Feature TDH1SDKI001: A large stand of flowering blue grama *(Bouteloua gracilis)* north of road.

Feature TDH1SDKI001. Medium quality, heavily grazed grassland south of road.

Feature TDH1SDKI001: Leafy spurge (*Euphorbia esula*) in heavily grazed pasture south of road.

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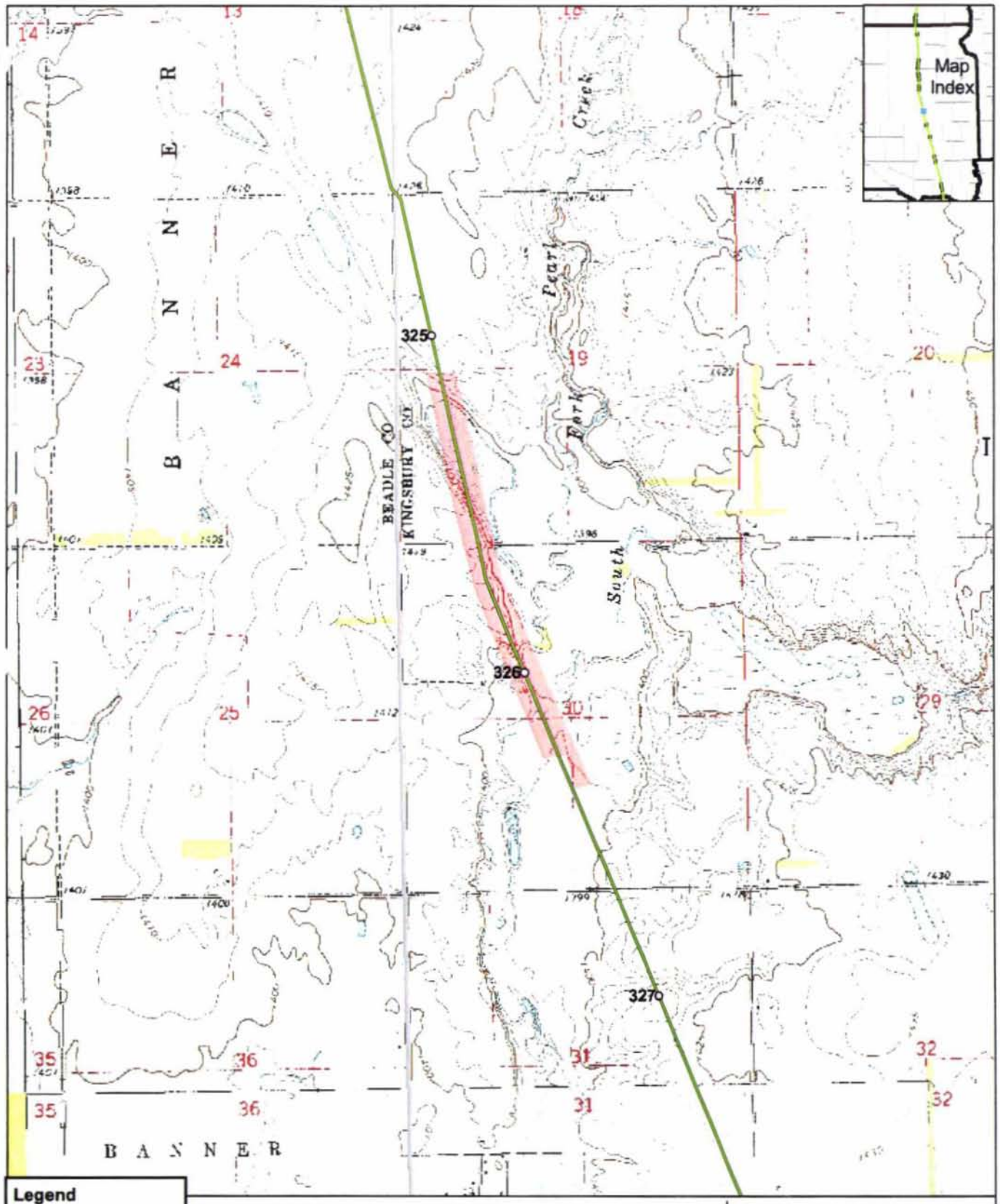

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDMI001	9/16/2006	342.9	344.0	Miner	SD	Drive By	Low	No

Site Summary: A pasture of introduced grasses that has nearly all smooth brome (*Bromus inermis*) and some crested wheatgrass (*Agropyron cristatum*). There are cattails (*Typha*) in the wetland spots and blue grama (*Bouteloua gracilis*) on the few upland areas.

Feature TDH1SDMI001: Overview of this site to the North from the road.

Feature TDH1SDMI001: Overview of the site south from the road.

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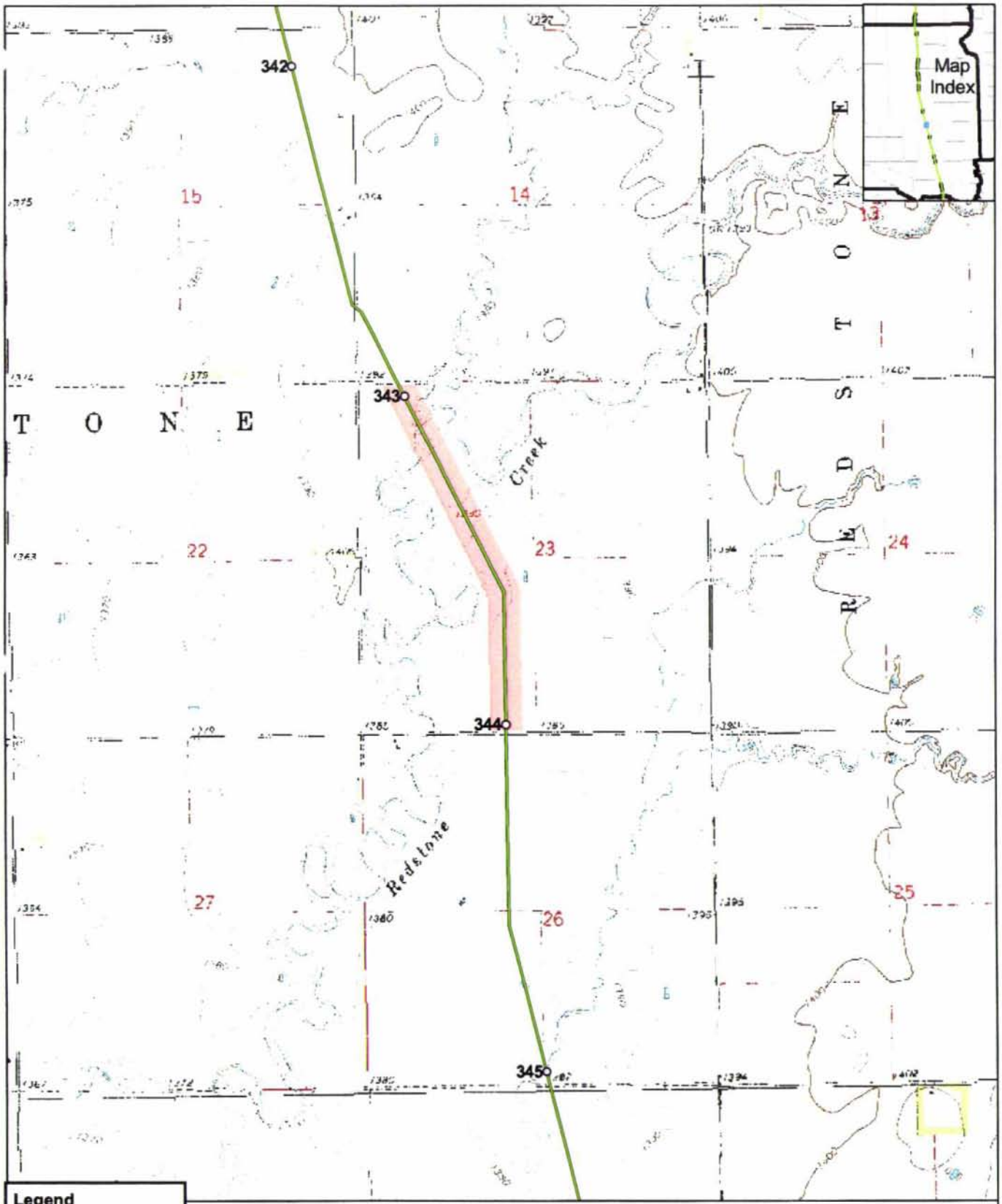

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDMI002	9/16/2006	358.5	359.9	Miner	SD	Drive By	Low	No

Site Summary: A pasture of introduced grasses that has blue grass (*Poa* spp.) and smooth brome (*Bromus inermis*) as dominants and crested wheatgrass (*Agropyron cristatum*) in spots. Wet areas have prairie cordgrass (*Spartina pectinata*), smartweed (*Polygonum*), and Indian hemp (*Apocynum cannabinum*).

Feature TDH1SDMI002: Overview of pasture north from the road.

Feature TDH1SDMI002: Overview of the pasture (wetland in foreground) south from the road.

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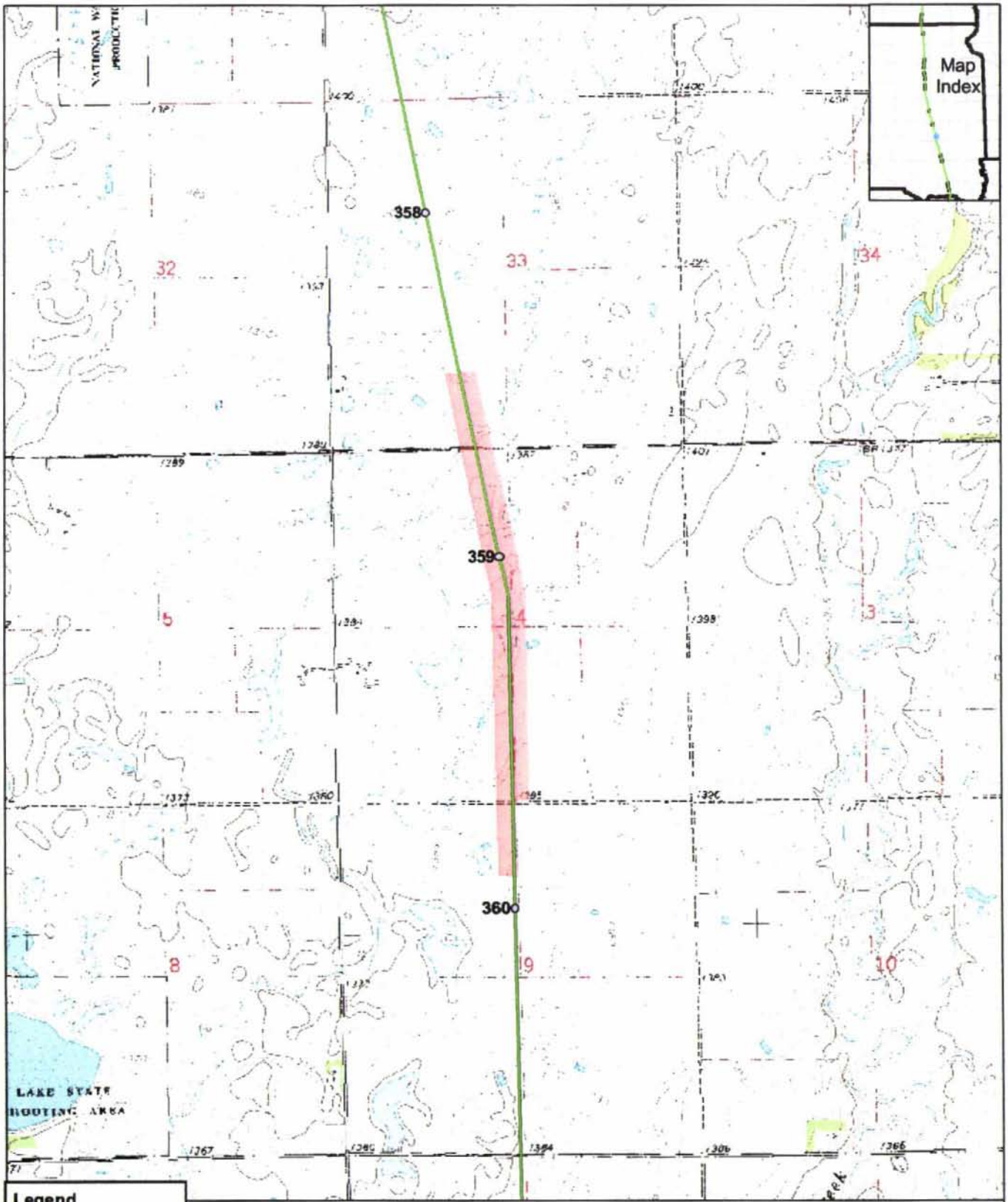

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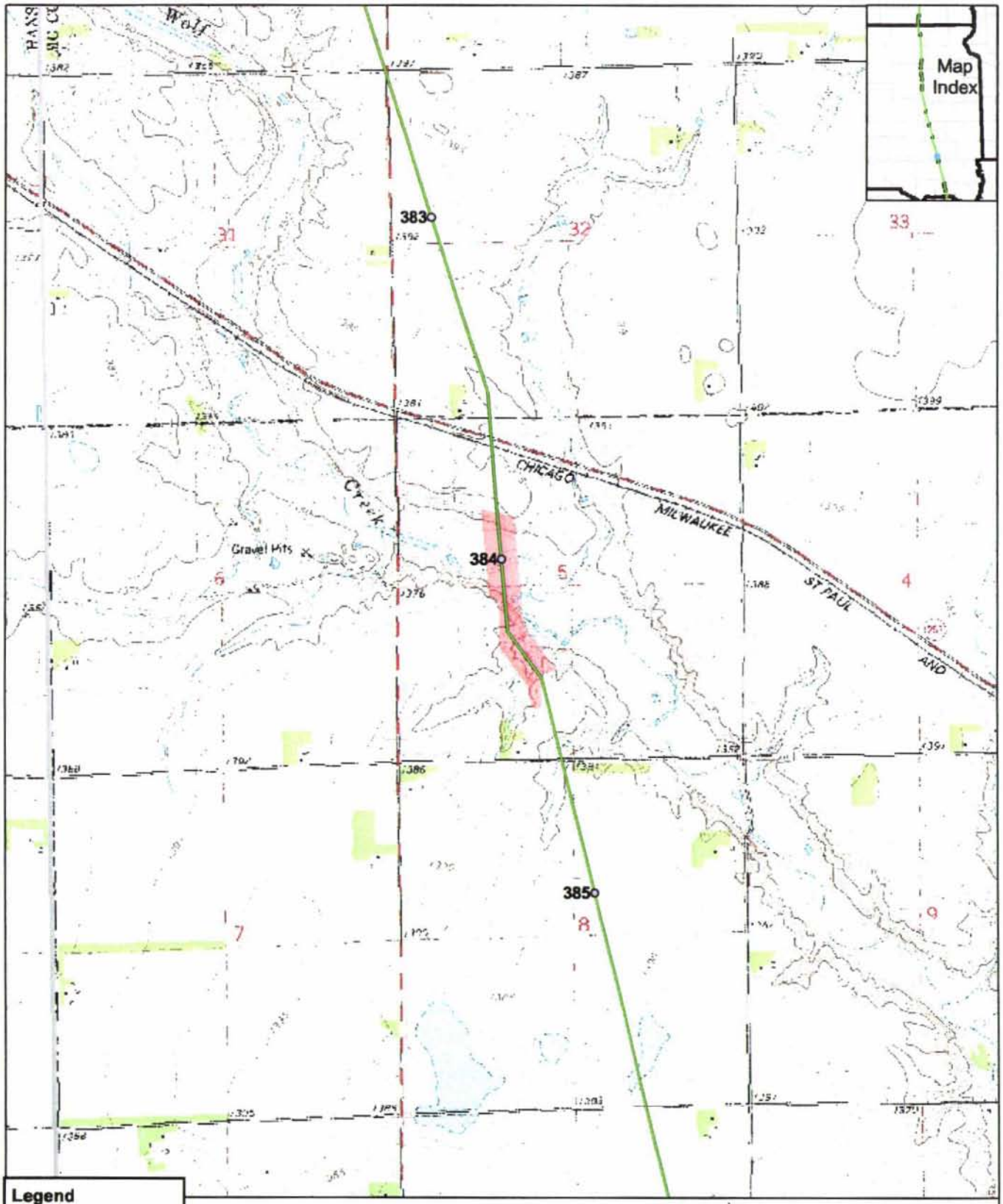
Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDMC001	9/16/2006	383.9	384.5	McCook	SD	Drive By	Medium – High	Yes, prairie fringed orchid

Site Summary: A pasture of introduced grasses that has smooth brome (*Bromus inermis*) as the dominant in low spots and cattails (Typha) in wet spots. Native grasses such as blue grass (Bouteloua gracilis) and prairie dropseed (Sporobolus heterolepsis) on hillsides. Due to these higher quality grassland slopes it is medium to high quality grassland with possible orchid habitat.

Feature TDH1SDMC001: Overview of area with creek in the distance.

CONDFIDENTIAL



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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDHU001	9/16/2006	389.7	390.6	Hutchinson	SD	Drive By	Low	No

Site Summary: A pasture of introduced grasses that has blue grass (*Poa* spp.) and smooth brome (*Bromus inermis*) as dominants and crested wheatgrass (*Agropyron cristatum*) in spots. Wet areas have prairie cordgrass (*Spartina pectinata*). Site also contained smartweed (*Polygonum spp.*), and Indian hemp (*Apocynum cannabinum*).

TDH1SDHU001. Overview of pasture.

Feature TDH1SDHU001. Close-up of a dense stand of smooth brome (*Bromus inermis*).

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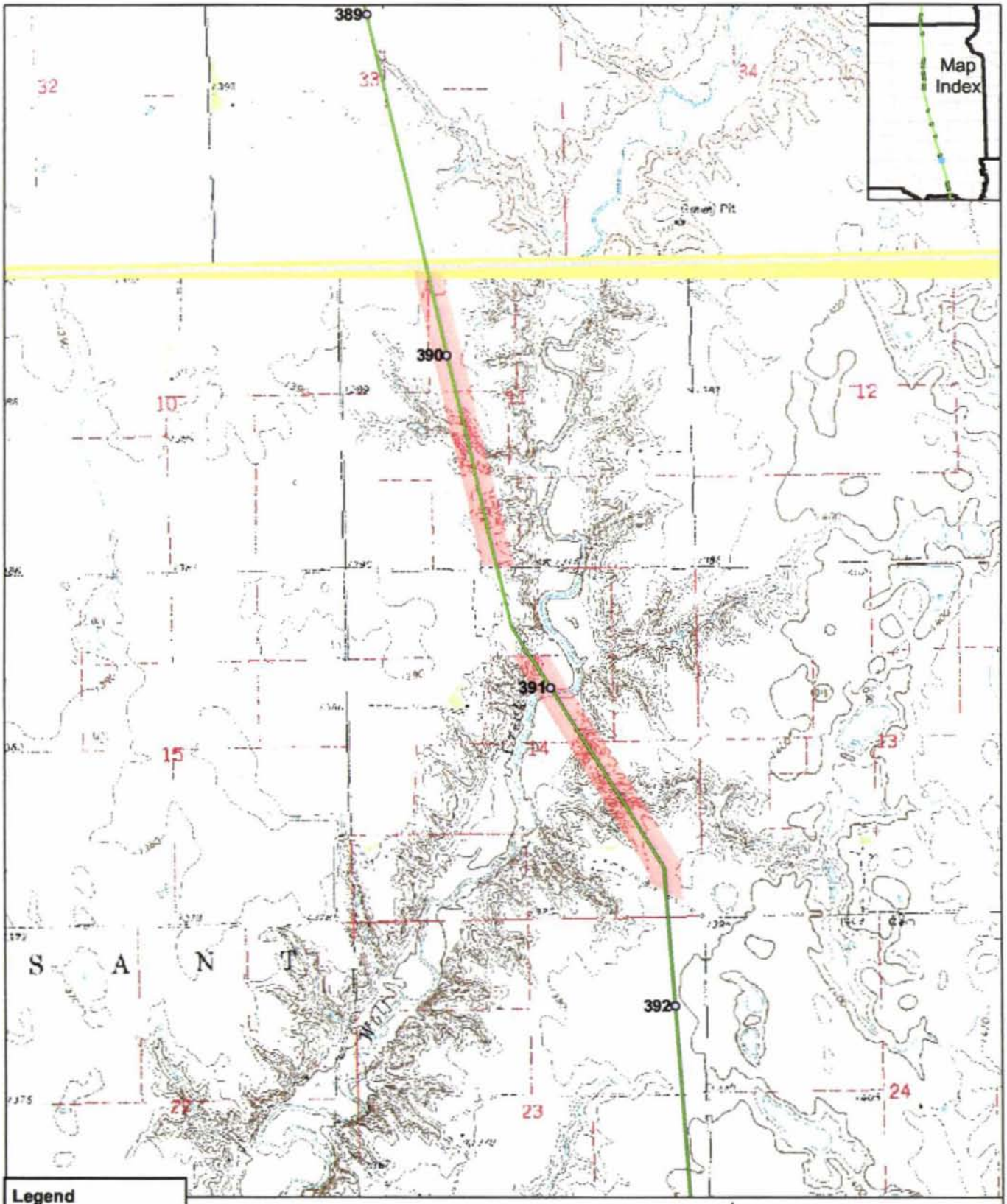

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDHU002	9/16/2006	390.9	391.7	Hutchinson	SD	Site Visit	High	Yes, Dakota skipper, prairie fringed orchid

Site Summary. This site is along Wolf Creek. Near the creek, in the ox-bow floodplain is sand dropseed (*Sporobolus* sp.) and prairie cordgrass (*Spartina pectinata*). On the hills are very high quality Dakota skipper habitat with little blue stem (*Schizachyrium scoparium*), black Sampson (*Echinacea angustifolia*), leadplant (*Amopha canescens*), etc. Other native plants that occur at this site that were not seen elsewhere in South Dakota during the survey were hairy grama (*Bouteloua hirsuta*) and milkwort (*Polygala alba*). Both north and south of Wolf Creek, the hills contain native plants, but as the terrain levels brome grass (*Bromus inermis*) becomes more common. Note the photograph of this area with grazed pasture to the north and a lesser grazed pasture to the south of a fence.

Feature TDH1SDHU002: Overview of high quality grassland around Wolf Creek (in background)

Feature TDH1SDHU002: Native hillside with little blue stem (*Schizachyrium scoparium*) and blazing star (*Liatris* sp.)

Feature TDH1SDHU002: Little blue stem (*Schizachyrium scoparium*), blazing star (*Liatris* sp.) and Black Sampson (*Echinacea angustifolia*).

Feature TDH1SDHU002: Effects of grazing on prairie habitat. Note the difference between the moderately grazed pasture to the left, and the nearly ungrazed pasture to the right.

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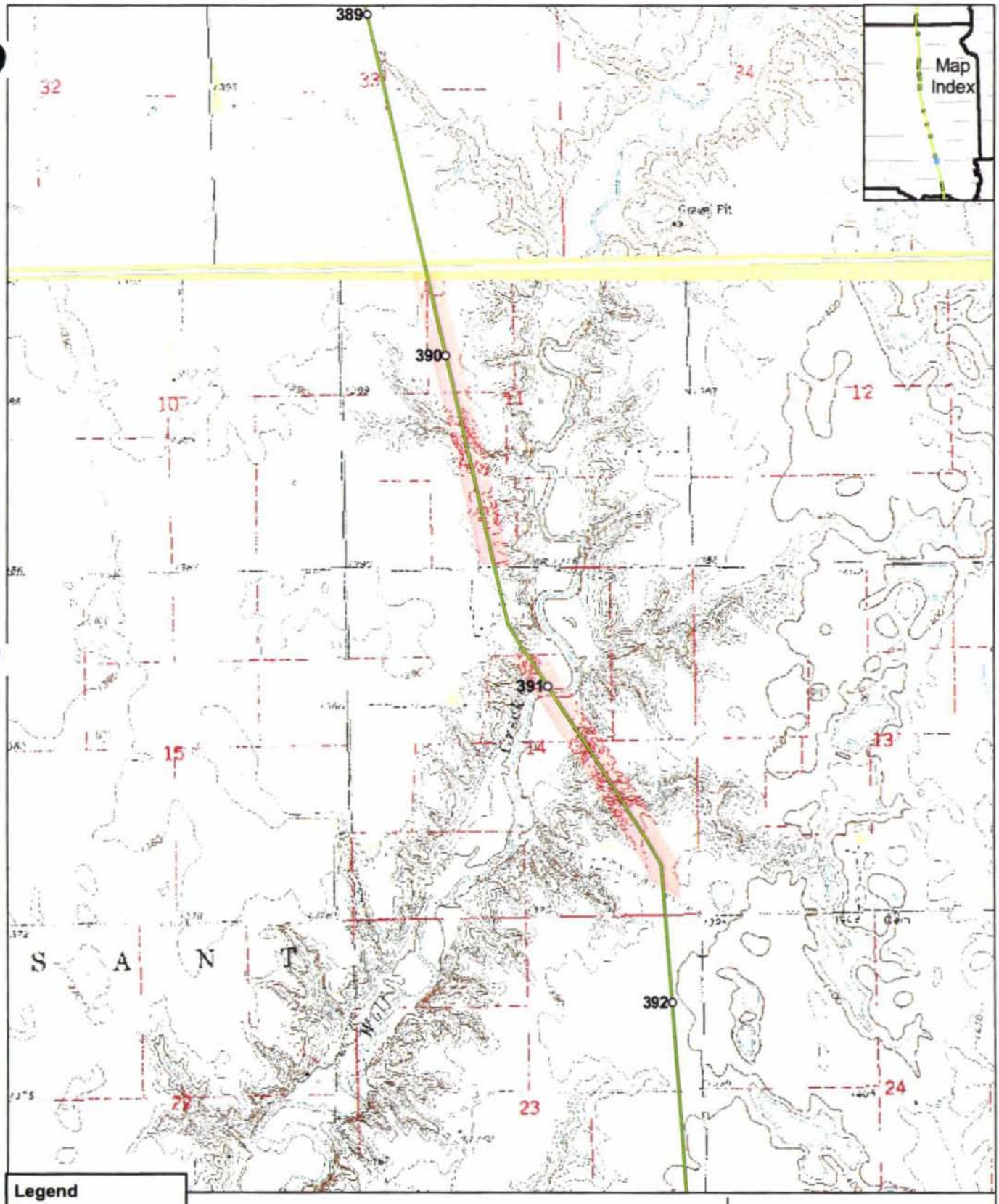

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDYA006	9/15/2006	418.7	419.2	Yankton	SD	Site Visit	Medium	No

Site Summary: This is a smooth brome (*Bromus inermis*) and blue grass (*Poa cf. pratensis*) dominated pasture with wet swale areas and upland ridges. Cedar trees (*Juniperus scopulorum*) are common in the ravines. Also common in the more mesic areas are three exotic plants: plumeless thistle (*Carduus acanthoides*), horseweed (*Conyza canadensis*), and yellow sweet clover (*Melilotus officinalis*). However, there are patches of native grassland present on the upland ridges.

Feature TDH1SDYA006: Overview of site to the north. In the foreground is a plumeless thistle (*Carduus acanthoides*).

Feature TDH1SDYA006: A smooth brome (*Bromus inermis*) dominated pasture area.

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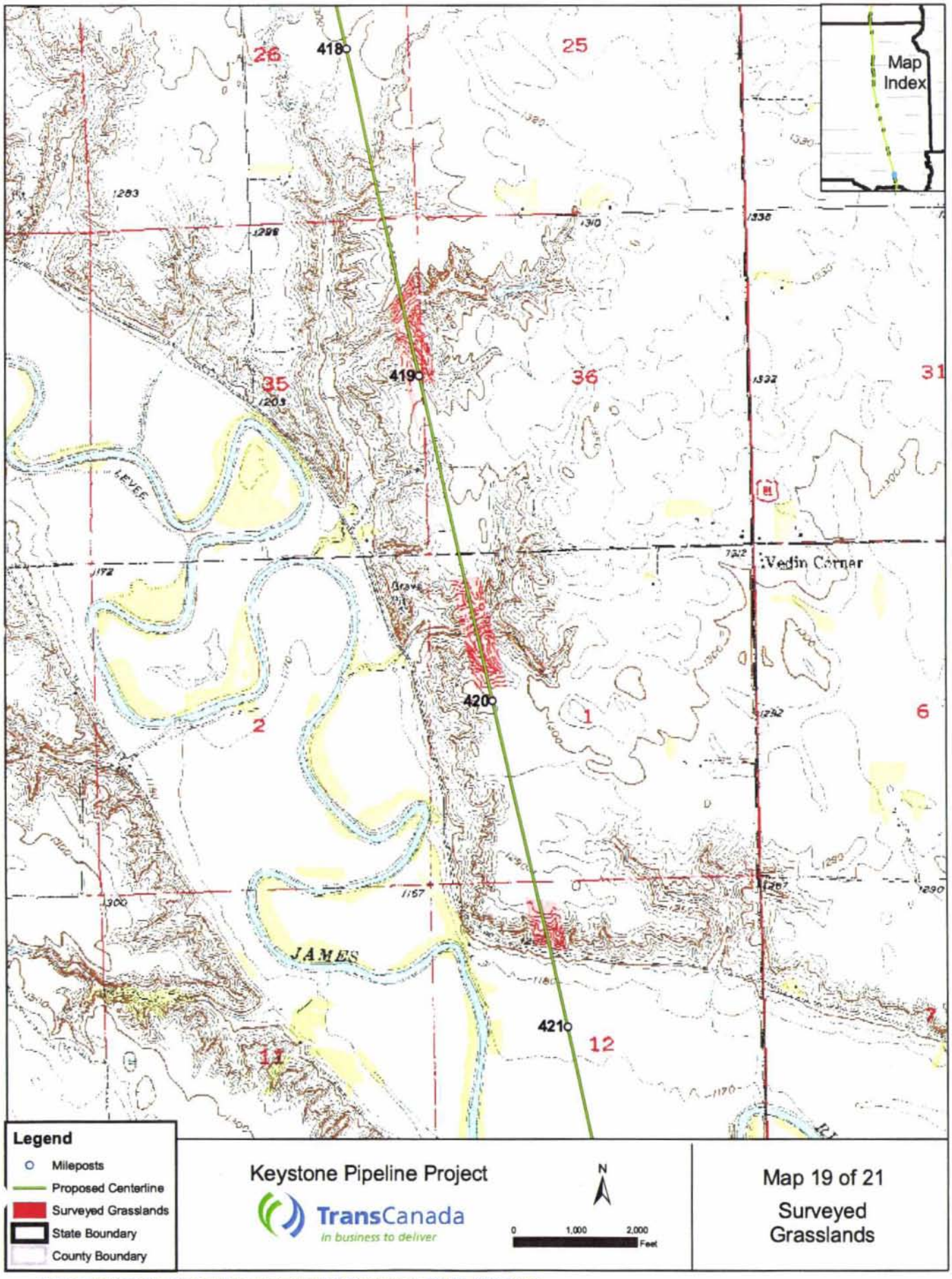

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDYA005	9/15/2006	419.6	420	Yankton	SD	Site Visit	High	Yes, Dakota skipper

Site Summary: This site has high quality upland areas with the native black Sampson (*Echinacea angustifolia)*, junegrass *(Koeleria micrantha)*, blue grass *(Bouteloua gracilis*), prairie dropseed (S*porobolus heterolepis*), etc. Cedar trees (*Juniperus scopulorum*) are common in the ravines. There are lowland spots with brome grass (*Bromus inermis*) and bindweed (*Convolvulus arvensis*).

Feature TDH1SDYA005: Native grassland ridge with cedar (*Juniperous scopulorum*) in the ravines.

Feature TDH1SDYA005: Native grassland ridge with cedar (*Juniperous scopulorum*) in the ravines.

Feature TDH1SDYA005: Cedar (*Juniperous scopulorum*) trees have been cut an left in these ravines

Feature TDH1SDYA005: This site has the most junegrass (*Koeleria macrantha*) of any site visited.

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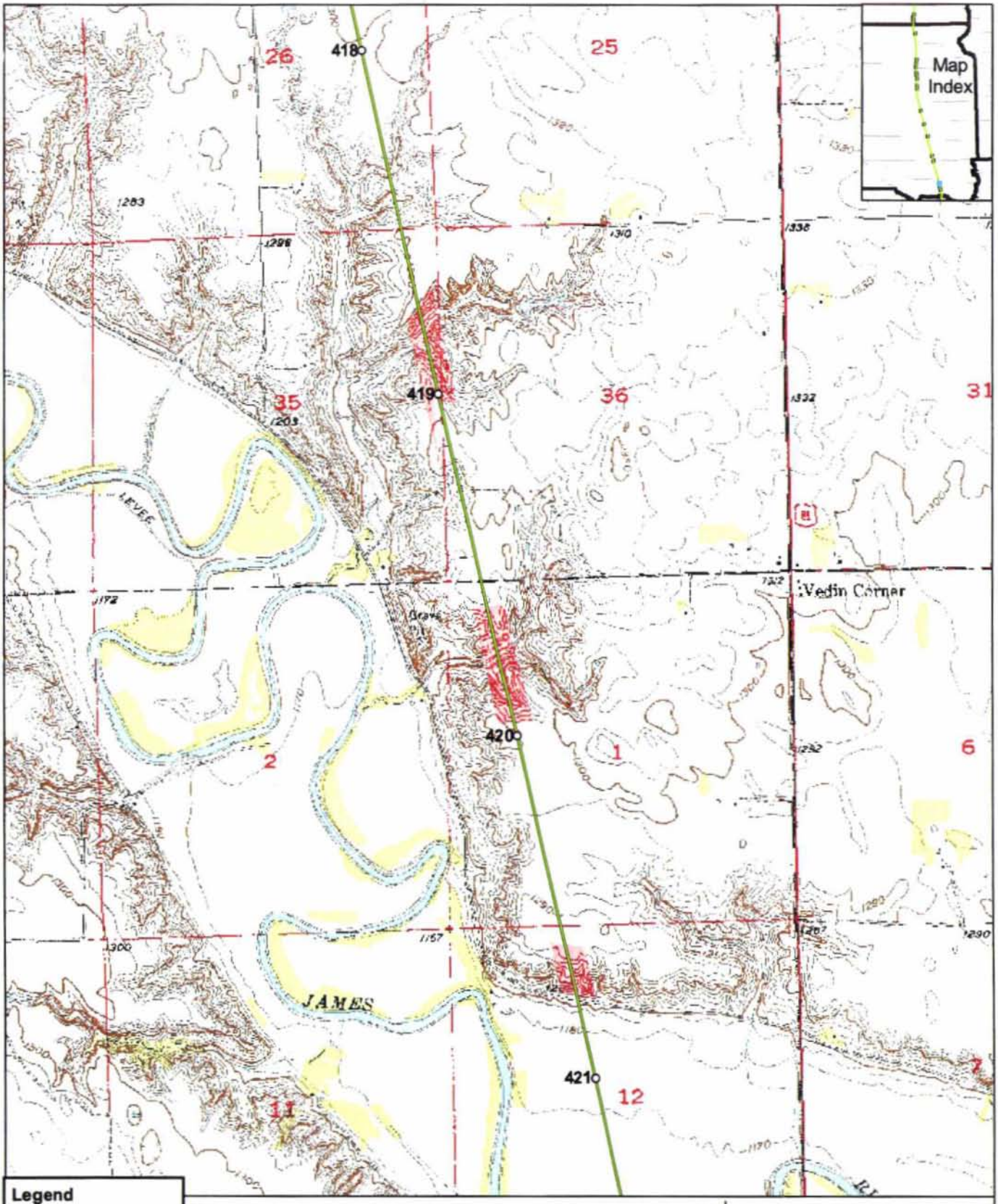

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDYA004	9/15/2006	420.6	420.8	Yankton	SD	Drive By	High	Yes, Dakota skipper

Site Summary: This is a moderately grazed, high quality grassland site for the Dakota Skipper. It is adjacent to fairly large areas of native grassland. It has unplowed hillsides with a good mix of native plants, including black Sampson (*Echinacea angustifolia*), side-oats grama (*Bouteloua curtipendula*) and blue gram (*Bouteloua gracilis*).

Feature TDH1SDYA004: High quality hillside grassland. View to the north.

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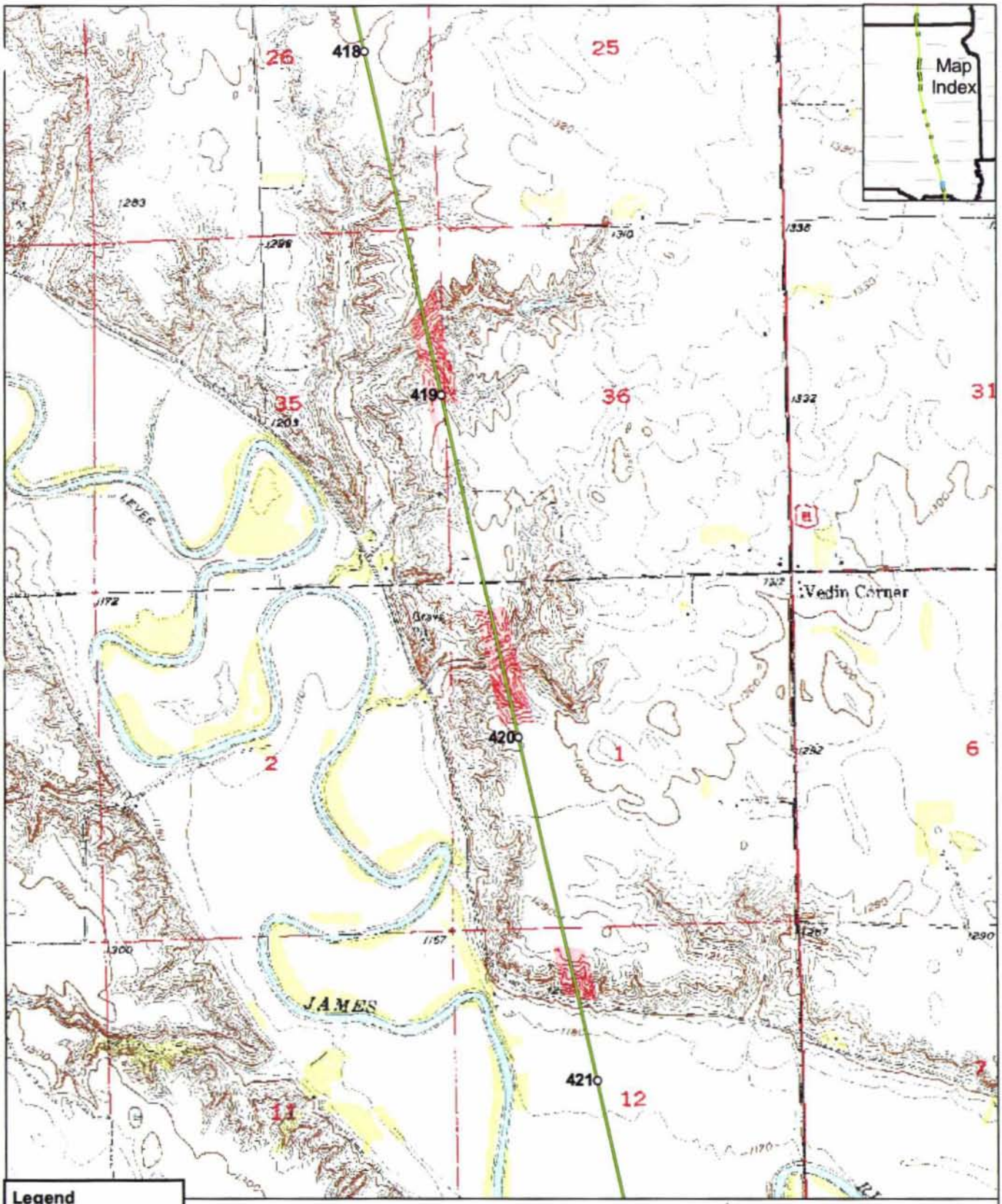

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDYA003	9/15/2006	421.8	422.1	Yankton	SD	Site Visit	High	Yes, Dakota skipper

Site Summary. This grassland is at the Keystone pipeline James River crossing. Although this area has ravines filled with cedar *(Juniperus scopulorum)* and a mix of less common broadleaf trees such as box elder (*Acer negundo*) and hackberry (Celtis occidentalis), there are ridges between these wooded ravines that have high quality, well protected native grassland. Grasses on these ravines include prairie dropseed (*Sporobolus heterolepis*), Indian grass (*Sorghastrum nutans*), side-oats grama and blue grama (*Bouteloua gracilis*). Native forbs include black Sampson (*Echinacea angustifolia*), cusp blazing star (*Liatris mucronata*), compass plant (*Silphium laciniatum*), and hoary verbain (*Verbena stricta*). Although this area is moderately grazed and has a few exotic weeds such as burdock (*Arctium minus*), it is quality habitat for the Dakota skipper.

Feature TDH1SDYA003: View to the south of a ridge of native prairie.

Feature TDH1SDYA003: A ridge of native prairie with trees in the ravines near the James River.

Feature TDH1SDYA003: A close-up of ridge vegetation: black Sampson (*Echinacea angustifolia*) to the right, and a purple cusp blazing star (*Liatris mucronata*) in the center.

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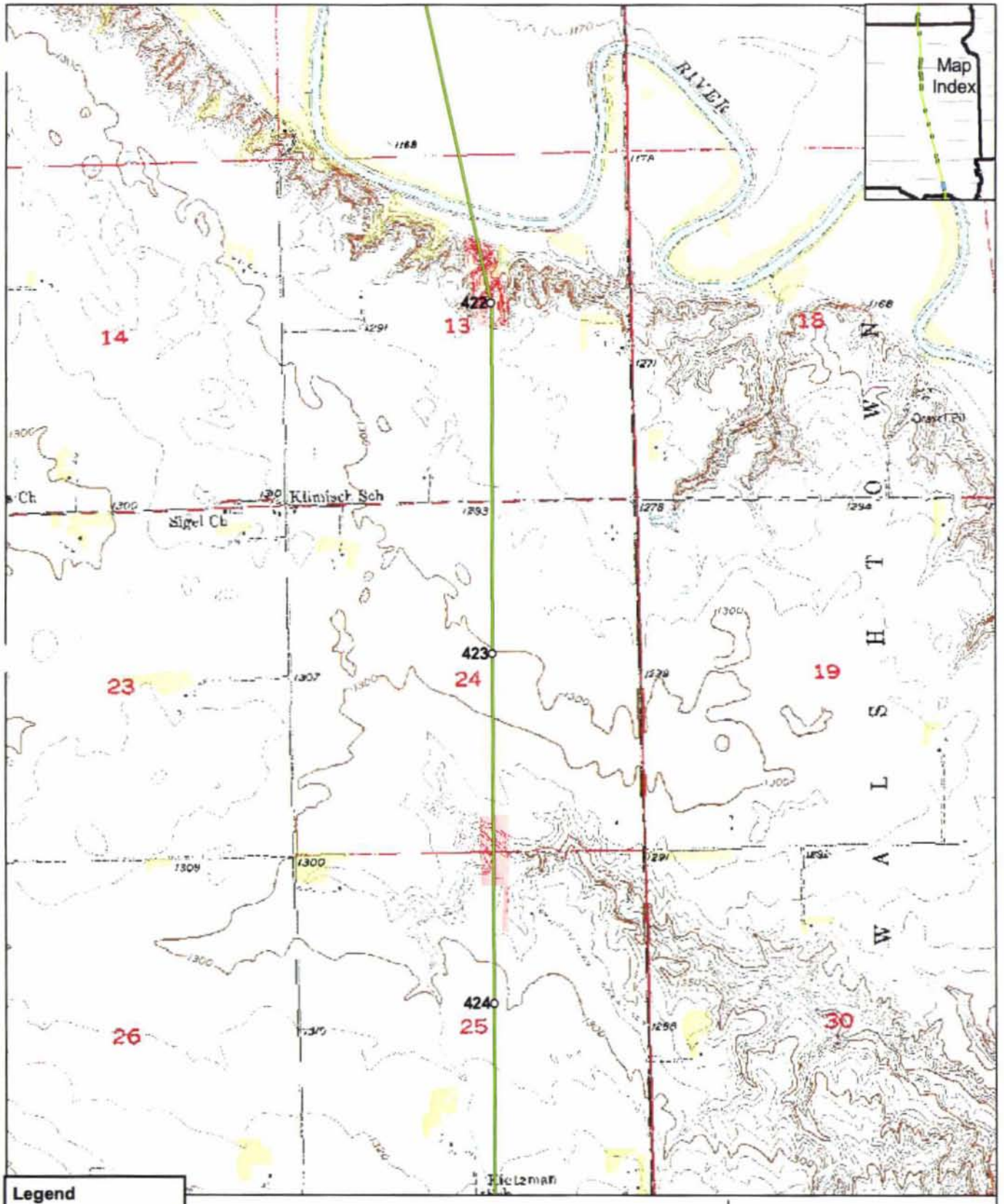

Legend

- Mileposts
- Proposed Centerline
- Surveyed Grasslands
- State Boundary
- County Boundary

Keystone Pipeline Project

TransCanada
In business to deliver

N

0 1,000 2,000 Feet

Map 20 of 21

Surveyed Grasslands

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDYA002	9/15/2006	423.5	423.8	Yankton	SD	Site Visit	Medium	No

Site Summary: The lowland swales are dominated by smooth brome (*Bromus inermis*) with very few native plants. The slopes of these hills have erosion contours due to heavy grazing. The upland area near center line is heavily grazed (few native forbs). The ridges along the construction corridor are dominated by blue grama (*Boutoula gracilis)* with patches of side-oats grama (*Boutoula curtipendula*), and still contain native prairie with few exotic plants. This site would become a higher quality prairie if the grazing intensity were lowered. Due to the absence of native forbs (heavy grazing), it is currently not a high quality site.

Feature TDH1SDYA002: Heavily trampled water tank at center line, along the ridge.

Feature TDH1SDYA002: Heavily grazed pasture with few forbs, which is dominated by blue grama (Bouteloua gracilis).

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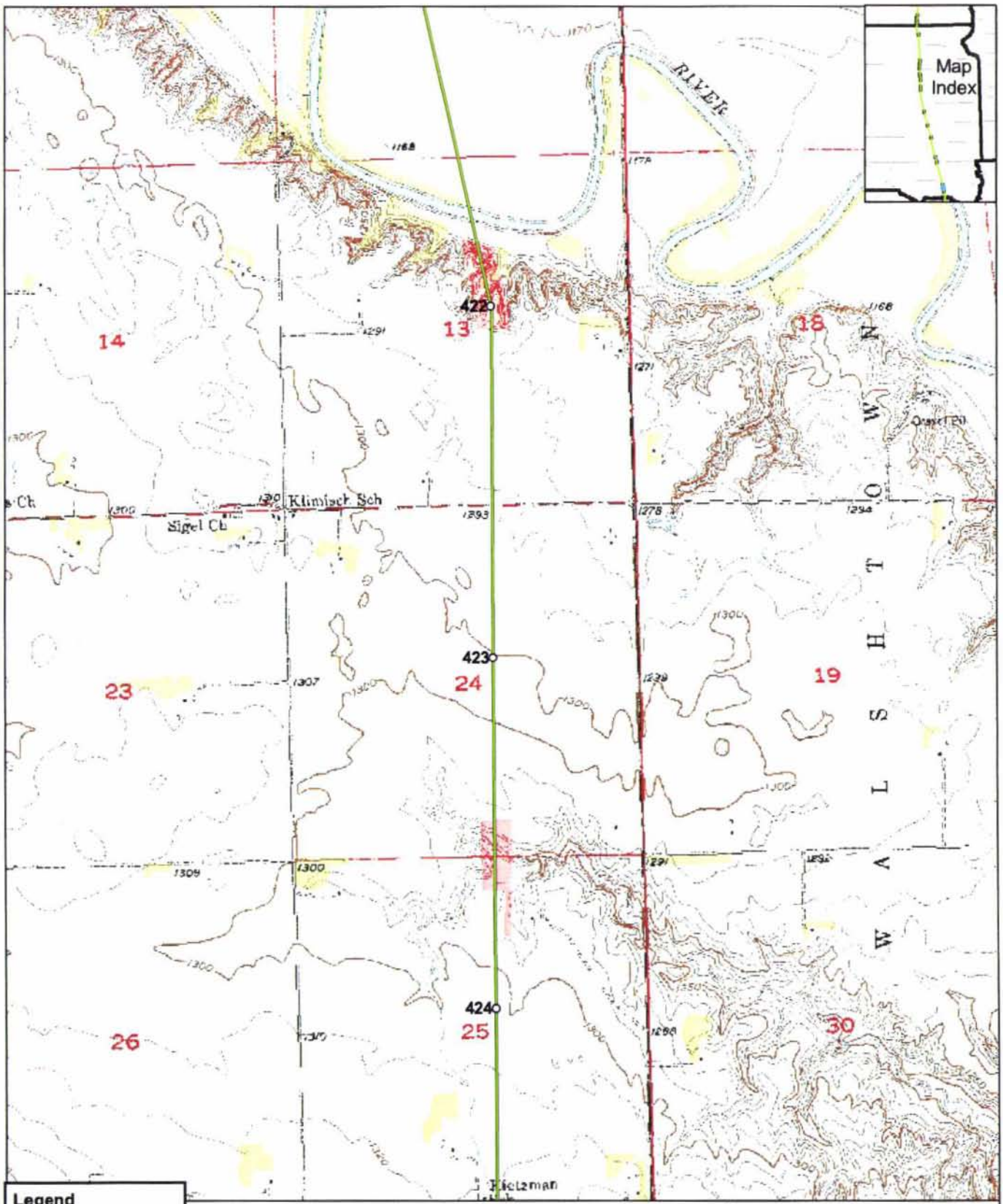

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDYA001	9/14/2006	426.7	428.9	Yankton	SD	Site Visit	Low	No

Site Summary: This area is very heavily infested with plumeless thistle (*Carduus acanthoides*), especially in the lowland swale areas. The slopes and uplands are dominated by a mix of exotic pasture grasses, especially by smooth brome (*Bromus inermis*) and crested wheat grass (*Agropyron cristatum*). Native grasses and forbs occur in only a few areas.

Feature TDH1SDYA001: Smooth brome (*Bromus inermis*) dominated pasture.

Feature TDH1SDYA001: Overview of site to the south.

Feature TDH1SDYA001: Plumeless thistle (*Carduus acanthoides*) is abundant in the swales.

Feature TDH1SDYA001: View of a stock pond to the east of center line

Feature TDH1SDYA001: Smooth brome (*Bromus inermis*) at the southern edge of this site.

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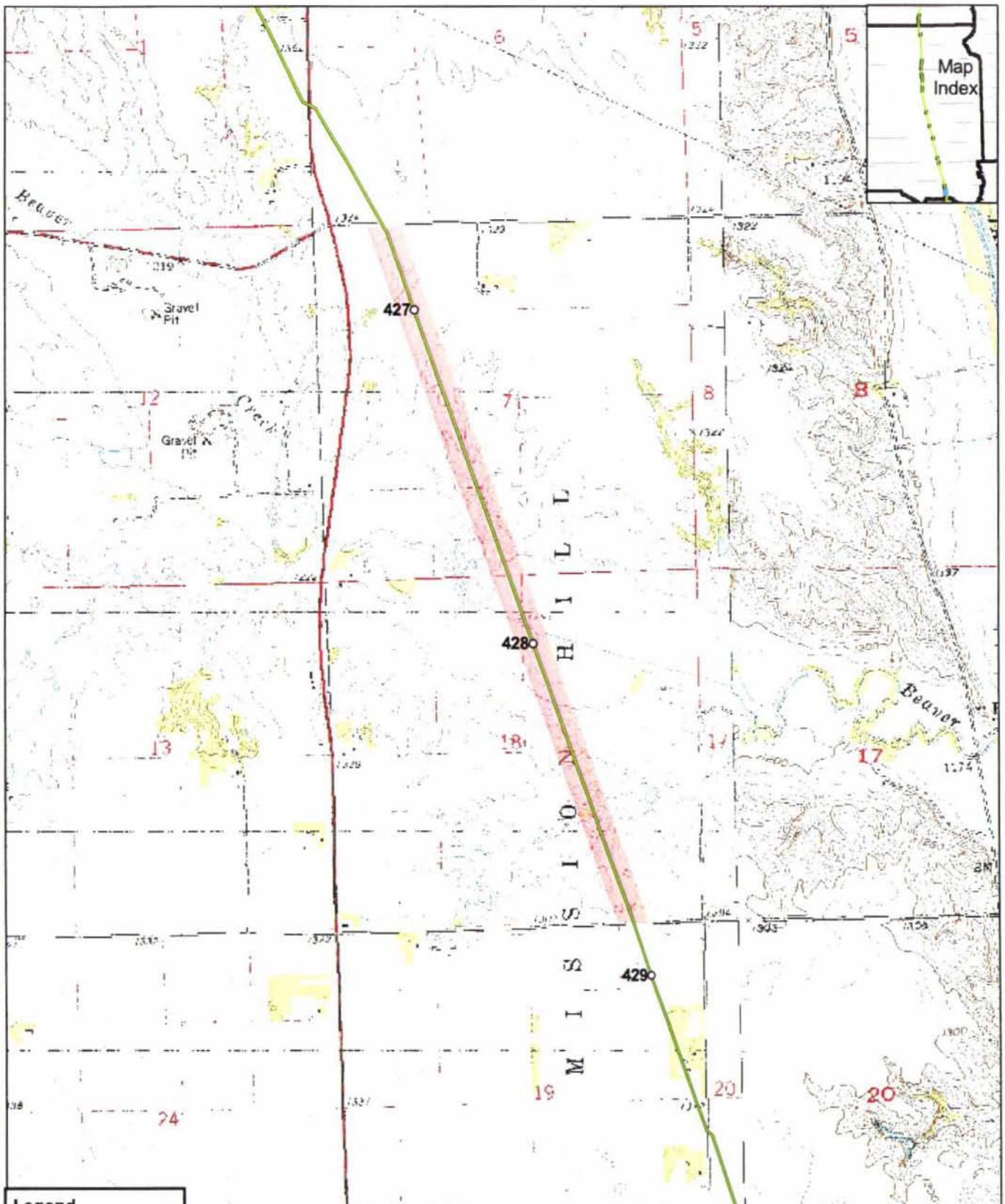

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Appendix II

Plant Species List

Plant species identified in the three southernmost counties in North Dakota (Ransom, Sargent, and Dickey) and in all South Dakota counties between September 11 and September 16, 2006. These are species that occur along the Keystone pipeline corridor. This list could easily be expanded if these areas were visited in the spring or early summer. Plants with an asterisk (*) are not native to this region.

SCIENTIFIC NAME	COMMON NAME
FERNS AND FERN ALLIES	
Equisetaceae / Horsetail family	
Equisetum laevigatum A. Braun	smooth scouring rush, horsetail
GYMNOSPERMS	
Cupressaceae /Juniper or Cedar family	
Juniperus scopulorum Sarg.	Sabina, Rocky Mtn juniper, cedar
ANGIOSPERMS: Monocotoledons and Dicotoledons	
Aceraceae / Maple family	
Acer negundo L.	box elder
Amaranthaceae / Pigweed family	
Amaranthus albus L.	tumble pigweed
**Amaranthus blitoides* Watson	prostrate pigweed
**Amaranthus retroflexus* L.	redroot pigweed
Anacardiaceae / Poison Ivy or Mango family	
Rhus glabra L.	smooth sumac
Apocynaceae / Dogane family	
Apocynum cannabinum L.	Indian hemp, dogbane
Asclepiadaceae / Milkweed family	
Asclepias speciosa Torrey	showy milkweed
Asclepias stenophylla A. Gray	whorled milkweed
Asteraceae / Sunflower family	
Achillea millefolium L.	yarrow, milenrama
Ambrosia psilostachya DC.	western ragweed
**Ambrosia trifida* L. H-12099	giant ragweed
Antennaria parvifolia Nutt.	pussytoes
**Arctium minus* (J. Hill) Bernhardi	burdock
**Artemisia absinthium* L.	wormwood
Artemisia dracunculus (L.) Poljakov	wild tarragon
Artemisia frigida Torr.	fringed sage
Artemisia ludoviciana Nutt.	white sage, LA sage
Aster cf. falcatus Lindl.	frost flower
Aster cf. sericeus Vent	silky aster
Bidens cernua L.	nodding begger-ticks
Brickellia eupatorioides (L.)	large-flower brickell-bush
Carduus acanthoides* L. **Noxious	plumeless thistle
Carduus nutans* L **Noxious	musk thistle
Cirsium arvensis* (L.) Scop. **Noxious	Canadian thistle
Cirsium undulatum (Nutt.) Sprengel	wavy-leaf thistle
Conyza canadensis (L.) Cronquist	horseweed
Coreopsis tinctoria Nutt.	plains coreopsis
Crepis spp.	hawksbeard

Asteraceae / Sunflower family (continued)	
Echinacea angustifolia De Candolle	Echinacea, black sampson
Euthamnia graminifolia (L.) Nutt.	Euthamnia
Grindelia squarrosa (Pursh) Dun.	Curly-top gumweed, rosinweed
Helianthus annuus L.	common sunflower
Helianthus maximilianii Schrad.	Maximilian sunflower
Helianthus petiolaris Nutt.	plains sunflower
Heterotheca villosa (Pursh) Shinners	golden aster
Iva xanthifolia Nutt.	marsh elder
Lactuca spp.	Blue lettuce
Liatris ligulistylis (A. Nelson) K. Schum,	blazing star
Liatris mucronata DC.	cusp blazing star
Liatris punctata Hook.	blazing star, gayfeather
Lygodesmia juncea (Pursh) Greene	skeletonweed, goldenweed
Ratibida columnifera (Nuttall) Wooton & Standley	prairie coneflower, Mexican hat
Silphium laciniatum L.	Compass plant
Solidago canadensis L.	Canada goldenrod
Solidago missouriensis Nuttall	Missouri goldenrod
Solidago spp.	goldenrod
Taraxacum officinale Weber	dandelion
Tragopogon dubius Scop	goat's beard, yellow salsify
Vernonia spp.	ironweed
**Xanthium strumarium* Nutt.	Cocklebur, porcupine eggs
Boraginaceae / Four-o'clock family	
Onosmodium molle Michaux.	Marbleseed, stoneseed,
Cactaceae / cactus family	
Coryphantha vivipara (Nutt.) Britt. & Rose	pincushion cactus
Cannabaceae / Hemp Family	
**Cannabis sativa* L.	hemp, marijuana
Caprifoliaceae / Honeysuckle family	
Sambucus canadensis L.	common elderberry
Symphoricarpos occidentalis Hook.	snowberry
Chenopodiaceae / Goosefoot family	
**Chenopodium album* L.	lamb's quarters, goosefoot
Chenopodium glaucum L.	oak-leafed goosefoot
Chenopodium leptophyllum (Moq.) Nutt. ex. S. Wats	prairie goosefoot
**Kochia scoparia* (L.) Schrad.	kochia, alkaliweed, fireweed
**Salsola tragus* L. [*S. australis, S. iberica & S. kali*]	Russian thistle, tumbleweed
Convolvulaceae / Morning glory family	
**Convolvulus arvensis* L.	bindweed
Cyperaceae / Sedge family	
Carex spp.	Several sedges
Schoenoplectus pungens (M. Vahl) Palla	common threesquare bulrush
Schoenoplectus validus	softstem bulrush
Elaeagnaceae / Olive family	
**Elaeagnus angustifolia* L	Russian olive

Euphorbiaceae / Spurge family	
Agaloma marginata (Pursh) Love & Love	snow-on-the-mountain
Chamaesyce spp.	spurges (several species)
Euphorbia esula L. **NOXIOUS**	leafy spurge
Poinsettia dentata (Michaux) Klotsch & Gracke	toothed spurge
Fabaceae / Legume Family	
Amorpha canescens Pursh	leadplant
Desmanthus illinoensis (Michx.) MacM,	Illinois bundleflower
Glycyrrhiza lepidota Pursh.	wild licorice
Lotus cf. purshianus Clem & Clem	prairie trefoil, deer vetch
**Medicago lupulina* L	black medic, hop clover
**Medicago sativa* L.	alfalfa
**Melilotus albus* Medikus	white sweet clover
**Melilotus officinalis* (L.) Lam,	yellow sweet clover
Pediomelum argophyllum (Pursh) J. W.Grimes	silver scurf-pea
**Trifolium pratense* L.	red clover
**Trifolium repens* L.	white clover, Dutch or Ladino clover
Juncaceae / Rush family	
Juncus arcticus Willd. var. balticus (Willd.) Trautv. [J. balticus]	Baltic rush
Juncus nodosus L.	knotted rush
Juncus spp.	Rush
Juncaginaceae / Arrowgrass family	
Triglochin cf. *martima* L. **POISONOUS**	Arrowgrass (in fringed orchid habitat)
Lamiaceae / Mint Family	
Lycopus americanus Muhlenberg ex W. Barton	American bugleweed
**Nepeta cataria*	catnip
Lemnaceae / Duckweed family	
Lemna minor L	duckweed
Malvaceae / Mallow family	
**Abutilon theophrasti* Medic	velvet leaf
**Hibiscus trionum* L.	Flower-of-an-hour
**Malva neglecta* L.	Cheeseweed
Sphaeralcea coccinea (Nutt.) Rydb.	scarlet globemallow, cowboy's delight
Moraceae / Mulberry family	
**Morus alba* L	white mulberry
Nyctaginaceae / Four-0'clock Family	
Mirabilis hirsuta (Pursh) MacMill.	hairy four o'clock
Mirabilis spp.	four o'clock
Onagraceae / Evening Primrose Family	
Gaura villosa Torrey	hairy gaura
Orchidaceae / Orchid Family	
Spiranthes magnicamphorum Sheviak	Great Plains Lady's tresses
Plantaginaceae / Plantain Family	
Plantago lanceolata L.	English plantain

Poaceae / Grass Family	
**Agropyron cristatum* (L.) Gaertn. var. cristatum	crested wheatgrass
**Agropyron elongatum* (Host.) Beaur.	tall wheatgrass [*Elymus*]
**Agropyron intermedium* (Host) Beauv.	intermediate wheatgrass [*Elymus*]
Agrostis stolonifera L.	red top
Andropogon gerardii Vitman	big bluestem
Andropogon hallii Hackel.	Hall's bluestem
Aristida purpurea Nutt.	purple three-awn, noeatum
Bouteloua curtipendula (Michx.) Torr.	sideoats grama
Bouteloua gracilis (Willd. ex Kunth) Lag. ex Griffiths [Chondrosum]	blue grama
Boutelous hirsuta Lag. [Chondrosum]	hairy grama
**Bromus inermis* Leyss. [Bromopsis]	Smooth brome
**Bromus cf japonicus* Thub. ex Murr. [*B. commutatus*]	Japanese brome
**Bromus tectorum* L. [*Anisantha*]	downy brome, cheatgrass
Cenchrus longispinus (Hackel in Kneucker) Fernald	longspine sandbur
Dichanthelium spp.	rosette grass
Distichlis spicata (L.) Greene	saltgrass
**Echinochloa crus-galli* (L.) Beauv.	barnyard grass
Hordeum jubatum L. [Critesion]	foxtail barley
Koeleria macrantha (Ledeb.) Schult.	Junegrass
Panicum capillare L.	witch-grass, tickle-grass
Panicum virgatum L.	Switch-grass
Pascopyron smithii (Rydb.) A. Love [*Agropyron*]	western wheatgrass
Phalaris arundinacea L.	reed canary grass
Phragmites australis (Cav.) Trin ex Steud.	Common reed
**Poa pratensis* L.	Kentucky bluegrass
Poa spp.	Native Poa
Puccinellia nuttalliana (Schult.) A. Hitchc.	Alkali grass
Schizachyrium scoparium (Michx.) Nash var. scoparium	little bluestem
**Setaria glauca* (L.) P. Beauvois	yellow bristlegrass, foxtail
**Setaria viridus* (L.) P. Beauv.	green bristlegrass, foxtail
Sorghastrum nutans (L.) Nash	Indian grass
Spartina pectinata Link.	prairie cordgrass
Sporobolus cryptandrus Torr. A. Gray	sand dropseed
Sporobolus heterolepis (A. Gray) A. Gray	prairie dropseed
Stipa comata Trin. & Rupr. [*Hesperostipa*]	needle-and-thread
Polygalaceae / Milkwort Family	
Polygala alba Nutt.	white milkwork
Polygonaceae /buckwheat family	
**Polygonum aviculare* L.	knotweed
Polygonum lapathifolium L. (Persicaria)	pale smartweed
Polygonum spp.	Smartweed (several species)
**Rumex crispus* L.	curly dock
Rumex spp.	Dock (several species)
Portulaccaceae / Purslane Family	
**Portulaca oleracea* L.	purslane
Ranunculaceae / Buttercup Family	
Anemone canadensis L	meadow anemone
Pulsatilla patens (L.) P. Miller	pasque flower

Rosaceae / Rose Family	
Prunus virginiana L. Sargent [Padus]	chokecherry
Rosa cf woodsii Lindl	wild prairie rose
Potentilla spp.	Cinquefoil
Salicaceae / Willow Family	
Populus deltoides H. Marshall	Plains cottonwood
Salix amygdaloides Andress.	Peachleaf willow
Salix exigua Nuttall	sandbar willow
Scrophulariaceae / Figwort Family	
Agalinis tenuifolia (Vahl) Raf.	Gererdia
Solanaceae / Nightshade Family	
Physalis longifolia Nutt.	common ground cherry
Physalis ptycanthum Dun. Ex DC.	black nightshade **POISONOUS**
Solanum rostratum Dun.	buffalo bur
Solanum triflorum Nutt.	cut-leaf nightshade
Typhaceae / Cattail Family	
Typha angustifolia L.	narrowleaf cattail
Ulmaceae / Elm Family	
Celtis occidentalis L.	netleaf hackberry
Ulmus americana L.	American elm
**Ulmus pumila* L.	Siberian elm
Verbenaceae / Vervain Family	
Verbena stricta Vent.	Hoary vervain

Appendix III

Aerial Photographs of Additional Grassland Survey Areas in Nebraska

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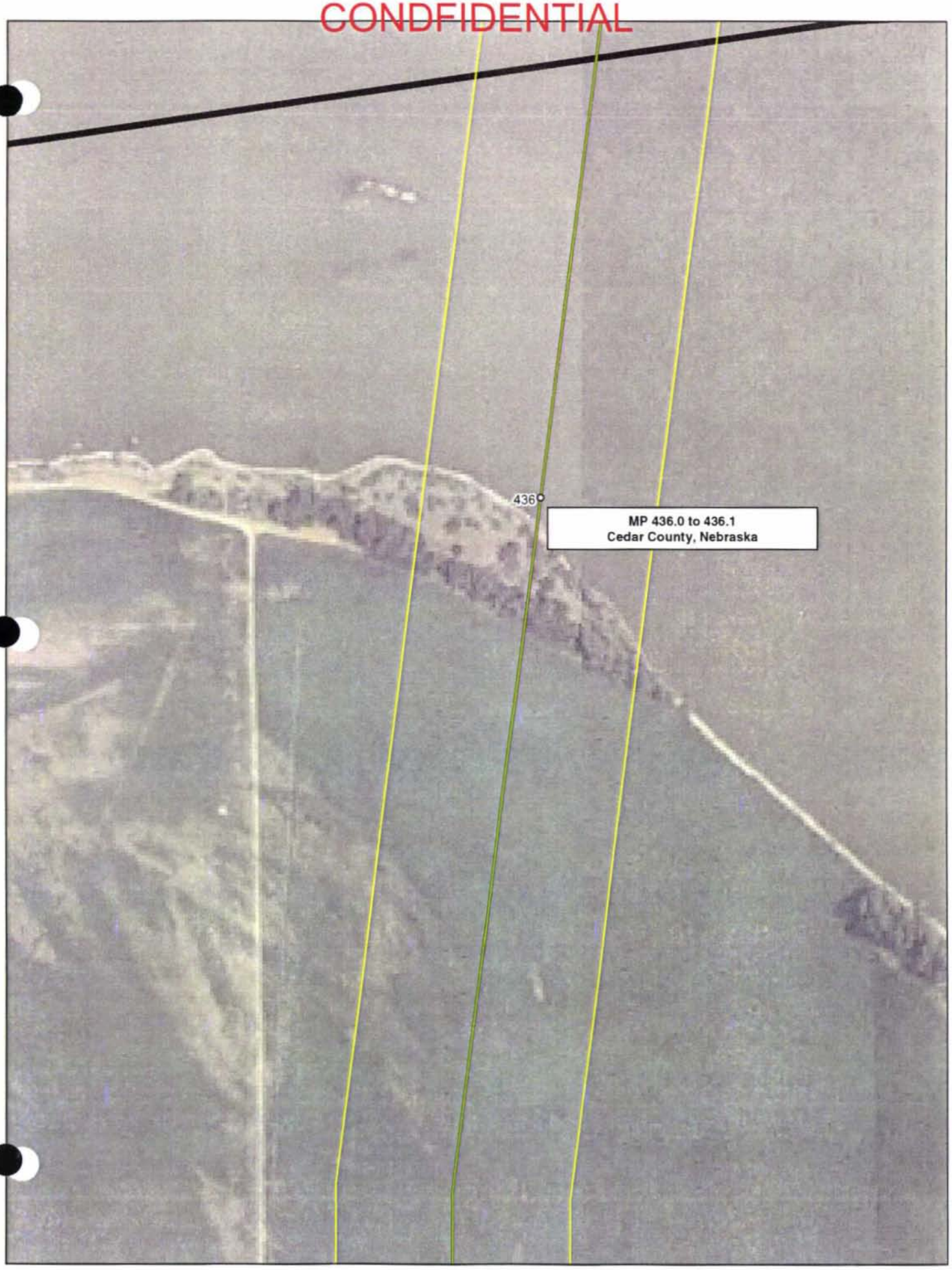

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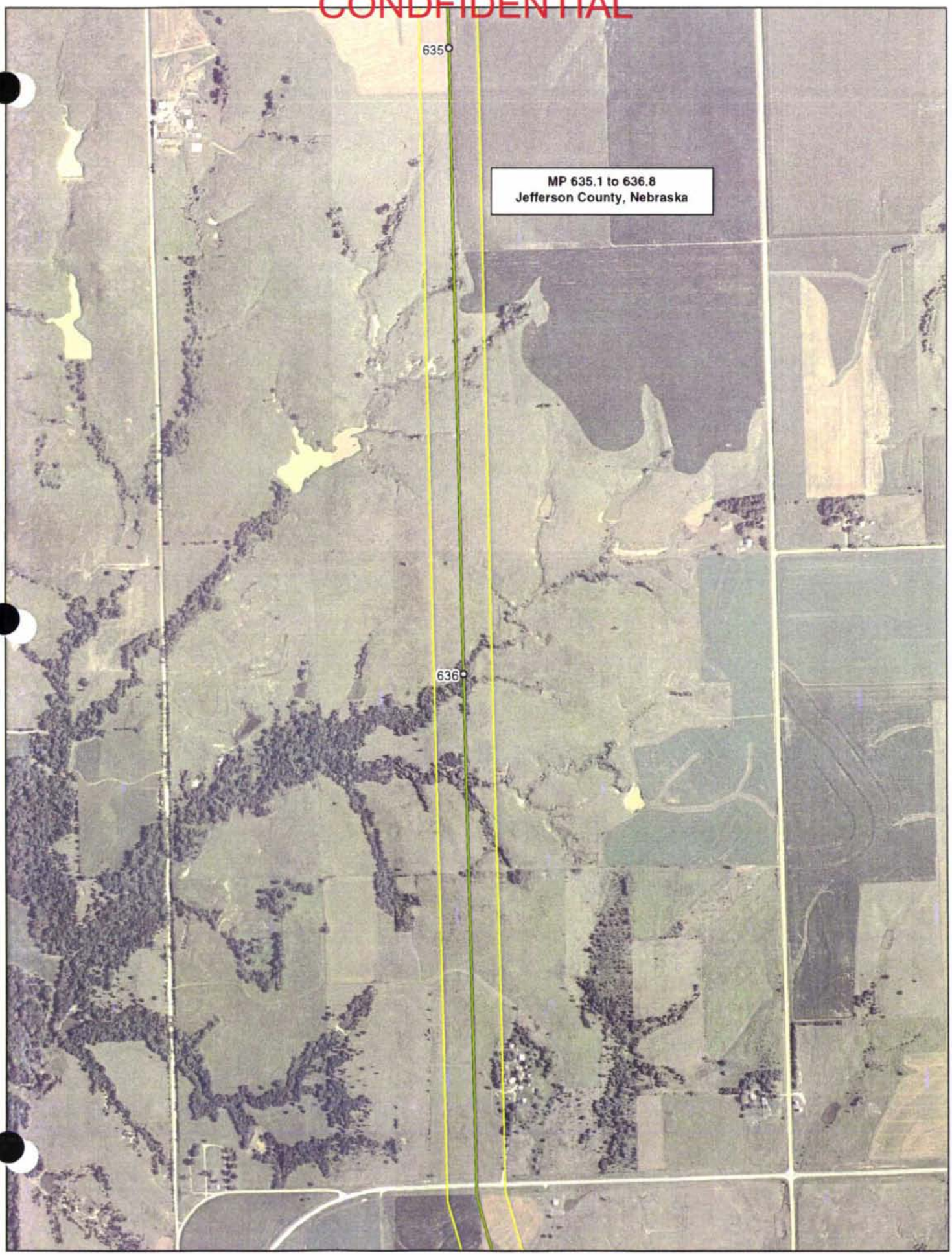

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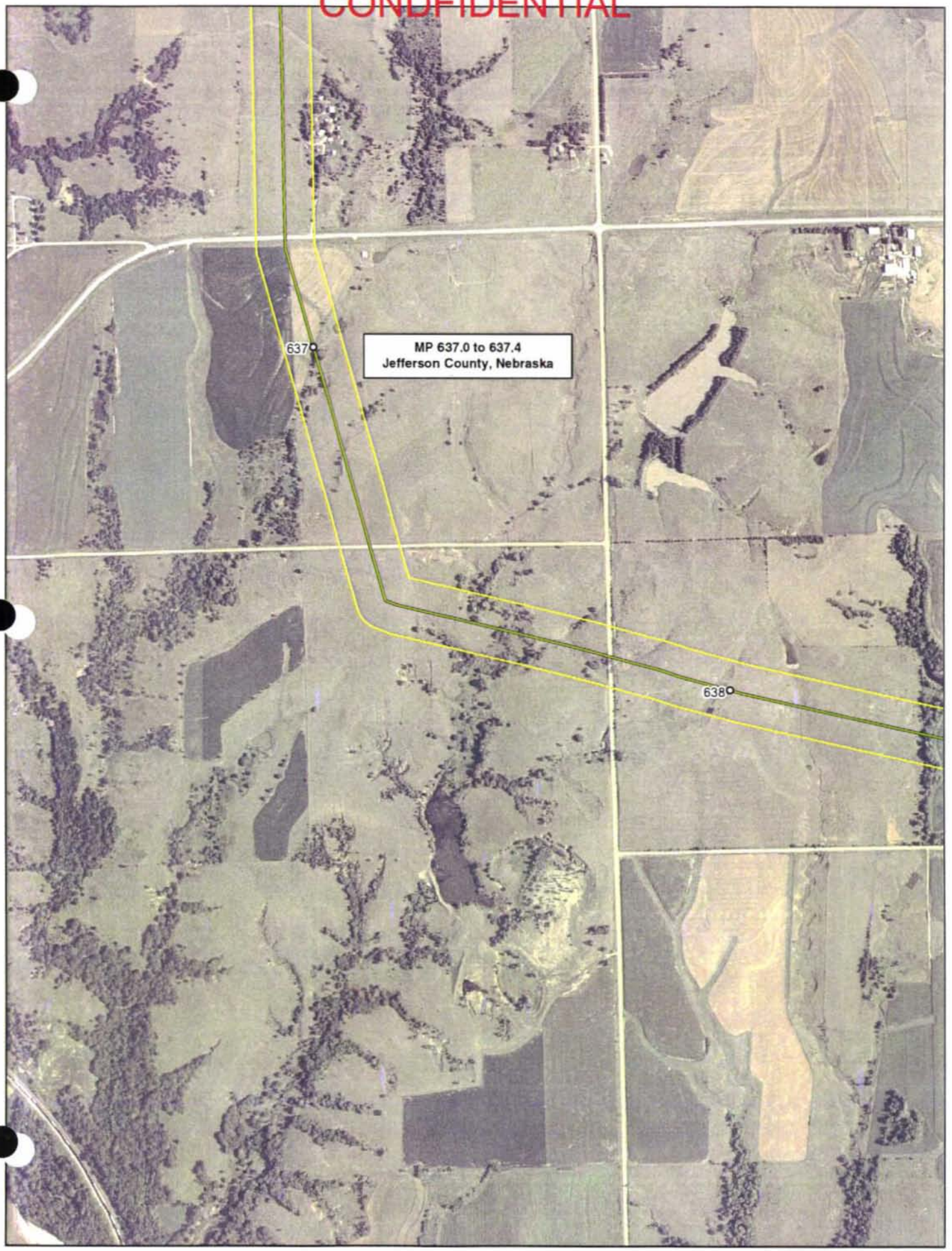

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Prepared for:
Keystone Pipeline Project

Keystone Pipeline Project
Progress Report for Wetland Surveys
October 2006

ENSR Corporation
October 2006
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Contents

List of Appendices

List of Tables

List of Figures

Executive Summary

Wetlands, waterbodies (including rivers, streams, lakes, and ponds), and riparian areas have been identified along the proposed Keystone Pipeline Project right-of-way (ROW) through ongoing field surveys and the review of aerial photographs for areas where reroutes have been developed. The purpose of this report is to review the methodologies being used to collect wetland and waterbody data, summarize the data that were collected for wetlands during the summer 2006 field effort, provide an update of ongoing (fall 2006) wetland surveys and discuss projected wetland survey needs for 2007.

1.0 Introduction

As part of federal regulatory requirements under the Clean Water Act, wetland and other waters of the U.S. (WUS) field surveys were completed to assist in estimating project surface disturbance. Information gathered during the inventories will be used to complete notification and permitting requirements under Section 401 and 404 of the Clean Water Act, as managed by the U.S. Army Corps of Engineers (USACE) and applicable state agencies. The Keystone Pipeline Project crosses four USACE districts including the Omaha, Kansas City, St. Louis, and Tulsa districts. Each of these districts has slightly different surveying and permitting requirements. Meetings were held in 2006 with the Omaha (February 6, March 29), Tulsa (March 13), Kansas City (March 27), and St. Louis Districts (February 17, May 24, and July 14), to discuss surveying, permitting, and construction requirements.

Consultation with the various USACE Districts resulted in the following general survey requirements:

- Omaha District (North Dakota, South Dakota, Nebraska): Field surveys along the Keystone Mainline ROW route will be conducted only at specific locations (larger wetland complexes, larger stream systems). Information will be provided to the USACE on other crossings, such as ephemeral streams, using remote sensing (aerial photography).
- Kansas City District (Kansas and the majority of Missouri): The Keystone Mainline ROW through Kansas and Missouri parallels an existing pipeline ROW and the proposed Rockies Express Pipeline ROW. Field data obtained from the Rockies Express Pipeline Project surveys has been used to identify wetlands and other WUS crossed by the Keystone Pipeline Project in these states. All wetland and drainage crossings along the Cushing Extension in Kansas will require ground surveys.
- St. Louis District (eastern Missouri and Illinois): All wetland and drainage crossings along the Mainline Route in eastern Missouri and in Illinois will require ground surveys.
- Tulsa District (Oklahoma): All wetland and drainage crossings along the Cushing Extension in Oklahoma will require ground surveys.

More specific information regarding discussions with the USACE districts' personnel, level of effort, wetland and other WUS delineation methodology and permitting requirements has been provided in a submittal to the Department of State (September 16, 2006). In partial fulfillment of USACE requirements, field surveys commenced in the summer of 2006 and will be completed by summer 2007. The remainder of this report provides a summary of data collection efforts for wetlands through October 2006 and discusses projected wetland survey needs for the spring/summer of 2007.

2.0 Data Collection Methods for Wetlands and other WUS

To initiate this project, ENSR completed a review of U.S. Geological Survey (USGS) topographic maps, National Wetland Inventory (NWI) maps, available soil surveys, and 2005 aerial photographs pertaining to the proposed ROW. The objectives of this data review were to identify wetlands and other WUS intercepted by the proposed pipeline route, including intermittent and ephemeral streams, and to identify specific wetlands and other WUS that will require field evaluation to confirm their status. Areas identified for field verification included: 1) NWI-mapped wetlands intercepted by the pipeline route that are not farmed; 2) areas that appear

to meet the wetlands three-parameter criteria (discussed below), but are not mapped on NWI maps; and 3) forested areas where wetland boundaries could not be estimated from aerial photographs. Additional areas to be field verified were included if recommended by the various USACE districts.

ENSR coordinated with USACE representatives regarding features requiring field verification and delineation. Preliminary survey areas were identified on maps of the proposed ROW previously provided by the district offices. For each site surveyed, a decision was made by the field team regarding the presence of wetlands and other WUS. For drainages with no wetland characteristics (e.g., unvegetated channel, defined bed and bank), a Stream Data Form developed by ENSR was completed to evaluate stream crossing characteristics. This form applied to stream crossings whether or not it supported adjunct wetland plant communities. If both wetlands and other WUS were present, a Stream Data Form and a Routine Wetland Determination Form was completed for the survey site.

The methods and techniques used to evaluate and delineate wetlands and other WUS on the maps of the proposed route corresponded to those specified for "routine on-site delineations" in the Corps of Engineers Wetlands Delineation Manual (Manual; USACE 1987). The Manual identifies a "three-parameter" approach used for defining wetlands which requires that all three of the conditions listed below be met under normal circumstances for an area to be defined and delineated as wetland.

1. The prevalent vegetation consists of hydrophytic plants that have the ability to grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content and depleted soil oxygen levels.

2. Soils are present and are classified as hydric or possessing characteristics that are associated with reducing soil conditions. Hydric soils are poorly drained and have a seasonal high water table within 6 inches of the surface.

3. The area is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation (usually 12.5 percent of the growing season) (USACE 1987).

Vegetation, soil, and hydrology data was collected at each sample point within the wetlands and immediately adjacent uplands and was entered onto a standardized wetland delineation field data form. The form also included a field sketch, which illustrated the wetlands and uplands. Wetland/upland boundaries were delineated using a handheld Global Positioning System (GPS) receiver. Photographs showing a representative view of each wetland visited also were taken. In addition to collecting sufficient data for "routine on-site delineations" and channel characteristics data for drainage crossings, wetland survey teams collected sufficient data (e.g., defined bed and bank and connectivity to navigable waters) for the USACE to make jurisdictional determinations for all wetlands and drainage crossings surveyed in the field.

Wetlands and other WUS along the proposed route were delineated in accordance with the direction provided by the USACE – Omaha, Kansas City, St. Louis, and Tulsa districts. The requirements and level of effort to complete wetland other WUS delineations differed within each district. The level of effort completed within each of the respective states has been provided below.

Keystone Mainline

- North Dakota: Key wetlands and other WUS were field delineated; key wetlands and other WUS along a reroute in southeastern North Dakota were identified based on the review of aerial photographs; the delineation of wetlands and other WUS along the reroute will be completed by summer of 2007.
- South Dakota: Key wetlands and other WUS were field delineated; key wetlands and other waters of U.S. along a reroute in northeastern South Dakota were identified based on the review of aerial photographs; the delineation of wetlands and other WUS along the reroute will be completed by summer of 2007.

- Nebraska: Key wetlands and other WUS were field delineated; key wetlands and waters of U.S. along a reroute were identified based on the review of aerial photographs; the delineation of wetlands and other WUS along the reroute will be completed in the fall of 2006.
- Kansas: Delineations were completed for wetlands and other WUS except where survey access was unavailable.
- Missouri: Delineations were completed for wetlands and other WUS crossed by the Keystone Mainline, except where survey access was unavailable.
- Illinois: Delineations were completed for wetlands and other WUS from the Mississippi River to the Patoka Terminal, except where survey access was unavailable.

Cushing Extension

- Nebraska: Preliminary identification of wetlands and other WUS was based on the review of aerial photographs. Delineations of wetlands and other WUS will be initiated and completed in 2007.
- Kansas: Preliminary identification of wetlands and other WUS was based on the review of aerial photographs. Delineations of wetlands and other WUS will be initiated and completed in 2007.
- Oklahoma: Preliminary identification of wetlands and other WUS was based on the review of aerial photographs. Delineations of all wetlands and other WUS will be initiated and completed in 2007.

3.0 Results of Summer 2006 Wetland Surveys

Maps of the proposed route, including USGS topographic maps and high resolution aerial photography overlaid with NWI wetland polygons, were evaluated for wetland crossings. Based on this evaluation, priority wetland survey areas were identified for that portion of the ROW occurring in UTM Zone 14 under Omaha District (USACE) jurisdiction, where the majority of wetlands along the proposed route occur. The boundaries of lower priority areas in UTM Zone 14 were delineated using aerial photo interpretation. The remainder of the ROW outside of the Omaha District requires 100 percent on-the-ground field surveys to evaluate wetlands crossed by the proposed project. Wetland data for the Project thus represents a combination of data collected through delineations in the field recorded with a GPS unit, and data digitized from maps and high-resolution aerial photography overlaid with NWI polygons. A total of 2,472 wetlands have been identified along the Keystone Mainline ROW, which cross 57.4 linear miles of the route. Of these wetland areas, 12.8 miles (22 percent) have been field delineated and the boundaries accurately captured with a GPS receiver, while wetlands that cross 44.6 miles (78 percent) have been delineated using high quality aerial photography where survey access was unavailable or survey protocol allowed this delineation approach as discussed with the USACE.

Palustrine emergent (PEM) wetlands represent 71 percent of the total wetland miles (**Figure 1**). PEM wetlands are dominated by persistent and nonpersistent grasses, rushes, sedges, forbs and other herbaceous and grass-like plants. Open water (OW) represents 16 percent of the total wetland miles crossed by the Project. OW is a broad category that describes lakes, ponds, streams, and rivers, as well as associated vegetation found within their geomorphologic boundaries (i.e., stream banks). Thus, this category represents surface waters found within wetlands or in defined channels, as well as riverine or seasonally flooded wetlands associated with open water. Palustrine forested wetlands (PFO) occur along 9 percent of the wetland miles identified along the route. PFO wetlands are dominated by woody vegetation, generally greater than ten feet in height. The remaining 4 percent of wetlands crossed by the Keystone Mainline are classified a palustrine scrub-shrub (PSS), which are typically dominated by shrubs and other short, woody plants.

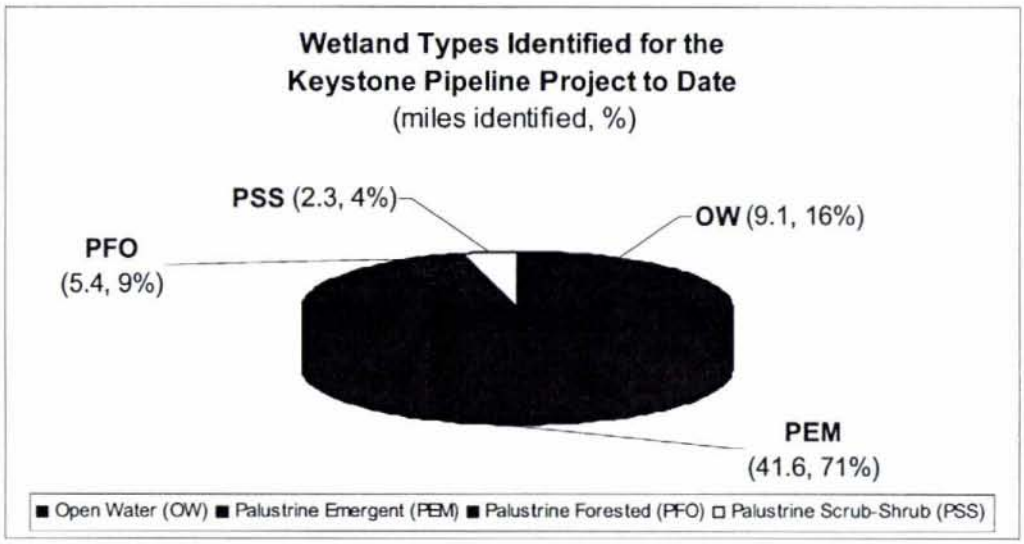

Figure 1 Wetland Types Identified for the Keystone Pipeline Project to Date

Wetland surveys for the Mainline of the Keystone Pipeline Project are approximately 80 to 90 percent complete (**Table 1**). The current wetland survey status by state is provided below.

- North Dakota: Wetland delineations are approximately 79 percent complete. Of 107 total locations requiring survey, 85 have been successfully completed. By the end of the 2006 field season in November approximately 93 percent of wetland surveys should be complete, depending on available access. The Hecla Sandhills area in extreme southern North Dakota will not be surveyed in 2006, thus wetland surveys for North Dakota will resume in the spring/summer of 2007 for this area and those tracts where access is not yet available.
- South Dakota: Wetland delineations are approximately 81 percent complete. Of 52 total locations requiring survey, 42 have been successfully completed. By the end of the 2006 field season in November approximately 90 percent of wetland surveys should be complete, depending on available access. The Hecla Sandhills in northern South Dakota will not be surveyed in 2006, thus wetland surveys for South Dakota will resume in the spring/summer of 2007 for this area and those tracts where access is not available.
- Nebraska: Wetland delineations are approximately 87 percent complete. Of 39 total locations requiring survey, 34 have been successfully completed. By the end of the 2006 field season in November it is projected that 100 percent of wetland surveys should be complete, depending on available access.
- Kansas: Wetland delineations have been completed for all wetlands and other WUS crossed by the Project, excluding land tracts where survey access was not available. Further wetland surveys for such tracts, or for possible re-routes, may be necessary in 2007.
- Missouri: Wetlands and other WUS from the western Missouri border to the eastern boundary of Audrain County have been completed, excluding land tracts where survey access was not available. Wetland delineations from the eastern boundary of Audrain County to the Mississippi River are currently 83 percent complete. Of 101 total miles requiring survey, 76 miles have been completed.
- Illinois: Of the 56 total miles requiring wetland survey from the Mississippi River to the Patoka Terminal, 50 miles have been completed.

Table 1 Wetlands Survey Progress as of October 13, 2006

State	Locations Requiring Pedestrian Survey[a]	Total Locations or Miles (L/M) Surveyed[a]	Percent Complete
North Dakota	107 (L)	85 (L)	79
South Dakota	52 (L)	42 (L)	81
Nebraska	39 (L)	34 (L)	87
Kansas REX	99 REX data (L)	98 (L)	99
Missouri REX	172 REX data (L)	165 (L)	96
Missouri	101 (M)	76 (M)	75
Illinois	56 (M)	50 (M)	89
Total locations	**469(L)**	**424(L)**	**90**
Total miles	**157(M)**	**126(M)**	**80**

NOTE: L indicates locations surveyed or available for survey; M indicates miles surveyed or available for survey.

[a] Numbers of wetlands for survey subject to verification.

4.0 Projected Survey Needs (Spring/Summer 2007)

Keystone Mainline

Remaining wetland survey work on the Keystone Mainline includes:

- North Dakota, South Dakota, Kansas, Missouri and Illinois: tracts requiring access and re-routes (if there are any changes from the current alignment). This work will be completed in spring/summer 2007
- North Dakota and South Dakota: Hecla Sandhills (discussed in more detail below). This area will be completed by summer 2007.

Hecla Sandhills

The Hecla Sandhills and their associated vegetation and wetland complexes are currently crossed by the Keystone Mainline ROW from approximate milepost 210 in North Dakota south to approximate milepost 224 in South Dakota. The area consists of stabilized sand dunes that are occupied by native grasslands and extensive small wetlands. Wetland delineation surveys will be completed after the pipeline route has been refined across this area.

Cushing Extension

The Cushing Extension has been evaluated for wetlands and other WUS using aerial photographs and NWI maps, but pedestrian surveys of wetlands and drainage crossings will be necessary:

- Nebraska, Kansas, and Oklahoma: Delineations of wetlands and other WUS will be initiated and completed in the spring/summer of 2007.

References

U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Available online at: http://www.wes.army.mil/el/wetlands/pdfs/wlman87.pdf

Appendix I

Photographs of Wetland Types Delineated Along the Keystone Mainline

Appendix II

Mainline Wetlands Identified for the Keystone Pipeline Project