Application for Incidental Take Authorization

Kankakee River
Will County, Illinois

BP Pipelines (North American) Inc.
Manhattan, Illinois

May 2002

Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

Table of Contents

Executive Summary - Purpose i
Project Description i
Project Permit History ii
Project Schedule ii

Section 1 - Description of Potential Impacts 1-1
Legal Description 1-1
Biological Data 1-1
Site Activities 1-2

Section 2 - Minimization and Mitigation of Impacts 2-1
Minimizing Affected Area 2-1
Continued Future Use 2-1
Mitigating Effects of Proposed Action 2-1
Habitat for Mussels 2-2
Post Project Monitoring 2-2
Management of Change 2-2
Verification of Funding 2-2

Section 3 - Alternative Actions 3-1

Section 4 - Likelihood of Survival of T & E Species 4-1

Section 5 - Implementing Agreement 5-1

APPENDICES

Appendix A - Map and Aerial Photo of Project Location A-1

Appendix B - Biological Data on State Threatened or Endangered Species B-1

Appendix C - Mussel Survey Report for BP Pipelines Project Location C-1

Appendix D - Proposal Plan for Mussel Relocation D-1

Appendix E - Project-Related Permits and Agency Approvals E-1

Executive Summary

Purpose

This application is submitted by BP Pipelines (North America) Inc. to the Illinois Department of Natural Resources (IDNR) pursuant to the requirements specified in the Illinois Administrative Code for Incidental Taking of an Endangered or Threatened Species (17 IAC 1080). As stated in Section 1080.10(a),

> "Incidental taking of endangered and threatened species shall be authorized by the Department of Natural Resources (Department) only if the applicant submits to the Department a conservation plan that satisfies all criteria established in this Part."

To proceed with the project as described herein, BP Pipelines (North America), Inc. requests approval to relocate three identified State threatened or endangered mussels species; the black sandshell (*Ligumia recta*), purple wartyback (*Cyclonaias tuberculata*), and the sheepnose (*Plethobasus cyphyus*). This recommended action has been developed under the guidance of the Illinois DNR, Office of Realty and Environmental Planning.

Project Description

In response to a recent inspection finding from the US Department of Transportation, Office of Pipeline Safety (OPS), 800-foot portions of two inactive petroleum pipelines will be removed along a span where they currently cross the Kankakee River. The project site is located in the general vicinity of the Northwest ¼ of Section 22, Township 33 North, and Range 9 East, North of Wilmington, Illinois, in Will County. The site location is depicted on Figure 1 and the configuration of the pipelines and crossings are depicted on Figure 2, both of which are provided in Appendix A. The pipelines cross the Kankakee River within the portion defined as a Class A & B stream as reported by the Chicago District of the US Army Corps of Engineers[1]. The Eastern

[1] Extracted from Biological Stream Characterization: Biological Assessment of Illinois Stream Quality through 1993. November 1996. Illinois Environmental Protection Agency.

portion of the crossing is located within the confines of the Des Plaines Fish and Wildlife Area. The Western portion of the crossing is located in an area used for agricultural purposes. In addition to the two inactive lines, one additional active pipeline is operating within the pipeline corridor. All equipment and work activities will be limited to within the pipeline right-of-way on both the East and West sides of the river. One tracked excavator will need to enter the Kankakee River to hoist and carry each pipeline to shore. Existing access road exist to both the east and west bank work sites.

Project Permit History

In preparation for this work, BP Pipelines submitted a joint application to the US Army Corps of Engineers, Illinois EPA, and Illinois DNR requesting authorization to construct in a water way. The US Army Corps of Engineers authorized approval November 21, 2001 under the Regional Permit Program. Specifically, work was authorized under Regional Permit 7, Temporary Construction Activities, and Regional Permit 8, Utility Line Projects. The IEPA has issued water quality certification for these Regional Permits.

The IDNR, Office of Water Resources also processed this joint application (IDNR Application No. 2001399). On October 22, the IDNR, Office of Water Resources issued a public notice soliciting comments on the proposed project and permit application. In response to this public notice, Mr. Robert W. Schanzle, Permit Program Manager, Office of Realty and Environmental Planning, IDNR identified that the Illinois Natural Heritage database contains occurrence records for two state listed threatened or endangered species. Mr. Schanzle further recommended that a qualified biological consultant survey any areas along the pipeline corridor with sand, gravel, and/or silt substrates. In consultation with Mr. Schanzle, BP Pipelines subsequently retained Helms & Associates to perform a mussel survey. The survey identified 13 species of mussels, three of which are listed as Threatened or Endangered in Illinois. None of these species are federally listed. The full report is included in Appendix C.

In addition to the US Army Corps of Engineers and IEPA, the Illinois Historic Preservation Agency and the Will/South Cook Soil & Water Conservation District have given review and approval to this work as described in the joint permit application. As part of the joint permit application process, separate notifications have been made to the Will County Land Use Department, US Coast Guard, and US Fish & Wildlife Service. A wetland survey has been performed at the project site and. A Soil Erosion & Sediment Control Plan has been developed and approved by the Will/South Cook Soil & Water Conservation District. These documents are available upon request.

BP Pipelines is proposing to retain the services of Don R. Helms of Helms & Associates to perform the mussel relocation. Mr. Helms has been issued a "Permit for Possession of Endangered or Threatened Species" by the Illinois DNR, Permit No. 02-2S.

A copy of all issued permits and regulatory approvals are provided in Appendix E.

Project Schedule

The mussel relocation is anticipated to take five calendar days with a crew of 3 to 4 certified divers working under the supervision of a licensed malacologist. This pipeline removal work is anticipated to take three weeks from mobilization to completion of any land rehabilitation resulting from the work. It is BP Pipelines desire to perform this work this summer after approval is received from the IDNR. To minimize impacts to the relocated mussel population, work will not begin until the water temperature is above 40 F.

Section 1

Description of Potential Impacts

Legal Description

The proposed project site is located on the Kankakee River, along a corridor 800 feet in width extending from the east bank to the west bank, north of Wilmington, Illinois, Will County, (NW ¼ S22, T33N, R9E, 3rd P.M.). Appendix A contains a site location on the USGS Wilmington, IL Quadrangle (Figure 1) and an aerial photo of the project site (Figure 2). Also included in Appendix A is a copy of the right-of-way agreement, which provides "indicia of ownership or control of affected property," pursuant to Part 1080.10(a)(1)(A) of the Illinois Endangered Species Act.

Biological Data

Biological data was provided by the Illinois Department of Natural Resources (IDNR) upon request and is included as Appendix B. Additional information was collected via the Internet from the Illinois History Survey website, www.inhs.uius.edu/cbd/. This information is also contained in Appendix B. Information provided by the IDNR includes data on the following species:

- Black sandshell (*Ligumia recta*) State Threatened
- Purple wartyback (*Cyclonaias tuberculata*) State Threatened
- Sheepnose (*Plethobasus cephysius*) State Endangered

The mussel survey conducted by Helms & Associates determined that these three species constituted roughly 0.9, 6.1, and 2.6 percent of the grab. This is a combined 9.6 percent contribution for the overall catch. The survey conducted by Helms & Associates is provided as Appendix C.

As determined by the Helms & Associates mussel survey, the mussels are primarily concentrated near the shore along both the west and east banks of the river. It was within this area that the substrate was more suitable for mussel habitat. Estimation was given to approximate the number

of mussels present along each bank. Roughly 6,075 mussels were estimated to be present along the west shore and 7,320 mussels were estimated to be present along the east bank. Because the substrate within the central portion of the river is mostly bedrock few mussels were found to exist there.

Site Activities

Removal of the targeted pipelines requires that one end be detached near the shoreline and hauled out at the opposite bank. Due to physical arrangement of the bank, it has been proposed that the pipelines be removed from the east bank. In the process of dragging the pipelines out of the river the potential exists to have unintended contact with an unknown amount of mussels within the path of removal. Physical damage and/or death may result from the removal process of the pipeline. There is potential for the pipelines to inadvertently cause scraping and crushing of neighboring specimens the majority of which is likely to occur on the east bank. It is here that the full length of the pipeline will pass. The west bank is expected to suffer little disruption and the central portion of the river is expected to suffer no damage relative to the species in question.

Section 2

Minimization and Mitigation of Impacts

Minimizing Affected Area

The area currently being evaluated provides the minimum amount of unnecessary contact. The working area along the pipeline corridor will generally be limited to 100 feet along each pipeline. A soil erosion and sediment control plan has been developed in accordance with the soil erosion and sediment control standards specified in the Illinois Urban Manual.

Continued Future Use

Relocation of the threatened and endangered mussel species population will be made to a similar habitat upstream or downstream of the project location. Some temporary disturbance of the existing sand, silt, or gravel substrates may result from equipment movement and pipeline removal within the working pipeline right-of-way. A temporary structure to stabilize the riverbank at the entrance and egress point will be utilized. This project does not plan any soil excavation, soil removal, or soil discharge into the river. Some temporary excavation at the riverbank will be necessary to cut and remove the pipeline, but all excavated material will be returned to the sites original grade. Any overburden generated will be disposed offsite. As such, the pipeline removal will not result in any long-term adverse physical impacts to the habitat. It is therefore anticipated that the mussel population could fully re-inhabit the area through natural mechanisms.

Mitigating Effects of Proposed Action

Helms & Associates was retained to conduct a pre-project mussel survey within the proposed area. The purpose of the survey was to evaluate the existing mussel population within the pipeline corridor and determine a cost-effective approach for the pipeline removal while causing the least amount of damage to the mussel community. The recommendation of Helms & Associates and the Illinois DNR, is that the mussels should be relocated from the pipeline corridor prior to the removal of the pipeline. This Helms & Associates mussel relocation

proposal is included in Appendix D. In general, the relocation of the threatened and/or endangered species will be conducted in accordance with commonly used practices and will conform with United States Fish and Wildlife Service guidelines for the relocation of federally listed species. All mussels that are collected will be taken to a similar habitat either upstream or downstream from pipeline corridor and placed within an existing mussel community of similar makeup.

Habitat for Mussels

Because substrate near the shore on both the east and west banks is good habitat for the mussels, it is believed that the mussels will be able to repopulate the area naturally without any transplantation of the relocated mussels back into the area. Additional information on the physical parameters and species composition, including relative abundance, is provided in the Mussel Survey Report (Appendix C).

Post Project Monitoring

Post project monitoring will be performed of the project site to determine how well the freshwater mussels are able to repopulate the project area and survive in that location. Two monitoring events are proposed. The first will be after two years from completion of the relocation and the second at five years after the relocation. The monitoring protocol will be in general accordance with the approach used for the initial mussel survey, information on which is provided in Appendix C. In general, this will involve monitoring at the east and west banks where relocation is planned. This would include examination of samples collected at 3 locations on east bank and 3 locations on west bank with 4 substrate collections at each location. As a result, there would be 2 banks x 3 locations/bank x 4 collections per location = 24 quarter meter substrate collections.

Management of Change

BP Pipelines is certified to the ISO 14001 Environmental Management Systems (EMS) Standard. As such, the company has a systemic process in place to manage its overall environmental obligations including its legal requirements and company policies. This EMS is periodically reviewed and updated. Specific to this project, a Soil Erosion and Sediment Control plan is in place that specifies management practices for the project to minimize pollutant runoff into the Kankakee River and suspension or other disturbances from the river bottom. Periodic inspections during the project are scheduled as well as post-project site rehabilitation measures. Although two pipelines are to be removed, other active pipelines will continue to be operated in the area. As such, and in accordance with US DOT Office of Pipeline Safety Regulations, the pipeline right-of-way will be inspected weekly.

Verification of Funding

It is estimated that the relocation of the mussel population will cost approximately $30,000. BP Pipelines has sufficient cash assets to ensure that these activities and associated construction activities will be adequately funded. All construction and post-construction control measures have been appropriated by BP Pipelines as part of the overall pipeline removal project.

Section 3

Alternative Actions

The removal action is in response to a recent inspection finding form the US Department of Transportation, Office of Pipeline Safety (OPS). Currently, these pipelines are inactive with no future plans for service. Other petroleum pipelines currently in service are operated within the general area of the crossing. The OPS has cited that the idled pipelines could pose a safety threat to the future operation of the existing pipelines. Potential concerns, such as the river current pushing the idled pipelines into the operating pipelines, could lead to potential safety issue that might ultimately lead to an unintended release from the active pipelines. Therefore, a "no action" alternative poses potentially greater risks to the habitat than the removal action described in this application. Best management practices are being employed for this project, including the relocation of the threatened or endangered mussel population.

Section 4

Likelihood of Survival of T & E Species

Safety of the individuals, threatened or endangered species included, that are now present, will be ensured by the relocation of the mussel community from the impact zone. Because the mussel habitat will remain intact and unchanged and a viable mussel community is present in the surrounding area, the mussels are expected to repopulate the site quickly. This will deter any long-term effects at the both the site and the community overall.

Section 5

Implementing Agreement

Application is hereby made for authorizations for the activities described herein. I certify that I am familiar with information contained in the application, and that I possess the authority to undertake the proposed activities. I further certify that to the best of my knowledge and belief, such information is true, complete, and accurate and that the proposed actions, including those described in the conversation plan herein, will be executed in compliance with all other pertinent federal, State, and local regulations. Although other federal and state permits have been issued to BP Pipelines (North America) Inc. for these proposed activities, no other final federal authorizations for a taking have been issued.

Juan T. Ortega — 4/29/02

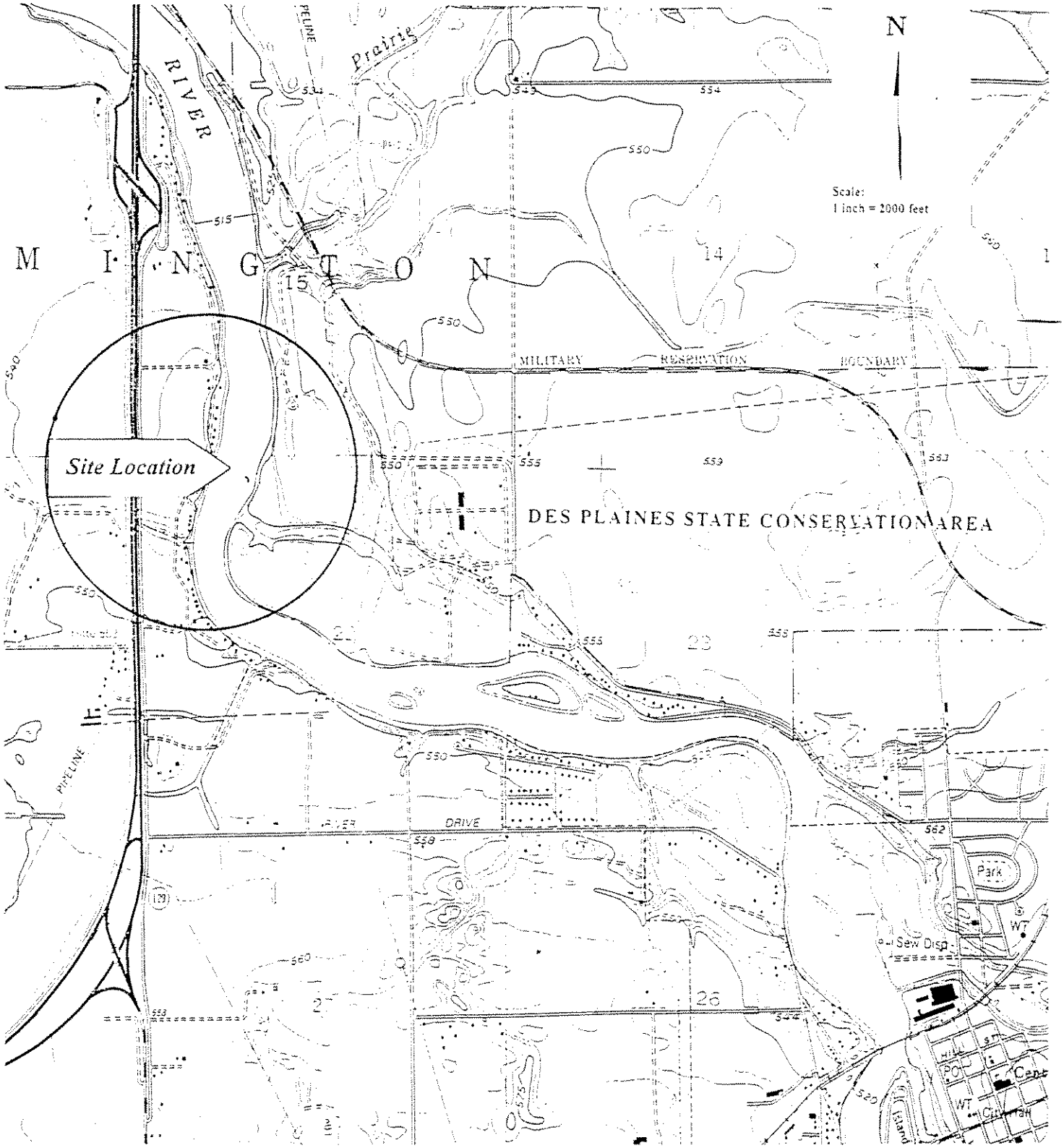
(Signature of Applicant or Authorized Agent) (Date)

Juan Ortega, District Manager - BP Pipelines (North America) Inc.

(Name of Applicant or Authorized Agent)

Appendix A

Map and Aerial Photo of Project Location



Site Location
Wilmington, IL Quadrangle
United States Geologic Survey
Photorevised 1993
Figure 1

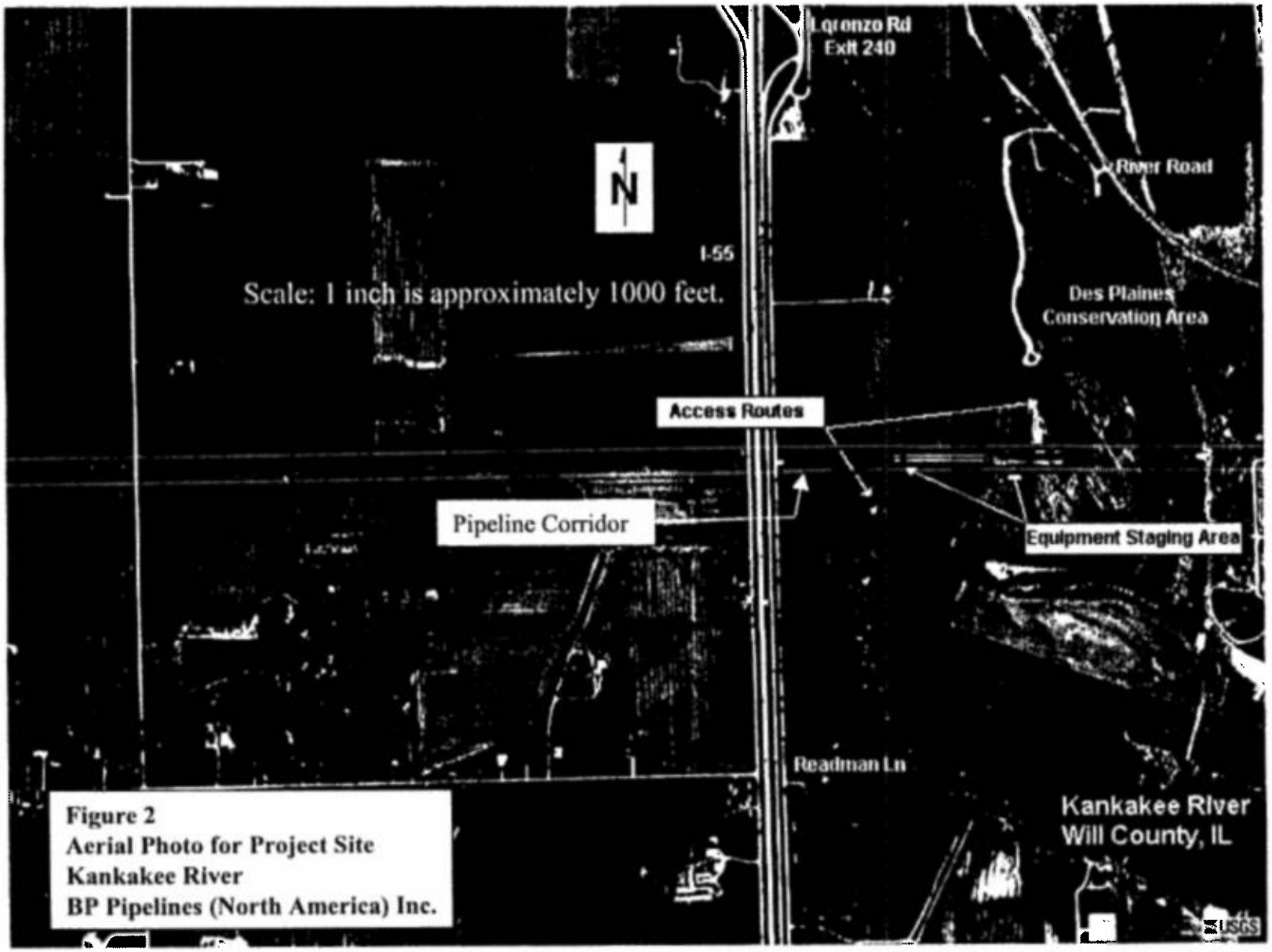
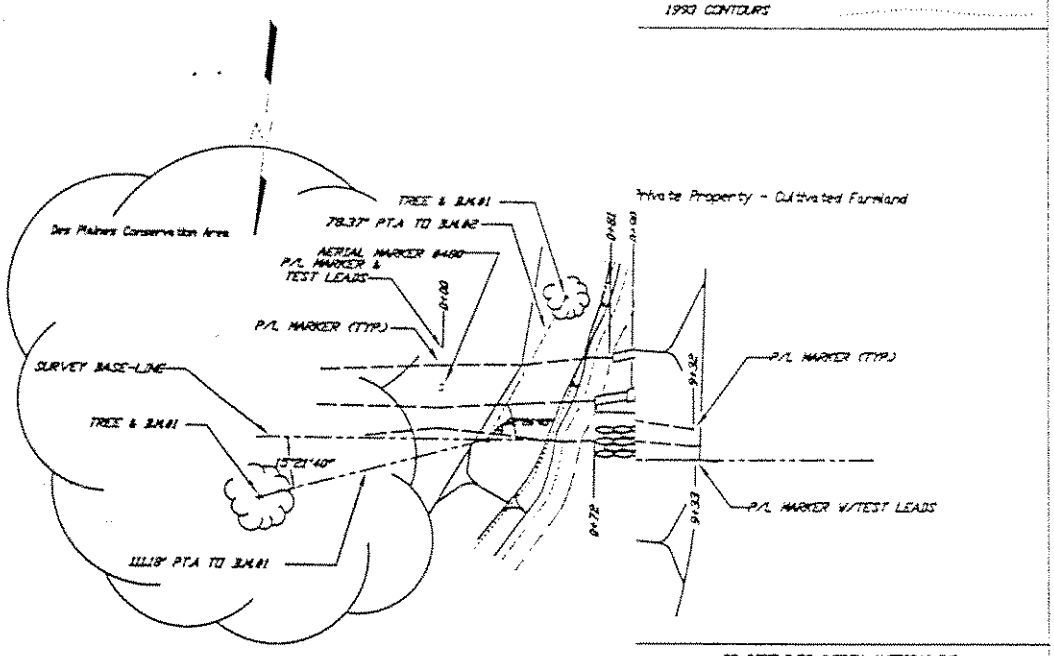


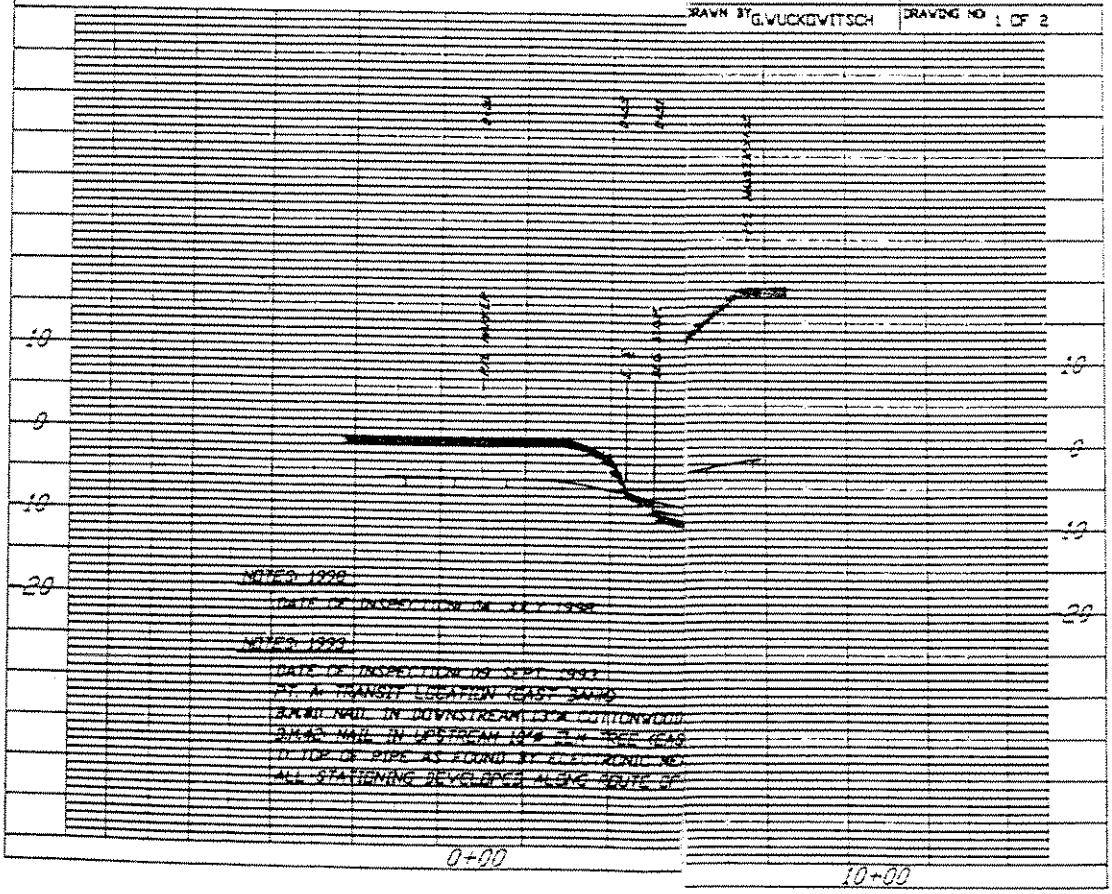
Figure 2
Aerial Photo for Project Site
Kankakee River
BP Pipelines (North America) Inc.



DP_PIPELINES_NORTH_AMERICA'_INC.
KANKAKEE_RIVER
WILMINGTON,_IL

DES_PLAINES CONSERVATION_AREA PIPELINE_EASEMENT

DATE 13 JULY 1998	APPROVED BY K.J.P.
DRAWN BY G.WUCKOVITSCH	DRAWING NO 1 OF 2



28 95

RIGHT OF WAY AGREEMENTS

And Related Authorizations Providing BP Pipelines the Right of Access to the Project Site

The following chain of title shows the succession from Stanolind Pipe Line Co. to BP Pipelines (North America) Inc.

- Effective May 1, 1950, the name of the corporation was changed from Stanolind Pipe Line Company to Service Pipeline Company.

- Effective April 1, 1970, the name of the corporation was changed from Service Pipeline Company to Amoco Pipeline Company.

- Effective April 2, 2001, the name of the corporation was changed from Amoco Pipeline Company to BP Pipelines (North America) Inc.

2991 #1483-84

STATE OF ILLINOIS

Permit
Nº 18094

Department of Transportation

Division of Water Resources

2300 South Dirksen Parkway
Springfield, Illinois 62764

Permission Is Hereby Granted, this 26th day of November 19 84

To

AMOCO PIPELINE COMPANY
8826 Santa Fe Drive
Overland Park, Kansas 66212

To install a pipeline under and across the Kankakee River in the Northwest 1/4 of Section 22, Township 33 North, Range 9 East of the 3rd Principal Meridian in Will County

in accordance with an application dated Oct. 10, 1984, and the specifications and plans entitled

INSTALL NEW 16" CONCRETE COATED PIPELINE ACROSS THE KANKAKEE RIVER TO TRANSPORT CRUDE OIL PRODUCTS TO CHICAGO METRO AREA, ONE SHEET, RECEIVED OCTOBER 12, 1984

filed with the Department of Transportation and made a part hereof, and subject to the terms and special conditions contained herein:

Examined and Recommended:

Neil R. Fulton

Chief, Bureau of Resource Management.

Neil R. Fulton

Approval Recommended:

Donald R. Vonnahme

Director

Donald R. Vonnahme

APPROVED:

Gregory W. Baise

Secretary

Gregory W. Baise

(over)

(39193—SM Sats—12-83)

cc: Chicago Corps of Engineers
Kankakee County

GRANT OF RIGHT OF WAY

1483-2A
Corps of Eng. No. 42-3

The UNITED STATES OF AMERICA, hereinafter called "GRANTOR", for and in consideration of the sum of ONE DOLLAR ($1.00), and other good and valuable consideration, the receipt of which is hereby acknowledged, and without further or additional rental or charge, hereby grants unto STANOLIND PIPE LINE COMPANY, a Maine corporation, hereinafter called "GRANTEE", the exclusive right to lay, maintain, inspect, operate, repair, replace and remove three (3) pipe lines, and also such additional pipe line or pipe lines as Grantee may from time to time in the future desire, for the transportation of crude petroleum, oil, gas, and the products or by-products of each thereof, and also water, on, over and through the tract or strip of land fifty (50) feet in width, situated in Will County, State of Illinois, and described as follows:

A strip of land fifty (50) feet in width throughout its entire length in said County and State, beginning at the center line of the Kankakee River in Section 22, Township 33 North, Range 9 East, thence east, south of and adjacent to the south line of a Township Road along the north line of said Section 22, extended easterly and westerly, (crossing the Township Road along the East line of said Section 22) to a point in the Northwest Quarter ($NW\frac{1}{4}$) of the Northwest Quarter ($NW\frac{1}{4}$) of Section 23, Township 33 North, Range 9 East; thence northeasterly to a point in the Southwest Quarter ($SW\frac{1}{4}$) of the Southwest Quarter ($SW\frac{1}{4}$) of Section 14, Township 33 North, Range 9 East, in the center line of said 50 ft. right of way, which point is approximately 55 ft. north of the south line of said Section 14; thence east, south of and adjacent to a line 50 feet south of and parallel to the south fence line of the fence to be constructed in connection with the Elwood Ordnance Plant, extended westerly, across Sections 14 and 13, Township 33 North, Range 9 East, and across Sections 18, 17, 16 and 15, Township 33 North, Range 10 East (the center line of said 50 ft. right of way being 75 ft. south of and parallel to said south fence line of the Elwood Ordnance Plant) to the east line of said Section 15; thence continuing this course East to a line 250 feet northwesterly of and parallel to the West right of way line of the Wabash Railroad in the South Half of Section 14, Township 33 North, Range 10 East; (the said 50 ft. right of way being the south 50 feet of a strip of land 100 feet in width, south of and adjacent to the south fence line of the Elwood Ordnance Plant in said Sections 14, 15, 16, 17 and 18 in Township 33 North, Range 10 East) thence in a northeasterly direction along the center line of said 50 ft. right of way parallel to and 275 feet west of the west right of way line of the Wabash Railroad across Sections 14, 13, 12 and 1, Township 33 North, Range 10 East, thence continuing northeasterly along said center line and 275 feet from said West right of way line of the Wabash

Railroad across Section 6, Township 33 North, Range 11 East; thence continuing northeasterly along said center line parallel to said railroad right of way, crossing the right of way of the Sinclair Refining Company pipe lines, to a point in said center line in Section 31, Township 34 North, Range 11 East, which point is 75 feet southeasterly of the southeasterly fence line and 25 feet East of the East fence line, extended south, of said Elwood Ordnance Plant, and 275 feet from the West right of way line of said Wabash Railroad (the northeasterly course of the 50 ft. right of way being the southeasterly 50 feet of a strip of land 100 feet in width southeasterly of and adjacent to the southeasterly fence line to be constructed in connection with the Elwood Ordnance Plant); thence north along said center line 25 feet east of and parallel to the East fence line of said Elwood Ordnance Plant to the north line of Section 31, Township 34 North, Range 11 East, of the third principal meridian, in Will County, Illinois, subject to the crossings of Township roads, Sinclair Refining Company pipe lines, State Highways U. S. 66, Chicago and Alton Railroad right of way and spur railroad tracks;

to continue in full force and effect so long as the said strip of land is used for pipe line purposes, together with the right of ingress and egress on, over and through said land for any and all purposes necessary and incident to the exercise by said Grantee of the rights granted hereunder.

Grantor expressly agrees that it will not cause or authorize the erection of any buildings or obstructions over said pipe lines.

Grantee shall have the right to change, from time to time, the size of its pipe lines, or any of them, if Grantee may desire.

The terms, conditions and provisions of this contract shall extend to and be binding upon the successors and assigns of the parties hereto.

IN WITNESS WHEREOF Grantor has caused this instrument to be signed and executed in its behalf by its Secretary of War thereunto lawfully authorized in the premises, this 24 day of September 1941.

UNITED STATES OF AMERICA

By Henry L Stimson

Secretary of War.

1433-9

RIGHT OF WAY

CARRIE M. THOMAS, SPINSTER

hereinafter called Grantor, for and in consideration of the sum of $1.00, the receipt of which is hereby acknowledged, hereby grant unto STANOLIND PIPE LINE COMPANY, a Maine corporation, hereinafter called Grantee, the exclusive right to lay, maintain, inspect, operate, repair, replace and remove three pipe lines, and also such additional pipe line or pipe lines as it may from time to time in the future desire for the transportation of crude petroleum, oil, gas, the products or by-products of each thereof and also water, on, over and through tract or strip of land fifty (50) feet in width of which Grantor warrant the owner in fee simple, situated in Will County, State of Illinois, and described as follows:

> A strip of land 50 feet in width beginning at the center line of the Kankakee River in Section 22, Township 33 North, Range 9, East, thence East, South of and adjacent to the South line of a Township Road along the North line of Section 22 and ending at the east line of said Section 22.

together with the right of ingress and egress on, over, and through said land for any and all purposes necessary and incident to the exercise by said grantee of the rights granted hereunder, hereby releasing and waiving all rights under and by virtue of the homestead exemption laws of this State.

Said Grantor expressly agree that will not cause or authorize the erection of any buildings or obstructions over said pipe lines.

Grantee has the right to change from time to time the size of its pipes, if it may desire.

The terms, conditions and provisions of this contract shall extend to and be binding upon the heirs, executors, administrators, personal representatives, successors and assigns of the parties hereto.

IN WITNESS WHEREOF, I (we) have hereunto set hand and seal this 12th day of April, 1940.

Signed, sealed and delivered in the presence of

A. C. Conn

Carrie M Thomas (Seal)

(Seal)

(Seal)

(Seal)

FORM TCPL—7-40

RIGHT OF WAY CONTRACT

OPTION

FOR AND IN CONSIDERATION OF Twenty-five & NO/100 ($25.00)--------- (Dollars to us in hand paid), receipt of which is hereby acknowledged, and the further consideration of ----$2.50--- per rod, to be paid as hereinafter provided, Mathew M. Readman and Gertrude M. Readman, his wife

do hereby grant to STANOLIND PIPE LINE COMPANY, its successors and assigns, hereinafter called grantee, the right to lay, maintain, inspect, operate, replace, change or remove a pipe line for the transportation of oil, gas, gasoline or other petroleum products, and also the right to erect, install, maintain, inspect, operate and remove telegraph and telephone lines and the equipment and apparatus therefor, to be located along said pipe line, or along fence or property line, together with the right to trim or cut trees as may be necessary in the erection and maintenance of said lines, if grantee desires to do so, to be used in connection with any such pipe line, on, over and through the following described land of which grantors warrant they are the owners in fee simple, situated in Will County, State of Illinois, to-wit:

That part of the W½ of NW¼ of Section 22, Township 33N, Range 9 East of the 3rd P.M., and that part of W¼ of SW¼ of Section 15, Township 33N, Range 9 East of the 3rd P.M., west of the Kankakee River

together with the right of ingress and egress to and from said land for any and all purposes necessary and incident to the exercise by said grantee of the rights granted by this contract.

If this option be exercised by the grantee, then the amount paid by grantee for this option shall be credited upon the amount to be paid by grantee for said right of way as above provided.

And for an additional consideration of One ($1.00) Dollar, the receipt of which is hereby acknowledged, said grantors hereby grant unto said grantee the right at any time to lay, maintain, operate, inspect, replace, change or remove an additional pipe line or pipe lines alongside of said first pipe line for the transportation of oil, gas, gasoline or other petroleum products on, over and through said land, and grantee agrees to pay grantors for each additional pipe line placed on said land by it the sum of

Two and 50/100 Dollars per rod----------

~~XXXXX~~ on or before the time grantee commences to construct such pipe line on, over and through said land. Said payment may be made direct to grantor or deposited to credit of the grantors or any one of them in the First National Bank of Wilmington, Illinois.

Grantors reserve the right to use said land for any and all purposes except the purpose hereby granted to said Grantee. Grantee agrees to pay any damages caused by grantee's operations hereunder, to said land, and to the improvements, crops, pasturage, fences and livestock of grantors on said land, on the basis of the status, condition, and use of said land and the improvements thereon, at the date of this contract. In the event the parties hereto cannot agree upon the amount of said damages, then the amount thereof shall be ascertained and determined by three disinterested persons selected as follows: One by said grantors, one by said grantee and the third by the two so selected, and the written award of any two of said three persons so selected shall be final and conclusive on the parties hereto. Within twelve (12) months from the date hereof construction of said pipe line will be commenced, or a survey of said pipe line will be made, establishing the definite location thereof over and across said lands, in either of which events grantee shall pay said sum of $2.50 per rod for the full length of said pipe line constructed, or to be constructed, across said lands as aforesaid; otherwise the rights granted hereunder shall terminate.
Any pipe line laid hereunder shall be buried so it will not interfere with cultivation of the surface of said premises.

It is agreed that the terms, conditions and provisions of this contract shall extend to and be binding upon the heirs, executors, administrators, personal representatives, successors and assigns of the parties hereto.

And I, or we, hereby release and waive all rights under and by virtue of the homestead exemption laws of this State, insofar as it pertains to this contract.

It is agreed and understood that said pipe line, or pipe lines shall be laid east and west, or approximately so, at or near the dividing line of said above described properties.

IN WITNESS WHEREOF, the grantors above named have hereunto set their hands and seals this 12th day of December, 1940

Signed, sealed and delivered in the presence of:

A J Wiadomski

Mathew M. Readman (Seal)
Gertrude M. Readman (Seal)

(ACKNOWLEDGMENT)

STATE OF Illinois
Will County, } ss.

Before me, a notary public in and for said County and State, on this 12th day of December, 1940, personally appeared Mathew M Readman and Gertrude M Readman, to me known to be the identical persons who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free and voluntary act and deed for the uses and purposes therein set forth.

My Commission expires: Mar 15-1941

Lawrence G Dickinson
Notary Public.

Apr-24-2002 11:55am From-ENG & VA NT (T&D) T-736 P.003/008 F-885

GATE BOX CONTRACT

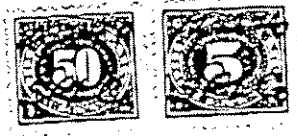
FOR AND IN CONSIDERATION of the sum of Five & No/[illegible]-[illegible]0) Dollars to us in hand paid, receipt of which is [illegible] acknowledged, and the further consideration of One hun[illegible]d Fifty & No/100 ($150.00) Dollars to be paid as hereinafter provided, we,

Mathew M. Readman and Gertrude M. Readman, his wife,

do hereby grant to STANOLIND PIPE LINE COMPANY, a Maine Corporation, hereinafter called Grantee, the right to install, maintain, inspect, operate, replace, change or remove a GATE BOX, apparatus and equipment, including, if the Grantee desires to do so fence and structures to enclose same, or any part thereof, on the following described land, of which Grantors warrant they are the owners in fee simple, situated in Will County, State of Illinois, to-wit:

That part of W½ of NW¼ of Section 22, and that part of the West one-half of SW¼ of Section 15, Township 33N, Range 9 East of the 3rd P.M., west of the Kankakee River, and more specifically described as follows:

A tract of ground fifty by fifty feet (50' X 50') in the North-west corner of Section 22- Township 33N, Range 9E of the 3rd P.M., [illegible]usive of Road Right of Way,



to be used in connection with any pipe line or pipe lines hereinafter constructed, maintained and operated by said Grantee, on over and through said described land, together with the right of ingress and egress to and from said land for any and all purposes necessary and incident to the exercise by said Grantee of the rights granted by this contract, so far as the rights granted hereunder affect said real estate and said Grantors hereby release and waive all rights under and by virtue of the homestead exemption laws of the State of Illinois.

The additional consideration mentioned above shall be paid before any pipe lines are laid, or within twelve months from this date, or the rights granted hereunder shall terminate.

The terms, conditions and provisions of this contract shall extend to and be binding upon the heirs, executors, administrators, personal representatives, successors and assigns of the parties hereto.

IN WITNESS HEREOF said grantors have hereunto set our hands and seals this 12th day of December 1940.

Signed, sealed and delivered in the presence of L. A. Pittman
A. J. Wisdom

Mathew M. Readman
Gertrude M. Readman

State of Illinois)
Will County) SS

Before me, Lawrence A. Pittman, a Notary Public in and for said County and State on this 12th day of December 1940, personally appeared Mathew M. Readman and Gertrude M. Readman, his wife, to me known to be the identical persons who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free and voluntary act and deed for the uses and purposes therein set forth.

Lawrence A. Pittman
Notary Public.

My Commission expires:
[illegible]/5/41

GATE JUNCTION CONTRACT

KNOW ALL MEN BY THESE PRESENTS:

THAT in consideration of the sum of Twenty-five and No/100 DOLLARS ($ 25.00) in hand paid, the receipt of which, is hereby acknowledged,

Mathew M. Readman, a widower, hereinafter called grantors, have given and granted unto SERVICE PIPE LINE COMPANY, hereinafter called grantee, the right to construct, install, maintain, inspect, operate, repair, replace, change or remove a pipe line gate valve or gate valves with any by-passes, cross-overs, scraper traps or other material, apparatus, and equipment used in connection therewith or incident thereto, inclusive of the right, if grantee so desires, to build such fences and structures as may be necessary to inclose the same, or any part thereof, on the following described land

situated in Will County, State of Illinois, to-wit:

That part of the W½ NW¼, Section 22, Township 33 North, Range 9 East, and
That part of the W½ SW¼, Section 15, Township 33 North, Range 9 East, west of the Kankakee River, more particularly described as:

A tract of land 50' x 50' near the northwest corner of the Northwest Quarter (NW¼) of Section 22, but east of and adjacent to the highway right of way.

For the same consideration, grantors hereby warrant and guarantee that they are the owners in fee simple of said above described land and hereby agree that said land may be used for the purposes herein provided as long as any pipe lines are maintained upon and over said lands by said grantee. Said grantee shall at all times have full rights of ingress and egress to and from said land for the full enjoyment by said grantee of the rights granted herein.

The terms, conditions and provisions of this contract shall extend to and be binding upon the heirs, executors, administrators, personal representatives, successors and assigns of the parties hereto.

IN WITNESS WHEREOF, said grantors have hereunto set their hands and seals this 10th day of June, 1955.

WITNESSES:

J. E. Butler

Mathew M. Readman (Seal)

(Seal)

(Seal)

(Seal)

(Seal)

Appendix B

Biological Data on State Threatened or Endangered Species

Biological Data
(Attachment 2)

The following pages are biological data for the three state threatened and endangered species provided on request by the Illinois Department of Natural Resources (8 pages).

Additional data published in Cummins and Meyer (1992) and accessed via Internet are also attached (4 pages).

Ligumia recta (Lamarck, 1819)

Black sandshell

Ligumia recta, INHS 11769 and 11722. Mississippi River, Rock Island County, Illinois. Length: 4.6 inches (11.7 cm) for male (top), 4.8 inches (12.2 cm) for female (bottom).

Other common names Black sand mussel, long John, honest John, sow's ear, lady's slipper.

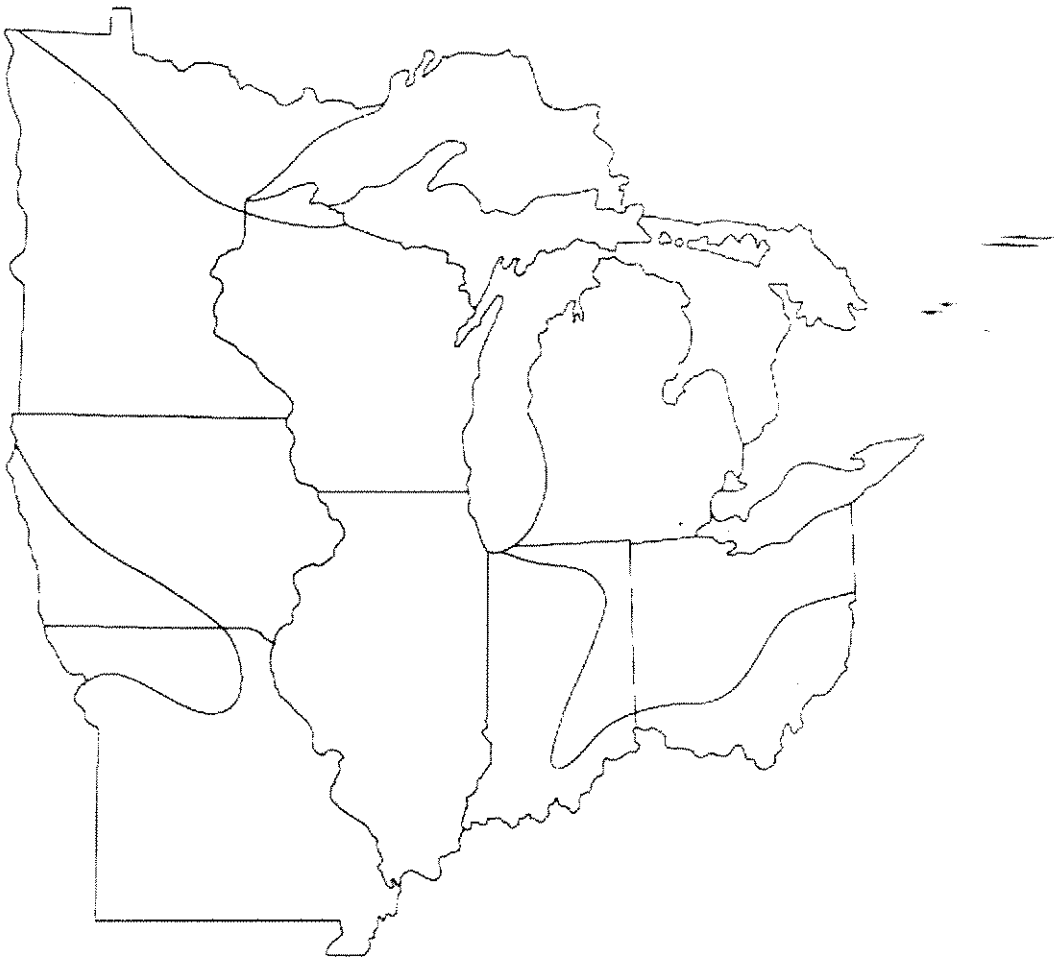
Key characters Elongate shell, pointed on the posterior end, smooth surface, usually dark brown to black, with a pinkish or purple nacre.

Similar species Spike, spectaclecase, yellow sandshell.

Description Shell elongate, solid, and moderately compressed. Anterior end rounded, posterior end pointed in males, saber-shaped in females. Dorsal margin straight, ventral margin straight to curved. Umbos low, only slightly elevated above the hinge line. Beak sculpture, if visible, of two or three indistinct, double-looped bars. Shell smooth and shiny, dark green, brown, or black, with green rays visible on some individuals. Length to 8 inches (20.3 cm).

Pseudocardinal teeth triangular, serrated, and divergent; two in the left valve, one in the right, occasionally with a small tooth anteriorly. Lateral teeth long, moderately thin, and straight. Beak cavity shallow. Nacre variable from white, pink, and salmon to deep purple, iridescent posteriorly.

Habitat
Medium to large rivers in riffles or raceways in gravel or firm sand.



Status
Widely distributed but uncommon in much of the Midwest. Threatened in Ohio.

Back | Forward | Index | Table of Contents
Book Order Information | Publications Catalog
INHS Mollusca Home Page | INHS Home Page

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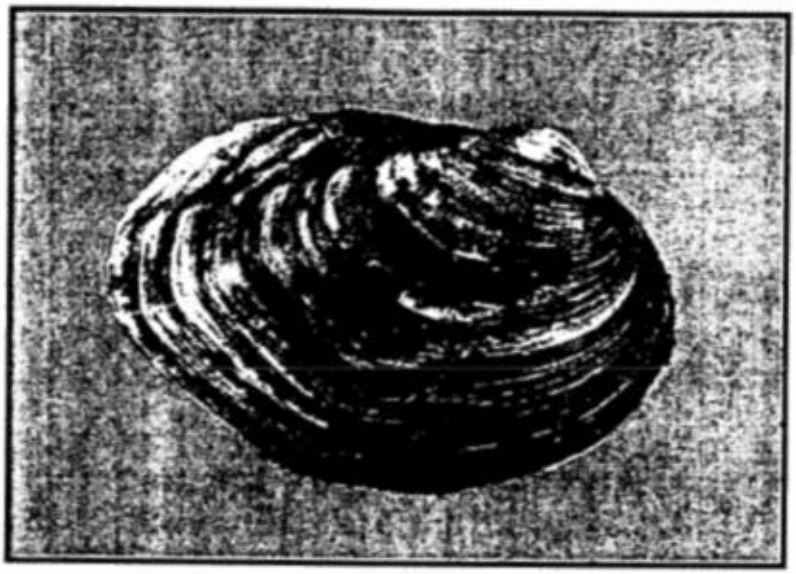
Plethobasus cyphyus (Rafinesque, 1820)

Back | Forward | Index

Sheepnose



Plethobasus cyphyus, INHS 4179. Tippecanoe River, Pulaski County, Indiana. Length: 3.8 inches (9.7 cm).

Other common names Bullhead.

Key characters Oblong shell with a smooth surface except for a single row of bumps or knobs running from the umbo to the ventral margin.

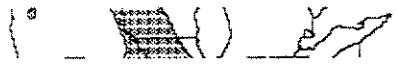
Similar species White wartyback, threehorn wartyback, round pigtoe, Wabash pigtoe, hickorynut.

Description Shell thick, oval or oblong, somewhat elongate, and slightly inflated. Anterior end rounded, posterior end bluntly pointed. Dorsal margin straight, ventral margin curved anteriorly, straight posteriorly. Umbos slightly elevated above the hinge line. Beak sculpture of two heavy ridges, visible only in young shells. Shell smooth, except for a row of knobs or tubercles on the center of the valve, running from the umbo to the ventral margin (some- times obscure). A shallow sulcus or furrow present between the row of tubercles and the posterior ridge. Periostracum yellow or light brown in juveniles, becoming chestnut to dark brown in adults. Length to 5 inches (12.7 cm).

Pseudocardinal teeth rather small relative to overall shell size; two in the left valve, one in the right (occasionally with a smaller tubercular tooth on either side). Lateral teeth long, straight or slightly curved; two in the left valve, one in the right. Beak cavity shallow. Nacre white, occasionally tinged with pink or salmon.

Habitat Medium to large rivers in gravel or mixed sand and gravel.

Status Rare throughout its range. Endangered in Indiana, Iowa, Ohio, and Wisconsin. Threatened in Illinois. Rare in Missouri.



Back | Forward | Index | Table of Contents
Book Order Information | Publications Catalog
INHS Mollusca Home Page | INHS Home Page

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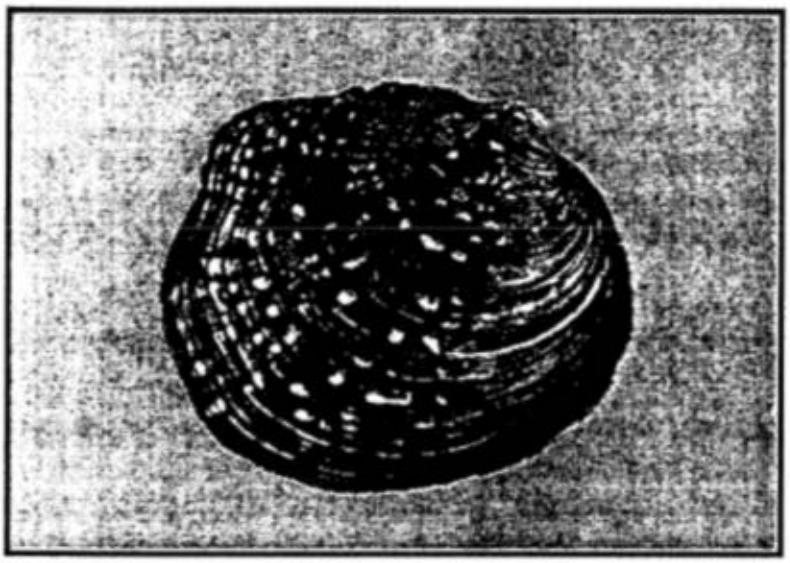
Cyclonaias tuberculata (Rafinesque, 1820)

Purple wartyback



Cyclonaias tuberculata, INHS 4078. Tippecanoe River, Fulton County, Indiana. Length: 3.5 inches (8.9 cm).

Other common names Missouri mapleleaf, purple pimpleback, deerhorn.

Key characters Rounded shell with a fairly prominent wing, beak covered with fine wavy sculpturing, no green stripe on the umbo, purple nacre. Deep and compressed beak cavity.

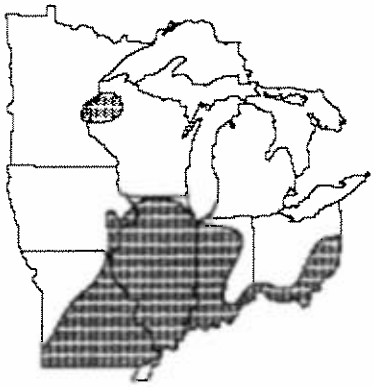
Similar species Orange-foot pimpleback, pimpleback, mapleleaf, wartyback.

Description Shell round, moderately thick, and compressed to moderately inflated (large rivers). Anterior end rounded, posterior end somewhat squared off. Dorsal margin straight, a wing present behind the umbo; ventral margin curved. Umbos low, even with, or barely rising above the hinge line. Beak sculpture of numerous wavy ridges covering the surface of the umbo. Shell surface, except the anterior fourth, covered with tubercles, forming small ridges on the dorsal wing. Periostracum yellowish brown or greenish brown in young shells (rarely rayed), becoming dark brown in older shells. Length to 5 inches (12.7 cm).

Pseudocardinal teeth large and well developed; two in the left valve, one in the right (usually with a small tooth on either side). Lateral teeth short, striated, and straight or slightly curved; two in the left valve, one in the right. Beak cavity very deep. Nacre usually deep purple, occasionally white with a purple tinge.

Habitat Medium to large rivers in gravel or mixed sand and gravel.

Status Widespread but uncommon in most of the Midwest. Endangered in Wisconsin. Threatened in Iowa. Species of Special Concern in Michigan. Species of Special Interest in Ohio.



Back | Forward | Index | Table of Contents
Book Order Information | Publications Catalog
INHS Mollusca Home Page | INHS Home Page

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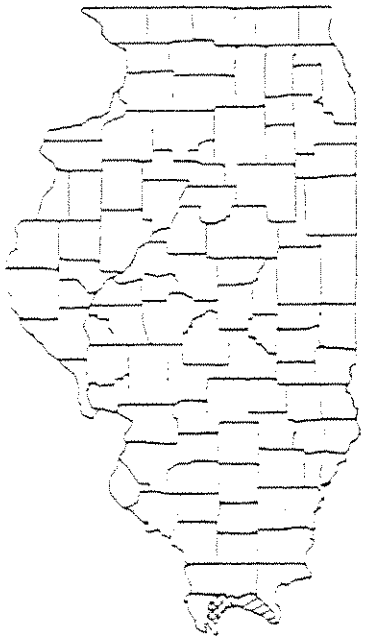
Plethobasus cooperianus (Lea)

ORANGE-FOOTED PEARLY MUSSEL | UNIONIDAE | Status: Endangered in Illinois, Federally Endangered



Present Distribution: The orange-footed pearly mussel is presently restricted to the Tennessee, Cumberland, and lower Ohio rivers in Illinois, Kentucky, Tennessee and Alabama (U.S. Fish and Wildlife Service 1984b).

Former Illinois Distribution: This species has probably always been restricted to the Ohio River in Illinois. It is now apparently much less abundant in the Ohio River that it was formerly (K.S. Cummings unpublished data).

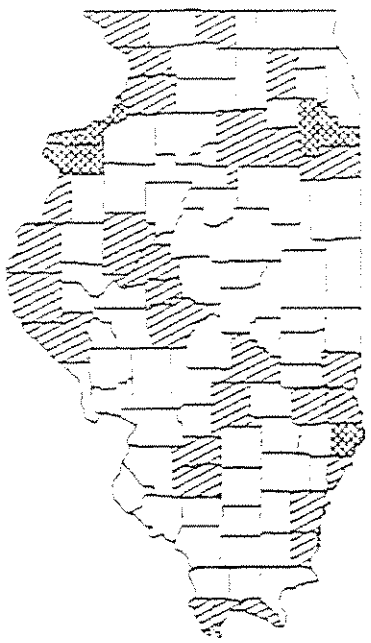
Habitat: This mussel inhabits medium to large rivers, where it is found on sand and gravel substrates (U.S. Fish and Wildlife Service 1984b).

Reason for Status: The decline of this species is primarily due to impoundments, increased siltation, and agricultural, municipal, and industrial pollution (U.S. Fish and Wildlife Service 1984b).

Management Recommendations: The protection of existing populations and presently used habitat, research examining the feasibility of reintroductions into its historic range, and life history research are the primary management needs for this species (U.S. Fish and Wildlife Service 1984b).

Plethobasus cyphyus (Rafinesque)

SHEEPNOSE | UNIONIDAE | Status: Threatened in Illinois



Present Distribution: The sheepnose is known from the Ohio, Cumberland, and Tennessee river systems; and the Mississippi River system from Iowa and Kansas north to Minnesota (Parmalee 1967). In Illinois this species is currently known from the Wabash, Kankakee and Mississippi rivers (IDOC Natural Heritage database, INHS mollusk collection).

Former Illinois Distribution: Parmalee (1967) wrote that this mussel was uncommon or rare in Illinois, and that it was restricted to the Mississippi (north of St. Louis), lower Wabash and Ohio rivers.

Habitat: The sheepnose is usually found in current, on mud or gravel bottoms at water depths of a few cm to 2 m; however, this mussel may occasionally be found at much greater depths (Parmalee 1967).

Reason for Status: This species is known from few locations in the state. Most populations are apparently small and isolated. Increased siltation and domestic, industrial, and agricultural pollution are the primary threats to this species in Illinois.

Management Recommendations: Areas where this species occurs should receive improved protection from herbicides, pesticides and industrial, agricultural, and domestic pollution.

Rallus elegans (king rail). This species appears to be rarer than previously though. Recent nesting is known to occur at very few locations (ca. 8) in the state. Proposed Action: change status from threatened to endangered.

MAMMALS

Lynx rufus (bobcat). Bobcats have recently (>1982) been sighted in 92 of Illinois' 102 counties, including 71 counties with more than three sightings. At a county level, about 40% of the state is now believed to possess good-to-moderate bobcat habitat. Proposed Action: remove from threatened.

Lutra canadensis (river otter). The river otter population in Illinois has meet the criteria established for a reclassification to threatened status as outlined in the state river otter recovery plan. The state river otter recovery team recommends reclassification to threatened status. Proposed Action: change status from endangered to threatened.

III. Species Accounts for Animals Proposed for Addition to the Illinois List

INVERTEBRATES

• *Cyclonaias tuberculata* (purple wartyback)

Proposed Status: add as threatened.

Present Distribution: The purple wartyback is known from the Kankakee, Iroquois, Ohio and North Fork of the Vermilion rivers and Jordan Creek in Illinois (K.S. Cummings, unpublished data).

Former Illinois Distribution: This species formerly occurred fairly widely in Illinois, occurring in 25 Illinois counties (INHS Mollusk Collection).

Habitat: Medium to large rivers in gravel or mixed sand and gravel (Cummings and Mayer 1992).

Reason for Status: Widespread but uncommon in the Midwest (Cummings and Mayer 1992), this species has experienced a dramatic population decline in Illinois. The purple wartyback is known to occur in just 16% of the Illinois counties with historic records. It is listed as endangered in Wisconsin and threatened in Iowa.

Management Recommendations: Management needs for this species include identification and protection of essential habitat, population monitoring and enhanced conservation measures designed to reduce siltation, agricultural runoff and pollution in water courses in which it occurs.

Recent (≥1985) Counties: Kankakee, Pulaski, Vermilion, Will.

Historic (<1985) Counties: Adams, Champaign, Clark, Crawford, Fulton, Kane, Kendall, LaSalle, Lawrence, Lee, Mason, Massac, McHenry, Menard, Morgan, Ogle, Rock Island, Wabash, White, Whiteside, Winnebago.

• *Lampsilis abrupta* (pink mucket)

Proposed Status: add as endangered (Federally Endangered).

Present Distribution: The pink mucket is currently known primarily from the Tennessee, Cumberland, Black, Osage, and Meramac river systems in Alabama, Arkansas, Kentucky, Missouri, and Tennessee (U.S. Fish and Wildlife Service 1985). It was formerly considered to be extirpated in Illinois (Cummings 1991), but has recently been discovered to occur in the Ohio River in Illinois (Cummings, pers. comm.).

Former Illinois Distribution: In Illinois, this species has always been restricted to the Ohio River

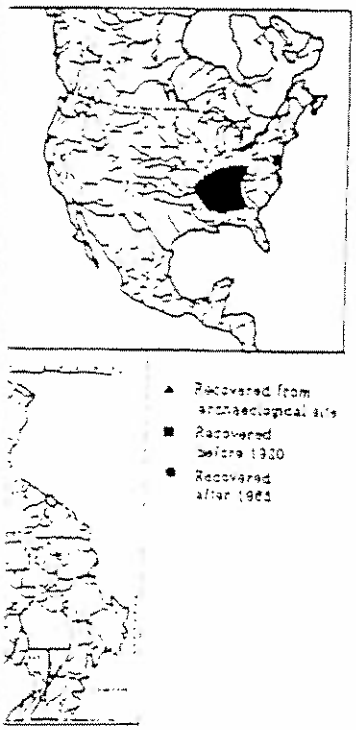
(Cummings, unpublished data).
Habitat: This mussel is usually found in large rivers where it occurs in moderate to fast flowing currents in rubble, gravel, sand, and silt, in water depths from 0.5 to 8 m (U.S. Fish and Wildlife Service 1985).
Reason for Status: The pink mucket was apparently always an uncommon or rare mussel (U.S. Fish and Wildlife Service 1985). However, populations of this species have been greatly reduced or eliminated thought its range as a result of impoundments, siltation, and municipal, agricultural, and industrial pollution (U.S. Fish and Wildlife 1985).
Management Recommendations: Management needs for this species include habitat preservation and protection, and population and habitat research (U.S. Fish and Wildlife Service 1985).
Recent (≥1985) Counties: Massac
Historic (<1985) Counties:

• *Ligumia recta* (black sandshell)
Proposed Status: add as threatened.
Present Distribution: Known from the Mississippi, Rock, Kishwaukee, Kankakee, Iroquois, and Ohio rivers and Rush Creek in Illinois (Cummings pers. comm./unpub. data).
Former Illinois Distribution: Formerly fairly widespread in the state, this species has experienced a nearly 75% reduction in the number of counties in which it occurs (INHS Mollusk Collection).
Habitat: Medium to large rivers in riffles or raceways in gravel or firm sand (Cummings and Mayer 1992).
Reason for Status: The black sandshell has experienced a tremendous population decline in Illinois, with this species known to occur in just 25% of the counties with historic records (INHS Mollusk Collection).
Management Recommendations: Areas where this species occurs should be protected from dredging, and sand and gravel mining. Additionally, efforts to reduce siltation and pollution in water ways in which this species occurs would also be beneficial.
Recent (≥1985) Counties: Iroquois, Jo Daviess, Kankakee, Lee, Massac, Pulaski, Rock Island, Whiteside, Will, Winnebago
Historic (<1985) Counties: Adams, Alexander, Calhoun, Clark, Clinton, Cook, Edgar, Grundy, Hancock, Jasper, Kane, Kendall, Knox, LaSalle, Mason, McHenry, Menard, Mercer, Ogle, Peoria, Pike, Sangamon, Stephenson, Tazewell, Vermilion, Wabash, Washington, White, Woodford.

• *Speyeria idalia* (regal fritillary)
Proposed Status: add as threatened
Present Distribution: Western Indiana, southwestern Wisconsin, southeastern North Dakota, south to Oklahoma and Colorado (Schweitzer 1992a). Formerly east to New Brunswick and North Carolina (Schweitzer 1992a).
Former Illinois Distribution: This species probably occurred throughout Illinois wherever prairie habitat existed in former times. Records exist for 22 Illinois counties only 7 of which appear to be recent.
Habitat: Tallgrass prairies, wet meadows and wet pastures.
Reason For Status: Populations of regal fritillarys in Illinois has declined considerably. Most

d shells, the bicolored nacre of
:o.

p of *Toxolasma lividus lividus*
sbery (pers. comm., 1975) said
uthern Appalachians and the
e have *T. l. glans*.



Genus *Ligumia* Swainson, 1840

Animal Characters: Differs from those of *Micromya (= Villosa)* in the structure of its rough mantle edge antero-ventrad to branchial opening being more differentiated into a greater number and longer row of papillae on the inner edge extending down quite to the central part of the ventral edge. These papillae are often quite tentacular and are rather regular and uniform in shape and size and are never widely separated as in the case of the *Micromya* mantle edge of this anterior branchial border. Its inner laminae of the inner gills are usually entirely connected with the visceral mass; however, a small hole is sometimes left at the posterior end post-dorsad to the foot.

Shell Characters: In shell characters there are no great distinctions to be considered as a group since the chief distinguishing characteristic is in the post-mantle edge as above discussed. Its beak sculpturing is identical with that of the *Micromya* shell, being sinuated or double-looped, the posterior loops being more or less broken behind. Utterback (1915-16:438)

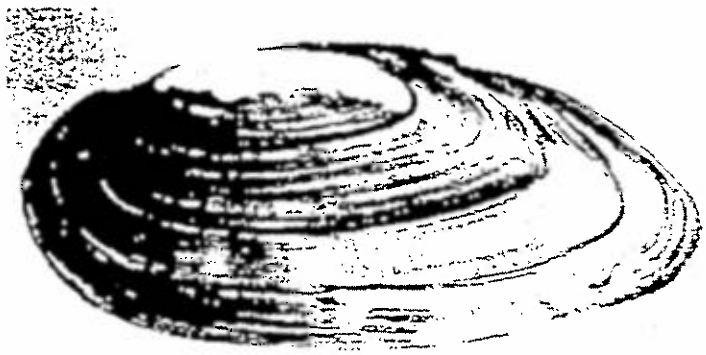
195

BLACK SAND SHELL
Ligumia recta (Lamarck, 1819)

1819—*Unio recta* Lamarck, An. Sans. Vert., VI, p. 74.
1820—*Unio latissima* Rafinesque, Ann. Gen. Sci. Phys., Bruxelles, 5:297, pl. 30, figs. 14, 15.
1823—*Unio praelongus* Barnes, Am. Jl. Sci., 1st Ser., VII, p. 261, fig. 11.
1840—*Ligumia* Swainson, A Treatise on Malacology, London, p. 378 (type, *recta* Lam.).
1885—*Unio rectus*, Call, Bull. Washburn College Lab. Nat. Hist., 1:50.
1900—*Lampsilis rectus* Simpson, Pr. U.S. Nat. Mus., XXII, pp. 544-545.
1906—*Lampsilis recta*, Scammon, Univ. Kansas Sci. Bull., 3:294; Simpson, 1914, A descriptive catalogue ... mussels, p. 95.
1912—*Eurynia (Eurynia) recta* (Lam.) Ortmann, Ann. Car. Mus., VIII, p. 344; Utterback, 1916, Amer. Midl. Nat., Vol. 4, Nos. 1-10, p. 440.
1922—*Ligumia recta latissima*, Ortmann and Walker, Occas. Papers Mus. Zool. Univ. Michigan, No. 112, p. 53.
1967—*Ligumia recta*, Parmalee, Ill. St. Mus. Pop. Sci. Ser., Vol. VIII, p. 74.

Anatomy of the Animal:

Nutritive Structures: Branchial opening with numerous papillae; anal finely crenulate; supra-anal separated from anal by moderate mantle connection; inner laminae of inner gills connected to visceral mass; palpi small, almost entirely free along their antero-posterior edges; color of soft parts grayish with its posterior mantle border blackish or reddish brown.



♂

1 cm.

196

♂

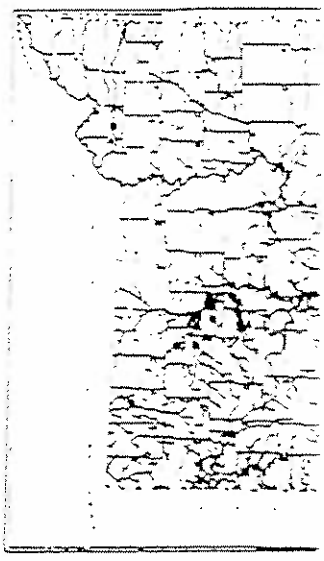
♂

Reproductive Structures: Marsupium rather kidney-shaped, consisting of 50 large ovisacs extending below the original ventral line into thickened, cream-colored, cone-shaped beads when gravid; ova lying in irregular masses within the sacs; mantle edge antero-ventrad to branchial opening specialized with very great number of large, densely crowded papillae extending entirely to the center of the ventral edge; conglutinates white, glochidia rather medium in size, semi-elliptical, spineless, rounded ventral edge, hinge line undulated, measure 0.220 x 0.280 mm. Utterback (1915-16:440)

Description of Shell: straight to gently rounde uniformly rounded, post anteriorly than posteriorl cm; posterior ridge is not the hinge line; inequipar indistinct double-~~looped~~ shallow depressions. Ep brown to black with age;

Left valve has two h lateral teeth long, roughe high, triangular, emargina can be seen anteriorly; roughened. Interdentum may be white, purple, p iridescent posteriorly.

Comments: The black sa distinct and separate con localized population is in t the major rivers in the cen River, and it occurs in s rather streamlined shape

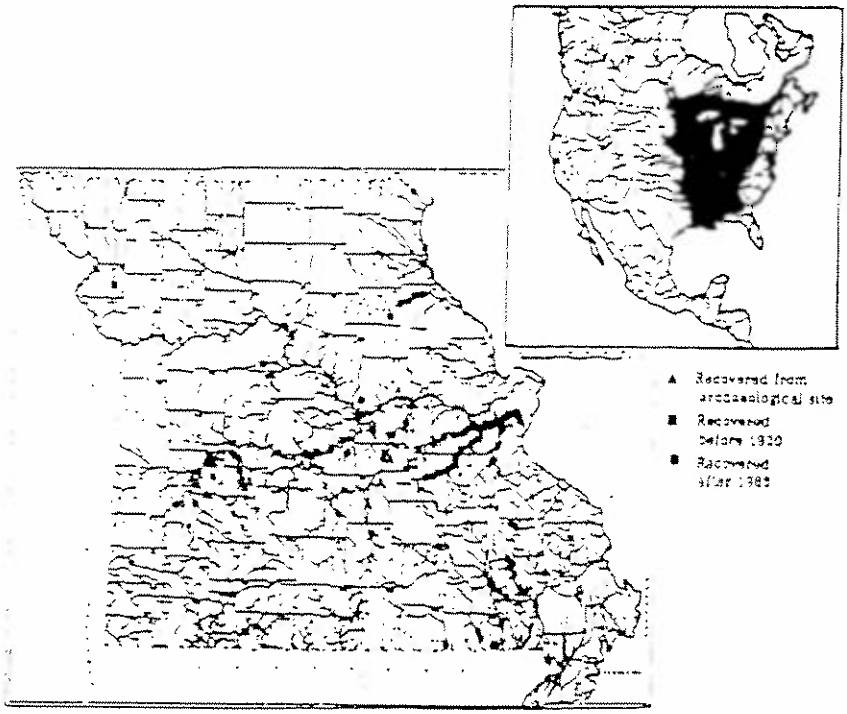


Description of Shell: Shell elongate, quadrate, stout; dorsal margin straight to gently rounded, ventral margin gently curved; anterior end uniformly rounded, posterior end sharply pointed. The shell is thicker anteriorly than posteriorly; compressed to moderately inflated; size to 16 cm; posterior ridge is not prominent. Beaks broad, low, not raised above the hinge line; inequipartite; beak sculpture reported to be three to five indistinct double-looped bars; growth-rest periods produce concentric shallow depressions. Epidermis light chestnut color becoming dark brown to black with age; valves usually covered with green rays.

Left valve has two high, roughened, emarginate pseudocardinals; lateral teeth long, roughened, nearly straight. Right valve has a singular, high, triangular, emarginate pseudocardinal tooth; a small lamellar tooth can be seen anteriorly; the lateral tooth is long, nearly straight and roughened. Interdentum narrow to absent; beak cavity shallow; nacre may be white, purple, peach and combinations of the various colors, iridescent posteriorly.

197

Comments: The black sand shell's geographic distribution shows three distinct and separate concentrations within Missouri. One small and localized population is in the Salt River system. It is also found in most of the major rivers in the central part of the state just south of the Missouri River, and it occurs in southeastern Missouri. The black, heavy and rather streamlined shape of this naiad makes it easy to recognize. The



dney-shaped, consisting
ginal ventral line into
ten gravid; ova lying in
ero-ventrad to branchial
large, densely crowded
ntral edge; conglutinates
mi-elliptical, spineless,
sure 0.220 x 0.280 mm.

black sand shell is found in small to large-sized gravel in water with good current.

The fish hosts are: Americal eel, *Anguilla rostrata;* bluegill, *Lepomis macrochirus;* largemouth bass, *Micropterus salmoides;* and white crappie, *Pomoxis annularis,* Fuller (1978:330).

Reproductive Period: Probably bradytictic.

Commercial Value: Little value to the button industry; Stansbery (1973) says it is used as a source of inlay material for pearl-handled knives and similar objects.

POND MUSSEL

Ligumia subrostrata (Say, 1831)

198

1831—*Unio subrostratus* Say, New Harm. Diss.

1850—*Unio mississippiensis* Conrad, Jl. Ac. N. Sci. Phila., I, p. 277, pl. XXVIII, fig. 11.

1868—*Unio topekensis* Lea, Pr. Acad. Nat. Sci. Phila., XII, p. 144.

1900—*Lampsilis subrostratus* Simpson, Pr. U.S. Nat. Mus., XXII, p. 546.

1912—*Eurynia (Eurynia) subrostrata* (Say), Ortmann, Ann. Car. Mus., VIII, p. 344; Utterback, 1916, Amer. Midl. Nat., Vol. 4, Nos. 1-10, p. 438.

1922—*Ligumia subrostrata,* Grier and Mueller, Nautilus, 36:100; Franzen and Leonard, 1943, Univ. Kansas Sci. Bull., 29:382; Murray and Leonard, 1962, Mus. Nat. Hist., Univ. Kans. Mis. Publ., No. 28, p. 140; Parmalee, 1967, Ill. St. Mus. Pop. Sci. Ser., Vol. VIII, p. 75.

Anatomy of the Animal:

Nutritive Structures: Branchial opening narrowly papillose; anal finely papillose, supra-anal separated from anal by a rather short mantle connection; inner laminae of inner gills connected to visceral mass; palpi rather small and connected antero-dorsad about one-fourth of its length; color of soft parts grayish with mantle edge along siphonal region blackish.

Reproductive Structures: Marsupia kidney- or rather fan-shaped, consisting of 20 large, well defined ovisacs, distended, when gravid, at ventral edge thus giving the conglutinates a clublike shape; ventral tips of ovisacs beaded, bearing bluish pigment with glochidia scattered throughout the sacs; glochidia rather large, semi-elliptical, spineless, regularly rounded ventrad, hinge-line straight, measures 0.270 x 0.330 mm; mantle edge antero-ventrad to branchial opening in female with numerous regular papillae extending quite down to the central part of ventral border. Utterback (1915-16:438)

Description of Sh
ventral margin str
rounded, posterior
terminated, males s
moderately inflated
ventral margin; post
raised above the hin
sharply drawn up
shown by concentric
ing black with age
obliterated or hard
ovate.

Appendix C

Mussel Survey Report for BP Pipelines Project Location