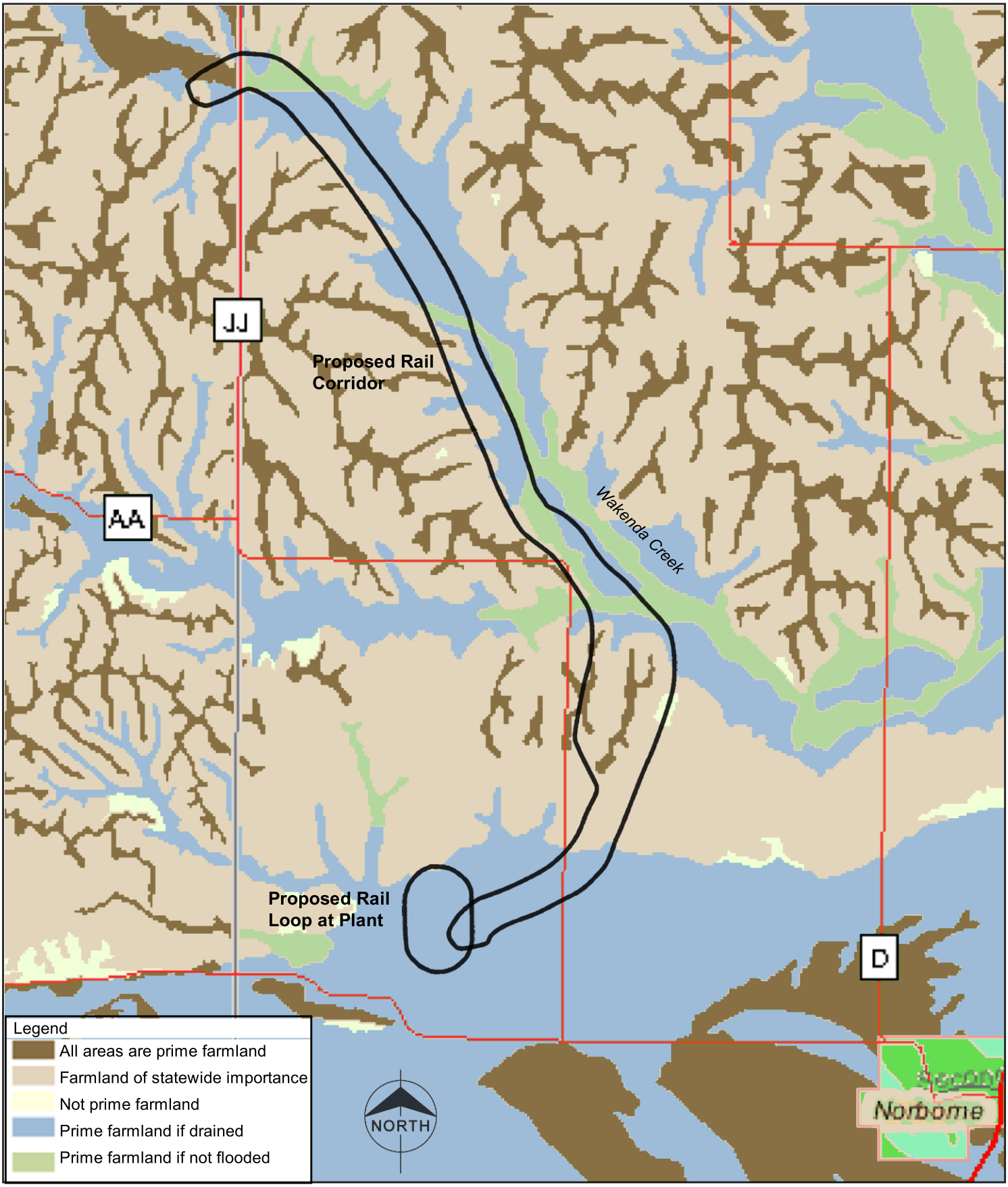


Figure 3-41. Prime Farmland North Rail Corridor

Big Lake Site

Holt County

Richardson County

N

Norborne

Missouri

Legend

- County Boundary
- Proposed Facility Boundary
- All areas are prime farmland
- Farmland of statewide importance
- Not prime farmland
- Prime Farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season

1 : 18,000

0 0.25 0.5 Miles

Figure 3-42.

Prime Farmland

Big Lake Site

Source(s): USDA - Natural Resources Conservation Service and URS Corporation.

flooded, or farmland of statewide importance. The main potential impact of the transmission line on farming would be on center-pivot irrigation systems.

3.6.2 Environmental Consequences

3.6.2.1 Identification of Issues

The following issues were identified during scoping and preparation of the Draft EIS:

- Identification of FPPA impacts
- Loss of farm land and impact on the agricultural economy
- Impacts of relocations of farm families and resulting impacts on business in the area
- Potential impacts of utility poles on center-pivot irrigation systems
- Repair to soil and water conservation practices or structures such as terraces, diversions, drain tiles, grade stabilization structures and grassed waterways.

3.6.2.2 Significance Criteria

Farmland impacts would be considered significant if they presented a hardship to the local economy, if farm losses were not compensated, or if resource losses represented a substantial part of the area resources.

3.6.2.3 Impact Assessment Methods

The plant site would occupy approximately 1,750 acres of farm land in Carroll County. Of that amount, approximately 1,000 acres of prime farmland would be taken out of production, and the other 750 would be leased back for agriculture. In addition, the railroad connection would require roughly 120 acres, all of which would be taken out of production. The new transmission lines to the plant would not require taking land out of production, except for the small amount occupied by the support structures. Since the study area is mainly agricultural, the limited amount of additional space required for new housing would pose minimal impact on agriculture (AECI, 2006n).

Impacts would occur primarily during construction.

Farmland Protection Policy Act

To comply with the FPPA, the NRCS developed the Land Evaluation and Site Assessment (LESA) system. It is a tool for evaluating the relative effect development projects would have on farmland. The impacted farmland is scored in two areas, and the more valuable the farmland, the higher the score. The two parts of the evaluation are the Land Evaluation (LE) section and the Site Assessment (SA) section. The LE section considers both the acreage and the value of the farmland that would displaced. The SA section considers the value of the farmland impacted in the context of the surrounding area. If the impacted farmland has major farm investments (irrigation systems, barns, etc.), is important to the local farm economy, and is in an area that has been developed for farming rather than urban use, it would receive a higher score.

The assessment is done using the Farmland Conversion Impact Rating Forms AD-1006 (for the proposed power plant site) and NRCS-CPA-106 (for the proposed railroad lines and transmission corridors) (*Appendix F, Farmland Conversion Impact Rating*). The higher the rating, the better suited the location is for agriculture and is encouraged to be retained for agricultural uses. LESA scores of 226 and above are in the high protection bracket, a rating between 176 and 225 indicates a moderate need for protection, and a rating below 175 indicates low protection status. For the proposed power plant site, the LE score was 66 and the SA score was 100, for a combined LESA score of 166 points. An assessment for the proposed railroad lines and transmission corridors will be finalized when the alignments are selected; the preliminary forms are included in *Appendix F, Farmland Conversion Impact Rating*.

Loss of Farmland and Impact on Agricultural Economy

In Carroll County in 2002 there were 325,363 acres of crop land and 246,376 acres harvested, leaving 78,987 acres of cropland not in production. The average farm size was 386 acres and the median size was 198 acres. The total market value of all crops sold in Carroll County in 2002 was $47 million, or an average of $190 per acre. For the estimated 1,200 acres that would be put out of production, if all were cropland, the annual market value of the crops would be about $230,000 (in 2002 average dollars) (NASS, 2006b).

Market value represents the gross income from crops and does not include the cost of production.

3.6.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action includes the following measures to reduce or prevent potential adverse impacts on farmland:

- Transmission line supports would be placed so as not to interfere with center-pivot irrigation systems to the extent practicable. These systems have been identified and transmission route corridors have been expanded in those areas to allow flexibility to make adjustments to avoid interference (see *Section 2, Alternatives Including the Proposed Action*).
- Approximately 750 acres of farmland acquired for the Proposed Action would be leased back for farming.
- Topsoil removed from the plant site would be stockpiled and re-used (AECI, 2005f).
- Drainage and erosion features on adjacent property, if impacted, would be repaired.

3.6.2.4.1 Impact Assessment

Proposed Action

The approximately 1,200 acres of farmland that would be taken out of production, conservatively assuming it is all cropland in production, represents a small part of the total harvested cropland in Carroll County. It is even fairly small compared to the cropland in Carroll County that is not in production (about 79,000 acres). The overall impact on the agricultural economy would be expected to be small, especially considering that the impact could potentially be offset by putting into production some of the cropland that is not currently in production. The impact on the economy overall would be expected to be more than offset by the benefits of the construction and operation employment at the facility.

Alternate Site – Big Lake

Impacts would be similar for the Big Lake Site; site boundaries were not defined, but the acreage requirements would be about the same, and the same kind of farmland would be impacted.

IGCC Alternative

With IGCC, the farmland impacts would be the same as for the Proposed Action.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on farmland.

3.6.2.4.2 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts and there would be no residual significant impacts.

3.7 LAND USE

This section identifies and describes the jurisdiction and existing and planned land uses in the vicinity of the Proposed Action, as well as environmental consequences as they apply to land use and access.

Information was compiled from agency maps and planning documents, aerial photography, conversations with local officials and previously conducted resource studies. Field investigations were conducted in 2005 and 2006 to verify existing land use conditions.

3.7.1 Affected Environment

3.7.1.1 Region of Influence

The region of influence for assessing construction, operation, and maintenance impacts on land uses includes Carroll County and the two adjacent counties, Lafayette and Ray.

3.7.1.2 Existing Conditions

3.7.1.2.1 Land Use Profile

This land use profile provides an overview of the agricultural and development patterns in the area. There are three regional planning agencies covering the primary study area: the Green Hills Regional Planning Commission (Carroll County), the Pioneer Trails Regional Planning Commission (Lafayette County), and the Mid-America Regional Council (Ray County) (OSEDA 2006a). Each county also has their own planning commission with a comprehensive land use plan. The Carroll County Economic Development agency adopted their Guide Plan for Land Use Development & Zoning Order in 1992, the Lafayette County Planning Commission adopted their Lafayette County Comprehensive Plan in 2003, and the Ray County Planning Commission adopted their Ray County Comprehensive Plan in 1998. All three plans mention the need for jobs for young people within their communities. Additionally, all three of these plans include preservation of agricultural land as part of their primary goal. Each plan states a desire to achieve orderly growth of urban areas with the least impact to agriculture. The plans also seek to provide their communities with adequate public facilities and services, while staying consistent with the previous goal. The commissions seek to improve recreation and transportation facilities while simultaneously desiring to enhance the quality of the physical environment. These plans show awareness of the problems and conflicts in dealing with growth, and a willingness to handle them in a systematic, coherent way. All three counties within the primary study area are predominantly rural; a large majority of the land use within the counties consists of harvested cropland and pastureland, as discussed in *Section 3.6, Farmland*.

3.7.1.2.2 Zoning

The land in the vicinity of the Proposed Norborne Plant had been zoned agricultural, but was rezoned for manufacturing specifically for the plant. Only the area within the facility boundary has been rezoned (Carroll County, 2006a).

3.7.2 Environmental Consequences

3.7.2.1 Identification of Issues

The following issue was identified during scoping and EIS development:

- Consistency with any adopted land use plans and ordinances

3.7.2.2 Significance Criteria

The effects of the Proposed Action and alternatives would be considered significant if the following were to occur:

- Inconsistencies with existing laws, ordinances, or regulations related to land use (local, state, or county)

3.7.2.3 Impact Assessment Methods

County plans and zoning ordinances were reviewed for consistency with the Proposed Action.

3.7.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

Measures to reduce land use impacts would be implemented as part of the Proposed Action, as follows:

- The proposed power plant site, substation, and landfill would be fenced to prevent conflicts with livestock and other agricultural activity.

- Easements and rights-of-way from appropriate owners/agencies would be acquired prior to Project construction.

3.7.2.4.1 Impact Assessment

Proposed Action

Development at the proposed power plant site is consistent with county land use plans. No significant adverse land use impacts are anticipated at the proposed power plant site under the Proposed Action.

Big Lake Alternate Site

Impacts would be similar for the Big Lake Alternate Site; there is no conflict with county land use plans.

IGCC Alternative

With IGCC, the land use impacts would be the same as for the Proposed Action.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on farmland.

3.7.2.4.2 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts and there would be no residual significant impacts.

3.8 PUBLIC LANDS, RECREATION AND VISUAL RESOURCES

3.8.1 Affected Environment

3.8.1.1 Region of Influence

The region of influence for the inventory and assessment of potential significant impacts to public lands and recreation resources was Carroll County and nearby areas of Ray, Saline and Lafayette Counties.

The visual region of influence represents the landscapes within which construction, operation, and maintenance of the Proposed Action potentially could result in significant impacts on visual resources. Since the facility would be in the floodplain, it would be visible to viewers within the floodplain and on top of the nearby bluffs. It would not be visible, or at least not noticeable, to viewers on the back sides of the bluffs (away from the river). The visual region of influence was judged to be within a radius of about 10 miles of the plant and limited to the area from bluff top to bluff top. The plant, especially

the stack, would be visible from greater distances within the floodplain, but it would be a small feature in the visual field. Figure 3-43 is a view of how the plant would look after construction.[67] The stack would be approximately 625 feet tall. At a distance of three miles, the plant stack would occupy two degrees of the visual vertical field (that is, if the area were perfectly flat, the top of the stack would appear to be two degrees above the horizon; with straight overhead being 90 degrees). At 10 miles distance in the floodplain, if there were no trees or other view obstructions, the stack would be visible but the full height would occupy only about 0.6 degree of the vertical view.

The biggest impact from the transmission lines would be to the rural residents who would be living within about a half-mile of the lines in areas with few trees. Except for the first 17 miles of the line from Norborne south toward Sedalia, which would be double-circuit and on poles about 105 feet tall, the transmission poles would be H-frames with an average height of about 80 feet (AECI, 2006t). The rail connectors would visually affect only residences very close to the rail line.

3.8.1.2 Existing Conditions

3.8.1.2.1 Recreation and Public Lands

Proposed Action

There are several small public parks and recreation centers located within each county in the primary study area. For instance, located within the study area towns, Carroll County has the Carrollton Recreation Park; Lafayette County has the Higginsville Park and Recreation Department, the Lexington City Park and Recreation Center, and the Odessa City Parks and Recreation Department; and Ray County has the Richmond Recreation Department (AECI, 2006n).

Figure 3-44 shows public lands near the proposed plant site. The closest public land to the proposed Norborne Plant is the 240-acre W.L. Schifferdecker Memorial CA at the southeast corner of Missouri Routes E and PP, about 5 miles northeast of the proposed plant. Across the river from the proposed site, in Lafayette and Saline Counties, there are several public lands along the river: the Baltimore Bottoms and Cranberry Bend Units of the Big

[67] CR (County Road) 300 and CR 111 shown in the figure are shown as County Roads 638 and 603, respectively, in other available maps.

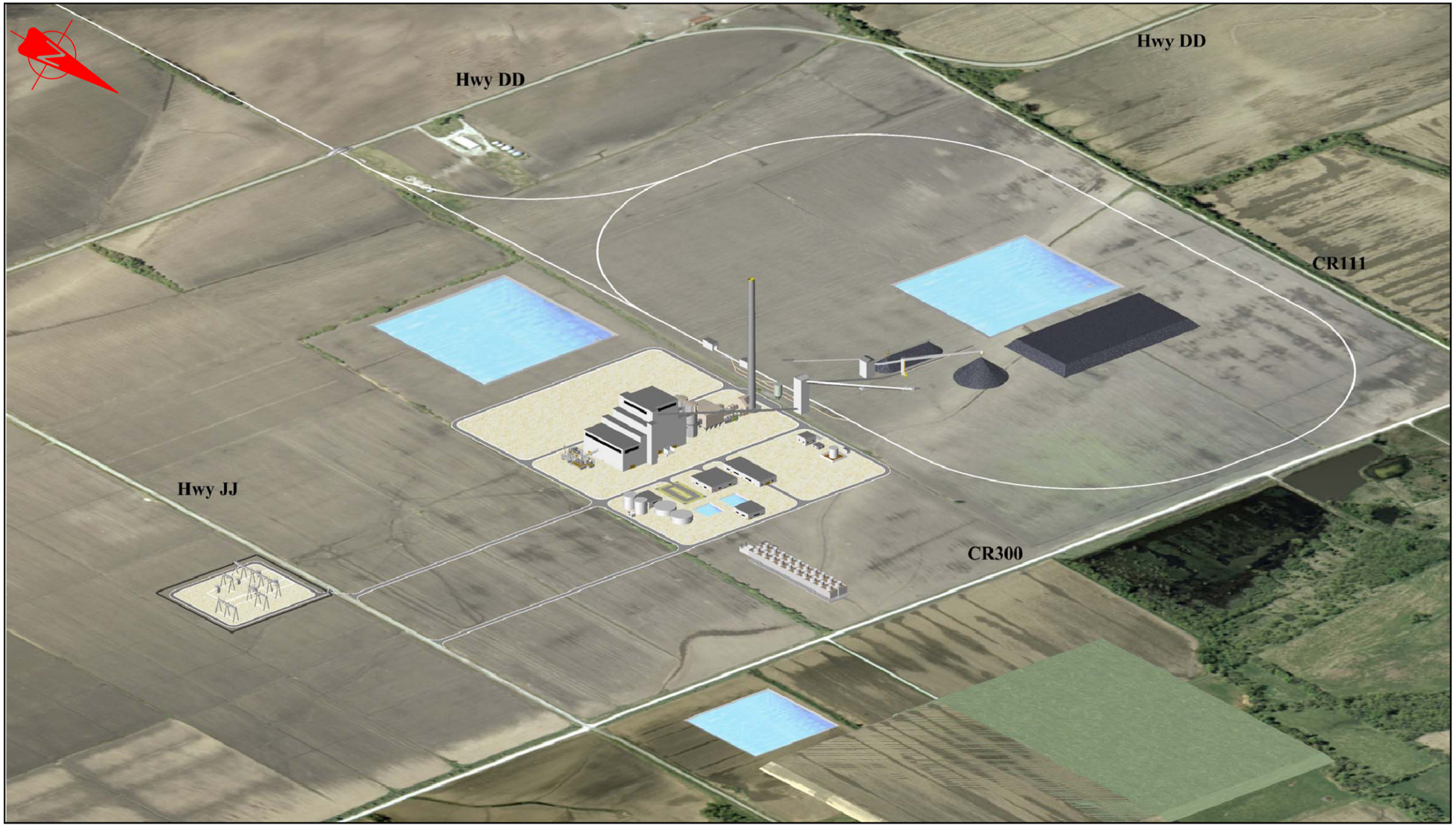
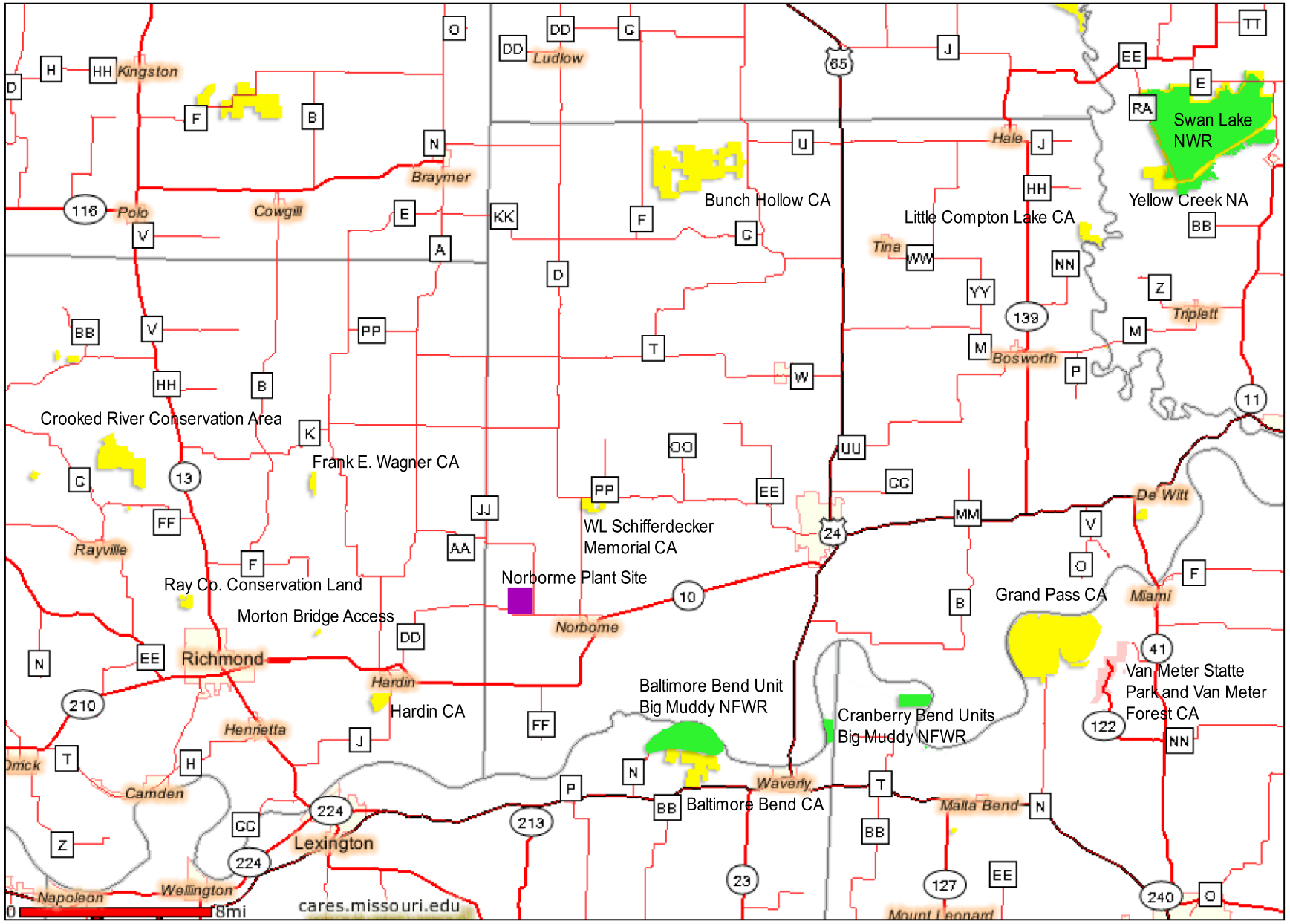


Figure 3-43. Proposed Norborne Plant



Note: edits to source map from USFWS, 2006b

Figure 3-44. Public Lands in Vicinity of Proposed Norborne Plant Site

Muddy NFWR, the Baltimore Bend and Grand Pass CAs, Van Meter State Park, and the Van Meter Forest NA. The Big Muddy NFWR units are part of USFWS' overall restoration plan for the Missouri River, as discussed in *Section 3.5.2.3.3, Effects on Potential Restoration Plans*. The Baltimore Bottoms Unit of the Big Muddy NFWR and the Baltimore Bend CA are adjacent to each other and about seven miles south of the proposed plant site. The Baltimore Bend CA covers 1,192 acres and has forested areas and is used for hunting. It also has a freshwater marsh and bottomland and upland forests. The Grand Pass CA is 5,096 acres of mostly marshland and is used for hunting. Van Meter State Park (983 acres) provides camping, fishing, hiking and picnicking and contains remnants of an Indian village site. The Cranberry Bend NFWR Unit is about 14 mile away, and the Grand Pass CA, Van Meter State Park and Van Meter Forest NA are about 25 miles away.

As shown in Figure 3-44 there are several CAs in Ray County. The closest to the proposed Norborne Plant is the Hardin CA, about 7 miles southwest of the proposed plant, in the Missouri River floodplain. It is a wooded 283-acre area.

Big Lake Site

Figure 3-45 shows public lands in the vicinity of the Big Lake Alternate Site and Figure 3-46 shows a closer view of Big Lake State Park in relationship to the Big Lake Site. As shown in Figure 3-46, Big Lake State Park is about two miles north of the site. According to the MDNR website, the 407-acre Big Lake State Park is "one of northwest Missouri's most popular outdoor recreation areas." (MDNR, 2006h). It has facilities for camping, lodging, dining, fishing, picnicking, and swimming.

Squaw Creek NWR, McCormack CA, and McCormack Loess Mounds NA are all adjacent to one another and about 7 miles east of the site. The 7,350 acre Squaw Creek NWR is a large wintering area for bald eagles and snow geese (USFWS, 2006a). The Bob Brown CA (3,302 acres) is about 8 miles southeast of the site. It is located on a marsh near the river and is popular for hunting.

The 811-acre Rush Bottom Fish and Wildlife Mitigation project, located along the Missouri River north of the Big Lake Site, is owned by the Corps of Engineers and managed by MDNR. The purpose of the project is restoration