Agenda Item: 12.

MEMORANDUM

TO THE BOARD:

SUBJECT: General's Manager Report

DATE: July 3, 2003

FROM: Steve Oltmans, General Manager

A. **INFORMATION/EDUCATION REPORT**: A copy of the I&E Report detailing Information and Education activities of the District for the month of June, 2003, is attached for your review.

B. **MISCELLANEOUS/PERSONNEL ITEMS**:

1. Attached is a letter from David Genoways, Chairman of the Washington County Historical Association, thanking the District for its support ($25,000) of the Lewis and Clark Monument project.

2. Attached is a letter from Rod Moseman, Vice President of Economic Development, Greater Omaha Chamber of Commerce, thanking the GM for participating in the Omaha Chamber's Select Tour consultants for the "Public/Private Partnerships" lunch on June 12, 2003.

C. **REPORT ON PURCHASES – CONSTRUCTION SERVICES, PROFESSIONAL SERVICES, PERSONAL PROPERTY**: Pursuant to Board direction, attached is a report indicating construction services, professional services and personal property purchases for the month of June, 2003. Please review this report and contact me if you have any questions.

D. **REPORT ON CENTRAL NEBRASKA PUBLIC POWER VS. REGISTERED IRRIGATION WELL OWNERS**: Attached is a copy of the filing by Central Nebraska Public Power and Irrigation District against all registered irrigation owners in the Platte River Basin and its tributaries upstream of Central's diversion dam located 1 mile east of North Platte. Central is seeking an order from the Nebraska Department of Natural Resources to have groundwater irrigation wells ordered unpermitted diversions and show down. They are also asking that all of Central's appropriations be declared priority and superior to all such groundwater irrigation wells. If you have any questions on this material, please contact me.

E. **NEWS CLIPS**:

* May 15, 2003, Ashland Gazette Article - Verhoeff takes reins of river corridor alliance
* May 29, 2003, Pender Times Article – 3 Sites set where farmers can discard pesticide applicators in Thurston, Dakota Counties

* May 29, 2003, South Sioux City Star – Picture of Dakota and Thurston Counties Earth and Arbor Day (note staff member Kelly Fravel)
* May 30, 2003, Omaha World Herald Article – Buyouts to ease Cole Creek fear – The city will begin making offers soon to help residents move out of the path of likely flooding.
* June 10, 2003, Omaha World Herald Article – War brews over water rights near drought-plagued Big Mac
* June 11,2003, Burt County Plaindealer Article – No opening set at Summit Lake
* June 12,2003, Omaha World Herald Article – Judge dismisses major water suit
* June 17, 2003, Omaha World Herald Article – Omaha center will recycle household hazardous waste. A new building to dispose of such materials as paint and pesticides will be in operation by next spring.
* June 18, 2003, Omaha World Herald Article – Dike project could end ice jams in river. Cabin owners will have to move or elevate their homes.
* June 18, 2003, Environmental Health Perspectives News Release – Low Sperm Count, Quality in Rural Areas Tied to Herbicides, Pesticides (this article was contributed by Director Melissa Gardner)
* June 19,2003, Omaha World Herald Editorial – Cleaning out the garage. **A** hazardous waste recycling facility is long-awaited good news.
* June 20,2003, Omaha World Herald Article – City has extra $1 million for Cole Creek buyouts.
* June 22, 2003, Omaha World Herald Editorial – Move ahead on merger. Responsive government should focus on what's best for taxpayers, not bureaucracies.
* June 27,2003, Omaha World Herald Article – Neighbors' views help shape park.
* July 1, 2003, Omaha World Herald Article – Plan would clear up water problems. A firm suggests forming a water district for Louisville, South Bend and Ashland.

WASHINGTON COUNTY

EST. W·C·H·A 1925

HISTORICAL ASSOCIATION

June 18,2003

Papio-Missouri Natural Resources District
% Mr. Steve Oltmans
8901 S. 154th Street
Omaha, NE 68138

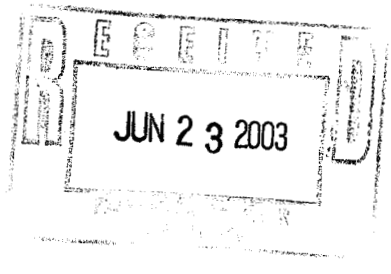
Dear Mr. Oltmans:

On behalf of the board of Directors, staff and members of the Washington county Historical Association, I want to extend to you a heartfelt thank you for your most generous support of our Lewis and Clark Monument project.

To this, I add my personal thank you as I understand in these uncertain economic times, with the competition for donations to so many worthwhile and wonderful projects, how significant your gift truly is. Your generosity contributed greatly to the success of our project. In some small way, I hope that I have conveyed the appreciation that we feel for your support of this project.

Sincerely,

David Genoways
Chairman of the Board



PO Box 25 • Fort Calhoun, NE 68023 • 402-468-5740 • info@newashcohist.org • www.newashcohist.org

GREATER OMAHA CHAMBER OF COMMERCE

June 18,2003

Steve Oltmans
Papio-Missouri NRD
8901 South 154th
Omaha, NE 68138

Dear Steve:

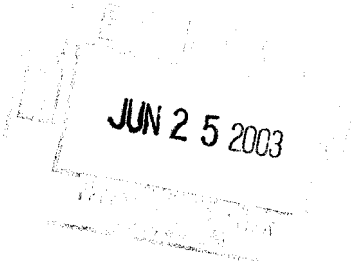
I would like to thank you for taking the time to meet with the Select Tour consultants for the "Public/Private Partnerships" lunch at the First National Bank on June 12th. The turn out from our public and private sector was impressive, and the city skyline view was spectacular.

The consultants saw that Omaha is a wonderful place to live, work and raise a family. This confirmed our community's strong commitment to public/private partnerships and the great relationships the public and private sectors have with one another. Overall, this year's tour has scored a 4.9 rating of a possible 5, based on the evaluations received from the consultants!

Again, thank you for your participation and support.

Sincerely,

Rod Moseman
Vice President, Economic Development
Greater Omaha Chamber of Commerce



1301 HARNEY ST.
OMAHA NE 68102-8104
402-346-5000
FAX: 402-346-7050
omahachamber.org

June 2003
Information & Education Report

Information

- Began work on Summer 2003 SPECTRUM
- Continued work on Back to the River Slide Program
- Worked on I&E budget for FY 2004
- Continued work on updated "Nebraska's Natural Resouces Districts" brochure
- Researched and ordered digital camers for project managers
- Updated web site pages
- Helped host HHW Collection and Recycling Center Groundbreaking
- Helped host Big Papio Trail/Towl Park Dedication
- Completed aerial photography of NRD projects

Education

- Presented Nature Trail Program to Kindercare group.
- Presented program to Creighton Univ. Latina Academy

Report On Purchases
Construction Services, Professional Services, Personal Property

June, 2003

Date	Project Name	Item / Task	Company	Cost
6/1/03	Project Maintenance	Rubber tired loader (rental) for installing riprap	Nebraska Machinery Co.	3,850/mo
6/2/03	Project Maintenance	Gravel, screened, crushed and shipped rock	Lyman Richey, Martin Marietta, Rinker	3,800.00
6/3/03	Project Maintenance	Chemicals 2-4D, Banvil, Crop oil	Frontier Cooperative Co.	2,180.00
6/9/03	Blair Field Office	Replace 13 windows for energy savings and security	Glass House	3,430.88
6/20/03	Photography	12 digital cameras for staff	Insight	3,583.99
6/24/03	Grass Drill Rental	Purchase new drill/trailer	Strobel Industries	12,000.00
6/28/03	NRC Building	Replace old AC compressor in north wing	Air Technology, LLC	6,867.40

NEBRASKA ASSOCIATION
OF RESOURCES DISTRICTS

June 19, 2003

TO: NRD Managers, NARD Board

FROM: Dean E. Edson, Executive Director

RE: CENTRAL NEBRASKA PUBLIC POWER vs. REGISTERED IRRIGATION WELL OWNERS

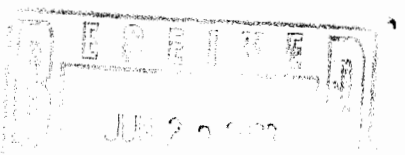
Attached is a copy of the filing by Central Nebraska Public Power and Irrigation District against all registered irrigation well owners in the Platte River Basin and its tributaries upstream of Central's diversion dam located 1 mile east of North Platte.

In essence, Central is seeking an order from the Nebraska Department of Natural Resources to have groundwater irrigation wells ordered unpermitted diversions and shut down. Further, asking that all of Central's appropriations be declared priority and superior to all such groundwater irrigation wells.

If your district would like to have input on this case, you may want to consider joining the Groundwater Management Act Coalition. For more information on this coalition, please contact myself, or Ron Bishop at the Central Platte NRD.

On a related note, the next meeting of the Water Policy Task Force Executive Committee is at the Holiday Inn Hotel and Convention Center in Kearney on Wednesday, July 16 from 8:30 a.m. - 3:00 p.m.

Attachment: CNPPID Filing before NDNR.



Nebraska Association of Resources Districts
601 So. 12th Street, Suite 201 • Lincoln, NE 68508 • (402) 471-7670 • Fax (402) 471-7677 • www.nrdnet.org

BEFORE THE DIRECTOR OF THE DEPARTMENT OF NATURAL RESOURCES
STATE **OF** NEBRASKA

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT (Central) P.O. Box 740 Holdrege, NE 68949-0740, Complainant, vs. The persons identified as registered irrigation well owners located in the Platte River watershed as listed in the Department *of* Natural Resources' database upstream of Central's Diversion Dam, Respondents.	COMPLAINT AGAINST UNPERMITTED DIVERSIONS

State of Nebraska
Department of
Natural Resources
Filed in the Department of
Natural Resources at 11:00
o'clock a M. this 9th
day of June, 2003

Complainant, The Central Nebraska Public Power and Irrigation District (Central) alleges:

1. This complaint is filed pursuant to the Department of Natural Resources' (Department) "Rules of Practice and Procedures", Nebraska Administrative Code Title 454, Chapter 5 "Contested Cases", Section **5.001** "Complaint". Central applied for and was granted the appropriations listed on the attached Exhibit "A", Water Rights Summary. Central seeks an Order **of** the Department prohibiting unpermitted diversions from the Platte River and its tributaries.

2. The violations complained of are unpermitted diversions of the waters of the Platte River and its tributaries by the persons identified as registered irrigation well owners located

in the Platte River watershed, as listed in the Department's database, upstream of Central's diversion dam, which is located in the NW¼ of Section 8, Township 13 North, Range 29, West of the 6th P.M. in Lincoln County, Nebraska.

3. The persons identified in paragraph 2, at the locations identified in paragraph 2, are diverting the waters of the Platte River and its tributaries without having first sought and obtained appropriations from the Department of Natural Resources pursuant to law.

4. Central is a political subdivision of the State of Nebraska, organized pursuant to Neb. Rev. Stat. §70-601, et seq. (Reissue 1996), governed by a Board of Directors elected from Keith, Lincoln, Dawson, Gosper, Phelps, Kearney and Adams Counties. Attached, marked "Figure 1" is a map showing the location of the principal features of Central's project, and the geographic area from which directors are elected.

5. Central owns and operates a system of reservoirs, canals and laterals utilized for purposes of hydro-power production, delivery of irrigation water, recreation and environmental enhancement.

6. The principal feature of Central's system is Lake McConaughy, an onstream storage reservoir located on the North Platte River in Keith and Garden Counties, with the right to store 2,000,000 acre feet of water. Attached is "Figure 2", showing the watershed of the Platte River in Nebraska upstream of

Central's diversion dam, upon which Central relies for water supply for public use.

7. Central is the largest irrigation district in Nebraska, providing irrigation water to about 112,000 acres during the 2002 irrigation season.

8. Central owns and operates the Jeffrey, Johnson No. 1 and Johnson No. 2 hydroelectric generating plants, which produce a maximum of 64 MW.

9. Pursuant to contract, Central stores and releases water for the Nebraska Public Power District (NPPD), which provides cooling for the Gerald Gentleman Power Station, a 1,400 mw coal-fired electric generating plant, Nebraska's largest, and the Canday Steam Plant, a 119 MW gas-fired electric generating plant. Storage for NPPD also provides irrigation water for about 75,000 acres.

10. Central operates its project pursuant to a license issued by the Federal Energy Regulatory Commission in 1998, which includes provisions for environmental enhancement, principally the storage of 10% of non-irrigation season inflows to Lake McConaughy in an environmental account, to be released for instream uses, as directed by the United States Fish and Wildlife Service.

11. Recreation features of Central's system, among other facilities, include Lake McConaughy, Lake Ogallala, Jeffrey Lake,

Johnson Lake and Elwood Reservoir. Recreation at Central's facilities includes more than one million visitor days per year.

12. The Central project represents an investment of hundreds of millions of dollars of public resources in the infrastructure and works of public improvement necessary to provide the multiple public uses Central maintains, and **in** reliance on the appropriations described in Exhibit "A".

13. The unpermitted diversions upstream of Central's diversion dam represent a deprivation of water which would otherwise be available for diversion pursuant **to** Central's appropriations, as described in Exhibit "A".

14. The Nebraska Constitution provides, in Article XV, Section 4: "Water A Public Necessity. The necessity of water for domestic use and for irrigation purposes in the State of Nebraska is hereby declared to be a natural want." The Constitution also provides: "Section 5. Use of Water Dedicated to People. The use of the water of every natural stream within the state of Nebraska is hereby dedicated to the people of the state for beneficial purposes, subject to the provisions of the following section. Section 6. Right to Divert Unappropriated Waters. The right to divert unappropriated waters of every natural stream for beneficial use shall never be denied except when such denial is demanded by the public interest. Priority of appropriation shall give the better right as between those using the water for the same purpose . . ."

15. The unpermitted irrigation diversions complained of herein are in violation of the Nebraska Constitution, and the law of Nebraska.

16. The Department of Natural Resources has jurisdiction over this controversy pursuant to Neb. Rev. Stat. §61-206(1)(Cum.Supp. 2002).

17. The unpermitted diversions complained of herein cause an average annual depletion of approximately 100,000 acre feet which would otherwise be available for use pursuant to Central's appropriations as described in Exhibit "A". This amount of depletion is roughly equal to the total quantity of water delivered to Central's irrigators for an average irrigation season.

18. The depletions caused by the unpermitted diversions complained of herein include average annual reductions in streamflow of all Platte River tributaries located upstream of Central's diversion dam, specifically including, but not limited to, an average annual depletion of approximately 15,000 acre feet from Pumpkin Creek (sometimes known as Pumpkinseed Creek), a study of which is attached as Exhibit "B".

WHEREFORE, Central prays that each of the Respondents identified in paragraph 2 be ordered to cease unpermitted diversions, and that Central's appropriations described in Exhibit "A" be declared prior and superior to the unpermitted

diversions identified in paragraph 2, and that the Department take all necessary and appropriate actions to protect Central's appropriations described in Exhibit "A", from the unpermitted diversions identified in paragraph 2, and that the Department take all necessary and appropriate actions to enforce the regulation of unpermitted diversions.

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT,
Complainant

By _____

Michael C. Klein #15428
Of: Anderson, Klein, Peterson & Swan
417 East Avenue, P.O. Box 133
Holdrege, NE 68949-0133
Phone (308)995-4458
Its Attorneys

WATER RIGHTS SUMMARY

Prepared for

Michael A. Drain, P.E.
Civil Engineering Supervisor
and
Michael C. Klein, Esq.
Legal Counsel

June 4, 2003

THE CENTRAL NEBRASKA PUBLIC POWER
AND IRRIGATION DISTRICT
Holdrege, Nebraska

Exhibit "A"

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT
Holdrege, Nebraska

WATER RIGHT SUMMARY

(June 4,2003)

IRRIGATION

STORAGE USE

Central has 126,494.6 acres of storage use water rights approved. (See attached Storage and Storage Use Application listing) .

NATURAL FLOW

Central has 125,728.2 acres of natural flow water rights approved. (See attached Natural Flow Application listing)

TRANSFERS

Since September 2002. one water right transfer has been approved. On June 2, 2003, Central's Board of Directors'approved transfer requests 03-1 through 03-7, a transfer of 684.9 acres. The revised pages for Central's water right Project Map No. 15584 will then be sent to the Nebraska Department of Natural Resources (DNR). The reporting of 2003 transfers to DNR is required prior to April 1,2004.

POWER

All water rights for power use are approved. (See attached Power Use Application listing)

INSTREAM USE FOR FISH & WILDLIFE

INSTREAM USE

Central has 215,000 acre-feet of instream use water rights approved. (See attached Storage and Storage Use Application listing)

INCIDENTAL UNDERGROUND WATER STORAGE USE

All water rights for incidental underground water storage use are approved. (See attached Incidental Underground Water Storage Use listing)

(6/4/2003dl)

(61412003)

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT
Holdrege. Nebraska

APPROVED STORAGE AND STORAGE USE WATER RIGHTS

Number	Source	Use	Priority Date	Provisional Grant	Irrigated Acreage	Point of Diversion
A-2374	North Platte River (Lake McConaughy Storage)	Storage	1934-04-27	1,782,500 AF	-----	S3-T14-R38
A-2374R	North Platte River (Elwood Reservoir Storage)	Storage	1934-04-27	40,500 AF	-----	S3-T14-R38
A-3476	Lake McConaughy (Storage Use - Supply, E-65 and Phelps Canals)	Supp. Irrig.	1941-07-28	—	76,908.7 ❶	S8-T13-R29
A-3620	Lake McConaughy (Storage Use - Supply Canal)	Supp. Irrig.	1941-07-28	—	607.4 ❶	S8-T13-R29
A-3823	Lake McConaughy (Storage Use - Supply and E-65 Canals)	Supp. Irrig.	1941-07-28	-----	445.8 ❶	S8-T13-R29
A-4656	Lake McConaughy (Storage Use - Supply and E-67 Canals)	Supp. Irrig.	1941-07-28	—	1,103.5 ❶	S8-T13-R29
A-5024	Lake McConaughy (Storage Use - North Platte Canal)	Supp. Irrig.	1952-09-13	-----	12,358.7	S13-T14-R34
A-5278	Lake McConaughy (Storage Use - E-67 Canal)	Supp. Irrig.	1953-04-22	-----	4,438.2 ❶	S8-T13-R29
A-6474	Lake McConaughy (Storage Use - Keith-Lincoln Canal)	Supp. Irrig.	1954-07-21	-----	4,998.2 ❸	S18-T14-R36
A-6474R	Lake McConaughy (Storage Use - North Platte Canal)	Supp. Irrig.	1954-07-21	-----	86.0 ❸	S13-T14-R34
A-6475	Lake McConaughy (Storage Use - Suburban Canal)	Supp. Irrig.	1954-07-21	—	7,152.9	S12-T14-R33
A-6476	Lake McConaughy (Storage Use - Paxton-Hershey Canal)	Supp. Irrig.	1954-07-21		7,357.5	S18-T14-R33
A-7716	Lake McConaughy (Storage Use - Supply and E-65 Canals)	Supp. Irrig.	1955-06-25	-----	563.0 ❶	S8-T13-R29
A-9673	Lake McConaughy (Storage Use - Supply, E-65, E-67 and Phelps Canals)	Supp. Irrig.	1958-12-24	—	10,713.3 ❶	S8-T13-R29
A-10282	Lake McConaughy (Storage Use - Supply, E-65, E-67 and Phelps Canals)	Supp. Irrig.	1964-01-20	-----	3,143.0 ❶	S8-T13-R29
A-16519	Lake McConaughy (Storage Use - Lisco Canal)	Supp. Irrig.	1986-08-21	-----	2,483.2	S14-T18-R47
A-17111	Lake McConaughy (Storage Use - Supply, E-65, E-67 and Phelps Canals)	Supp. Irrig.	1992-03-30	—	27,730.0 ❶	S8-T13-R29
A-17112	Lake McConaughy (Storage Use - E-65 and Phelps Canals - out-of-basin)	Supp. Irrig.	1992-03-30	-----	841.7 ❷	S8-T13-R29
A-17695	Kingsley Reservoir (A-2374) (Lake McConaughy Storage)	Instream Use	1998-08-28	215,000 AF	N/A	N/A

❶ Quantity of water diverted limited to 3.62 acre-feet per acre per annum.

❷ Quantity of water diverted limited to 3.62 acre-feet per acre per annum inside the Platte River basin and limited to 3.19 acre-feet per annum outside the Platte River basin.

❸ Irrigation acreage of 4,998.2 includes the 86.0 acres shown for A-6474R.

(61412003)

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT
Holdrege, Nebraska

APPROVED NATURAL FLOW WATER RIGHTS

Number	Source	Use	Priority Date	Provisional Grant	Irrigated Acreage	Point of Diversion
D-754R	Clear Creek (Natural Flow - Clear Creek Canal)	Irrig.	1893-05-30	4.98 cfs	348.1	S32-T16-R41
A-1111	Clear Creek (Natural Flow - Barber Canal)	Irrig.	1911-07-05	0.14 cfs	10.0	S29-T13-R29
A-2355	Platte River (Natural Flow - E-65 and Phelps Canals)	Irrig.	1934-01-13	629.80 cfs	86,211.4 ❹	S8-T13-R29
A-10280	Platte River (Natural Flow - Supply, E-65, E-67 and Phelps Canals)	Irrig.	1964-01-20	580.80 cfs	39,516.8 ❺	S8-T13-R29
A-10281	Platte River (Natural Flow - E-65 and Phelps Canals)	Irrig.	1964-01-20	629.80 cfs	86,211.4 ❹	S8-T13-R29

❹ A-2355 & A-10281, Diversion authorized at a rate of 1 cfs for every 136 acres.
Quantity of water diverted limited to 3.07 acre-feet per acre per annum.

❺ A-10280, Diversion authorized at a rate of 1 cfs for every 68 acres.
Quantity of water diverted limited to 3.07 acre-feet per acre per annum.

(6/4/2003)

THE CENTRAL NEBRASKA PUBLIC POWER **AND** IRRIGATION DISTRICT
Holdrege, Nebraska

APPROVED POWER USE WATER RIGHTS

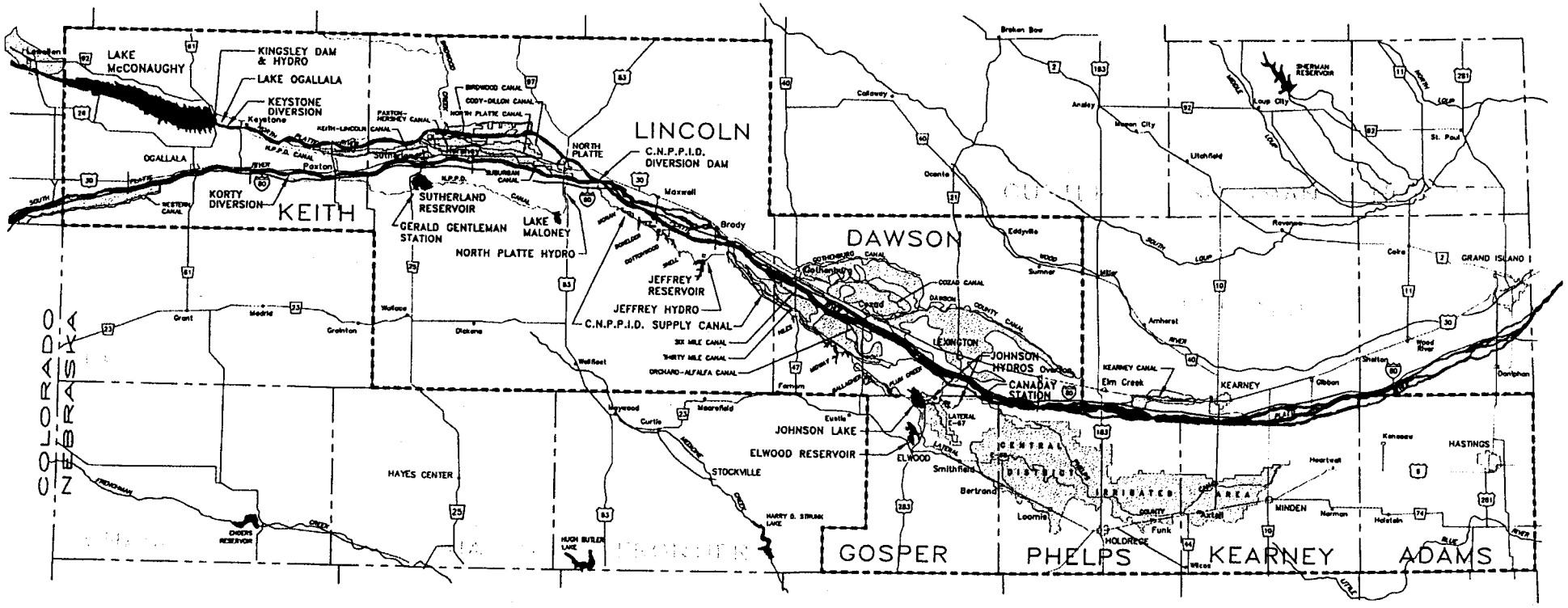
Number	Source	Use	Priority Date	Provisional 'Grant	Irrinated Acreage	Point of Diversion
A-2354	Platte River (Jeffrey, J-1 & J-2 Power plants at 330 *ft.* head)	Power	1934-04-27	1,500 cfs	-----	S8-T13-R29
A-3474	Platte River (Increased Jeffrey, J-1 & J-2 power head 48.32 feet)	Power	1941-07-28	-----	-----	S8-T13-R29
A-3475	**Lake** McConaughy (Use 500,000 AF of storage for Power Generation)	Supp. Power	1941-07-28	500,000 AF	-----	S8-T13-R29
A-4674	Platte River (Jeffrey, J-1 & J-2 Power plants)	Power	1950-05-11	700 cfs	-----	S8-T13-R29
A-15923	North Platte River (Kingsley Power plant)	Power	1981-07-10	5,720 cfs	-----	S3-T14-R38

(6/4/2003)

THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT
Holdrege, Nebraska

APPROVED INCIDENTAL UNDERGROUND WATER STORAGE & RECOVERY WATER RIGHTS

Number	Area	Included Appropriations	Priority Date	Included Appropriations Properties	Point of Diversion
U-2	Gosper, Phelps and Kearney Counties in Nebraska Over 680,000 acres overlie that portion of the groundwater reservoir which has been recharged by Central's project	A-2355 A-2374R A-3476 A-3620 A-3823 A-4656 A-5278 A-7716 A-9673 A-10280 A-10281 A-10282	The priority date for each ***Included Appropriation*** listed shall not be changed.	The provisional grant allowed each ***Included Appropriation*** listed shall not be altered nor shall the rate, quantity or time of surface water diversion for each be increased from that existing on the filing date of Application U-2.	The point of diversion for each ***Included Appropriation*** listed shall not be changed.
U-12	Lincoln, Dawson and Frontier Counties in Nebraska Over 339,000 acres overlie that portion of the groundwater reservoir which has been recharged by Central's project	A-2354 A-2355 A-2374R A-3475 A-3476 A-3620 A-3823 A-4656 A-4674 A-5278 A-7716 A-9673 A-10280 A-10281 A-10282	The priority date for each ***Included Appropriation*** listed shall not be changed.	The provisional grant allowed each ***Included Appropriation*** listed shall not be altered nor shall the rate, quantity or time of surface water diversion for each be increased from that existing on the filing date of Application U-12.	The point of diversion for each ***Included Appropriation*** listed shall not be changed.



THE CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT

Figure 1

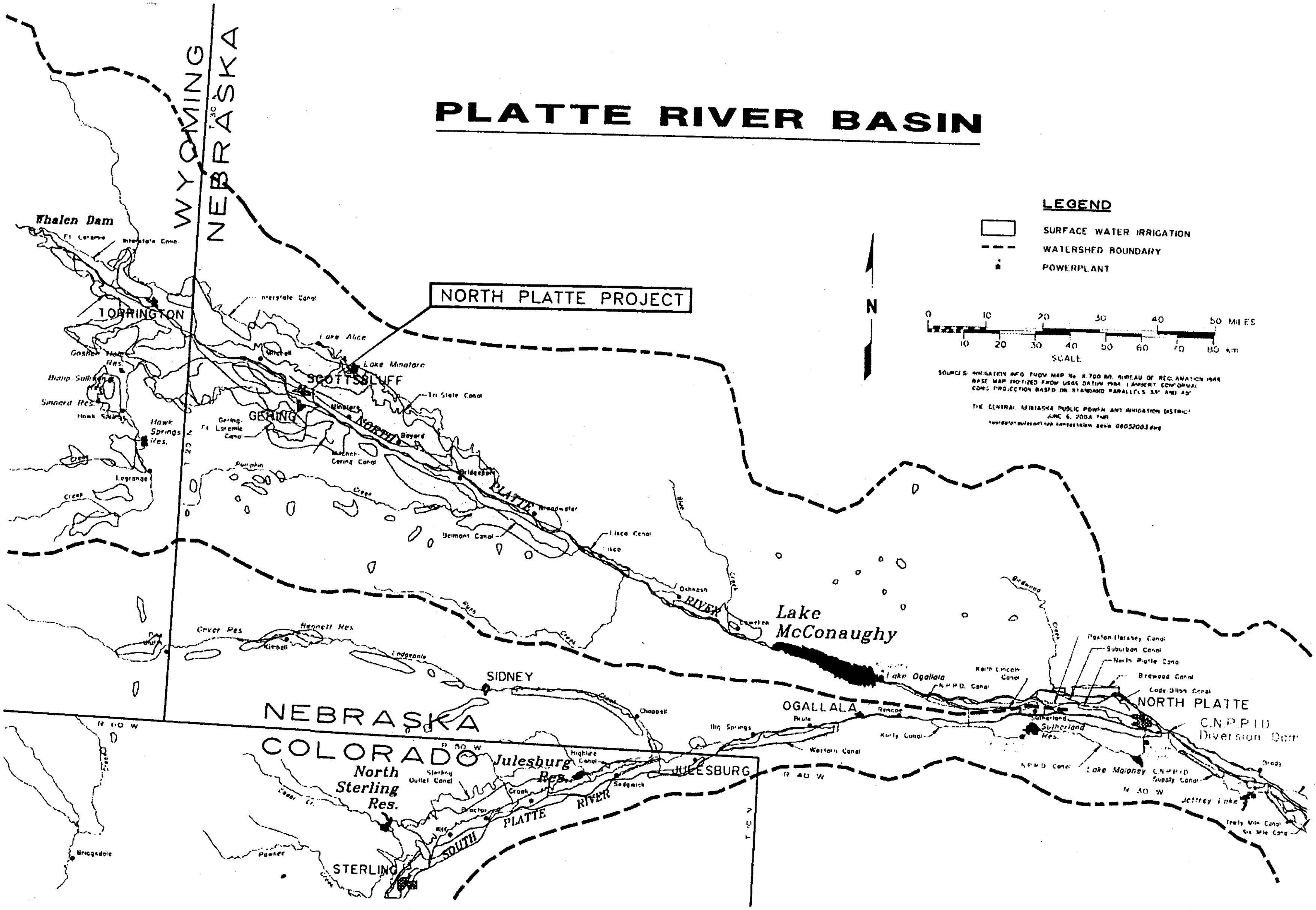

PLATTE RIVER BASIN
LEGEND
SURFACE WATER IRRIGATION
WATERSHED BOUNDARY
POWERPLANT
N
SCALE
NORTH PLATTE PROJECT
WYOMING
NEBRASKA
COLORADO
Whalen Dam
TORRINGTON
SCOTTSBLUFF
GERING
Lake Minatare
Lake Alice
NORTH PLATTE
Lake McConaughy
Lake Ogallala
SIDNEY
OGALLALA
JULESBURG
Julesburg Res.
North Sterling Res.
STERLING
SOUTH PLATTE RIVER
NORTH PLATTE
C.N.P.P.I.D. Diversion Dam
Sutherland Res.
Lake Maloney

Figure 2

AWRA 2002 SUMMER SPECIALTY CONFERENCE
PROCEEDINGS

GROUND WATER/SURFACE WATER INTERACTIONS

Sponsored By The

AMERICAN WATER RESOURCES ASSOCIATION

Hosted By The

AWRA COLORADO STATE SECTION

Co-Sponsored By The

AMERICAN SOCIETY OF CIVIL ENGINEERS, COLORADO SECTION

COLORADO GROUNDWATER ASSOCIATION

COLORADO RIPARIAN ASSOCIATION

COLORADO WATER QUALITY MONITORING COUNCIL

COLORADO WATERSHED ASSOCIATION

NATIONAL GROUND WATER ASSOCIATION

ROCKY MOUNTAIN SECTION OF AMERICAN WATER WORKS ASSOCIATION
AND WATER ENVIRONMENT FEDERATION

JULY 1-3, 2002 • KEYSTONE, COLORADO

AWRA
Community, *Conversation, Connections*

Exhibit "B"

AMERICAN WATER RESOURCES ASSOCIATION
4 WEST FEDERAL STREET, P.O. BOX 1626
MIDDLEBURG, VA 20118-1626
(540)687-8390/ FAX: (540)687-8395

E-MAIL: info@awra.org
HOME PAGE: www.awra.org

Literature citation for this volume:

Kenny, Jerry F. (Editor), 2002. Ground Water/Surface Water Interactions. AWRA 2002 Summer Specialty Conference Proceedings, American Water Resources Association, Middleburg, Virginia, TPS-02-2, 610 pp.

AMERICAN WATER RESOURCES ASSOCIATION TECHNICAL PUBLICATION SERIES
TPS-02-2

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ISBN 1-882132-57-2

TABLE OF CONTENTS

PROCEEDINGS
GROUND WATERISURFACE WATER INTERACTIONS

APPROACHES TO ANALYZING AND MODELING INTERACTIONS

ALLUVIAL DEPLETIONS TO STREAMFLOW

PUBLIC RELATIONS ISSUES AND APPROACHES

SURFACE WATEFUGROUND WATER QUALITY

STREAMFLOW DECLINES CAUSED BY GROUNDWATER DEVELOPMENT IN PUMPKIN CREEK BASIN

Michael A Drain[1], P.E.

ABSTRACT: Groundwater development in can cause declines in the amount of surface water flow in hydrologically connected streams. This paper looks at the F'umpkin Creek watershed as an example of streamflow declines caused by groundwater development. The Pumpkin Creek watershed has very limited water resources, with low average precipitation and limited aquifer supplies. Groundwater use in the alluvial aquifers of the Pumpkin Creek watershed has increased dramatically over the last several decades. As a consequence of the groundwater development, Pumpkin Creek has experienced a reduction in surface water diversions, a reduction in annual basin outflows, and an increase in the occurrence of zero-flow days.
KEY TERMS: streamflow declines; streamflow depletions; groundwater development; Pumpkin Creek

INTRODUCTION

Groundwater development in alluvial aquifers, or other aquifers that are hydrologically connected to streams, can cause declines in the amount of surface water flow in the streams. This paper looks at the example of the Pumpkin Creek watershed in western Nebraska, where it is hypothesized that groundwater development of hydrologically connected aquifer supplies has resulted in stream flow declines. The data and trends presented in the paper support this hypothesis.

PUMPKIN CREEK WATERSHED

The Pumpkin Creek watershed is located in the "panhandle" of western Nebraska, extending approximately from the Nebraska-Wyoming state line east to Bridgeport, Nebraska Pumpkin Creek is a tributary to the North Platte River, which is itself a tributary to the Platte River.

The Pumpkin Creek watershed has very limited water resources. The watershed lies in the "rain shadow" of the Rocky Mountains, with average annual precipitation of approximately 15 to 17 inches per year (Nebraska Department of Natural Resources, 2002). The Pumpkin Creek watershed is underlain by little to no appreciable aquifer throughout much of its extent. The only aquifer supplies of any real utility are located in "fractures" in the underlying bedrock, and in the thin alluvial deposits along Pumpkin Creek, its tributaries, and draws (Cannia, 2001). The only source of water input to the Pumpkin Creek watershed comes from precipitation occurring within the watershed, there are no surface water or groundwater inflows, either naturally or artificially occurring, originating from outside the basin.

The Pumpkin Creek watershed is composed predominately of non-irrigated rangeland, with a limited but growing number of irrigated croplands primarily located in the vicinity of F'umpkin Creek, its tributaries, and draws.

GROUNDWATER DEVELOPMENT

Development of groundwater resources in the Pumpkin Creek watershed has increased steadily and extensively. Most development has been the drilling of wells for irrigation, although there have been a small number of wells for industrial, domestic, and livestock uses as well. The total number of registered wells has increased from 70 wells in 1940 to 543 wells in 1998 (Nebraska Department of Natural Resources, 1999). A graph of the number of wells in the Pumpkin Creek watershed over time is given in Figure 1. As can be seen from the graph, the majority of groundwater development occurred after approximately 1960 to 1970, and occurred at an accelerated rate as compared to the rate of growth prior to that period.

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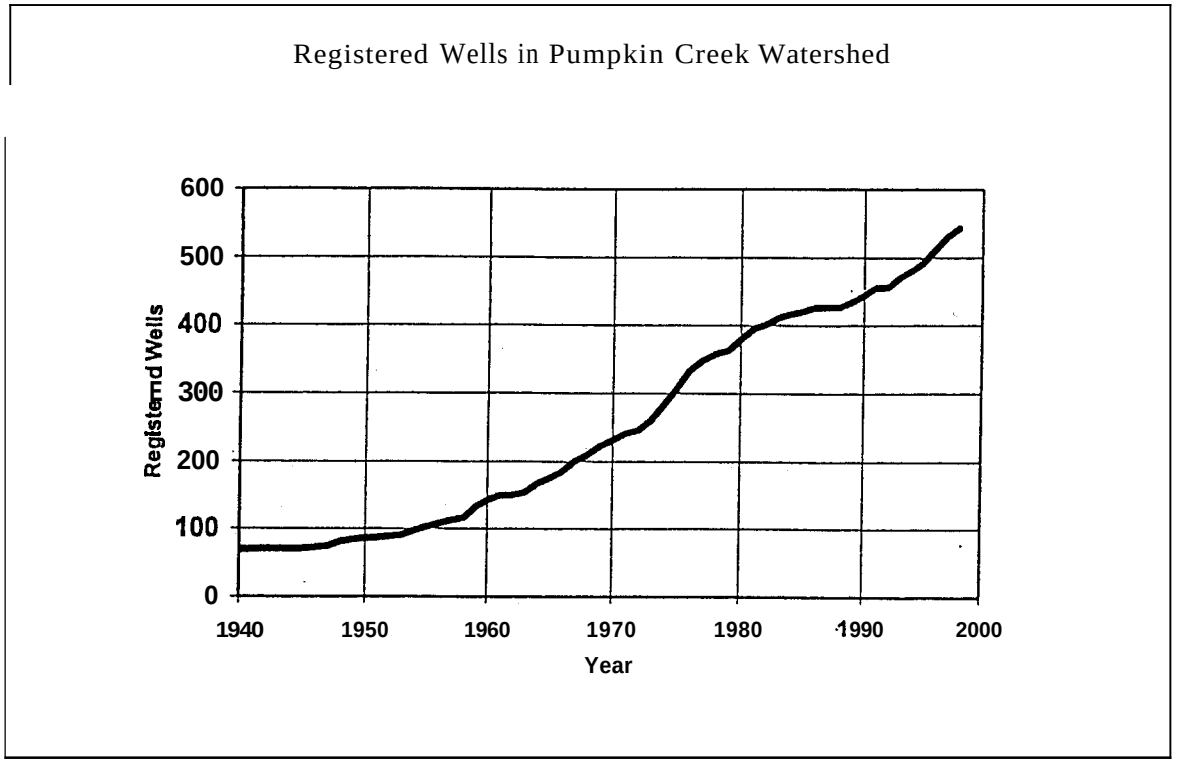

Figure 1. Increasing Number of Wells in Pumpkin Creek Watershed Over Time

STREAMFLOW DECLINES

Streamflows in Pumpkin Creek have declined dramatically since approximately the late 1960s to early 1970s. This decline in streamflow can be seen in each of the following a decrease in the amount of water available for diversion by surface-water appropriators; a decrease in total annual outflow from the watershed, and an increase in the number of "zero flow" days on Pumpkin Creek

A number of small surface-water irrigation projects and individual surface-water irrigators use water diverted from Pumpkin Creek and its tributaries to irrigate their crops. These surface-water irrigators have seen a dramatic reduction in the supply available for diversion in recent years. One example of this loss of irrigation water supply is the Court House Rock Canal. A graph showing the decline in the Court House Rock Canal diversion (Nebraska Department of Water Resources, 1940-1999) over time is shown in Figure 2. As can be seen from the graph, water available for diversion dropped from a range of approximately 3,000 to 6,000 acre feet per year in the period prior to the late 1960s to early 1970s, to less than 200 acre-feet in 1999. This particular canal is significant because it is fairly senior in priority (meaning it has the right to surface water ahead of others when there is not enough supply for all surface water appropriators) and because it is located near the downstream end of the watershed on Pumpkin Creek A declining water supply for Court House Rock Canal, which is so senior in priority and so far downstream, suggests a declining irrigation-season surface-water supply throughout most of the Pumpkin Creek watershed.

The stream gauge for F'umpkin Creek at Bridgeport is located at the downstream end of the watershed, shortly before Pumpkin Creek empties into the North Platte River. As such, gauged flows for Pumpkin Creek at Bridgeport is a good indicator of total surface water outflows from the watershed. A graph of Pumpkin Creek annual streamflow over time is given in Figure 3. As can be seen from the graph, total annual streamflow in Pumpkin Creek (Nebraska Department of Natural Resources, 2001) has declined from a range of approximately 20,000 to 30,000 acre-feet per year in the period prior to the late 1960s to early 1970s, to current levels of approximately 10,000 acre-feet per year or less.

Historically, F'umpkin Creek was a constantly flowing stream, receiving baseflow contributions from the adjoining alluvial aquifer on a continuous basis. Today, the stream is dry throughout much of its course. At the Pumpkin Creek stream gauge at Bridgeport, there was not a single day of "zero flow", or no recorded flow, for the entire period of record from 1932 to 1974. From 1975 to 1998, however, there were 455 zero-flow days on Pumpkin Creek, with one or more

zero-flow days occurring in 16 out of those 24 years. A graph showing the occurrences of Pumpkin Creek zero-flow days (Nebraska Department of Natural Resources, 2001) by year is given in Figure 4. The regular occurrence of zero-flow days since the early 1970s is important because it is an indicator that the decline in Pumpkin Creek streamflow is the result of a decline in groundwater fed baseflows, which itself is an indicator of a decline in the water supply in the alluvial aquifer.

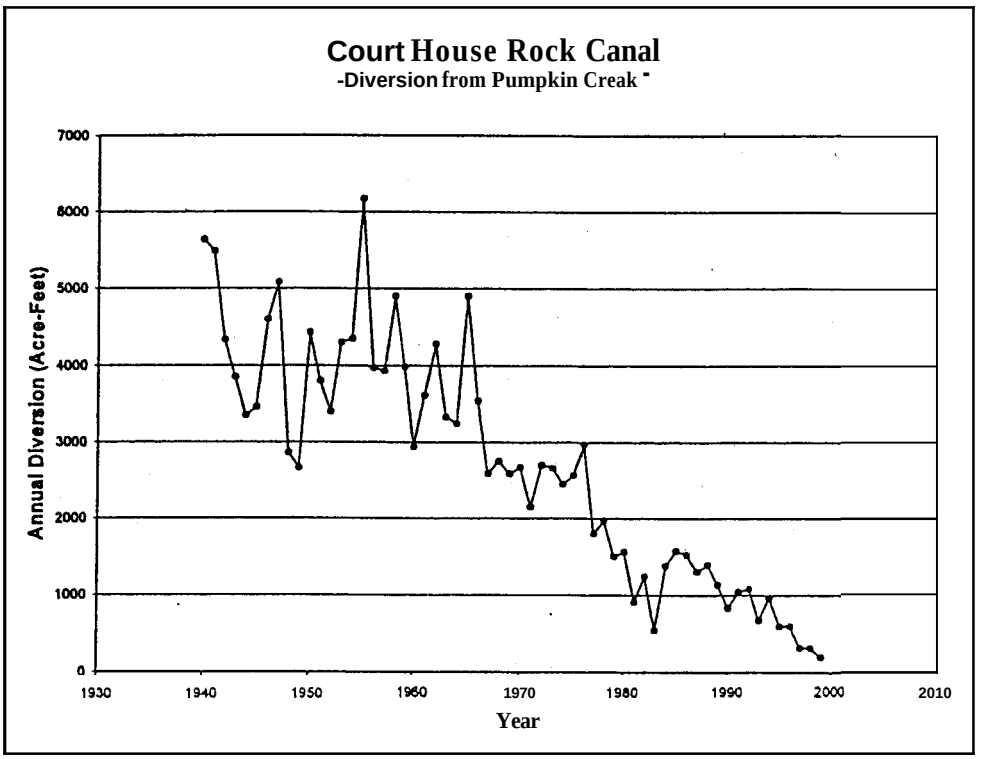

Figure 2. Declining Streamflow Available for Diversion at Court House Rock Canal

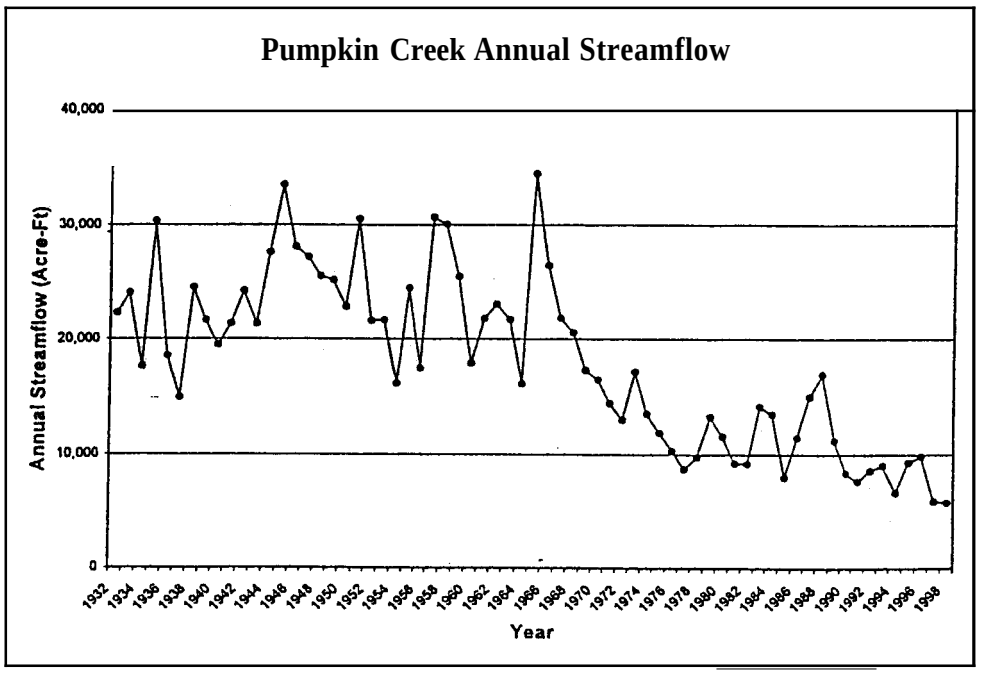

Figure 3. Declining Total Annual Streamflow on Pumpkin Creek

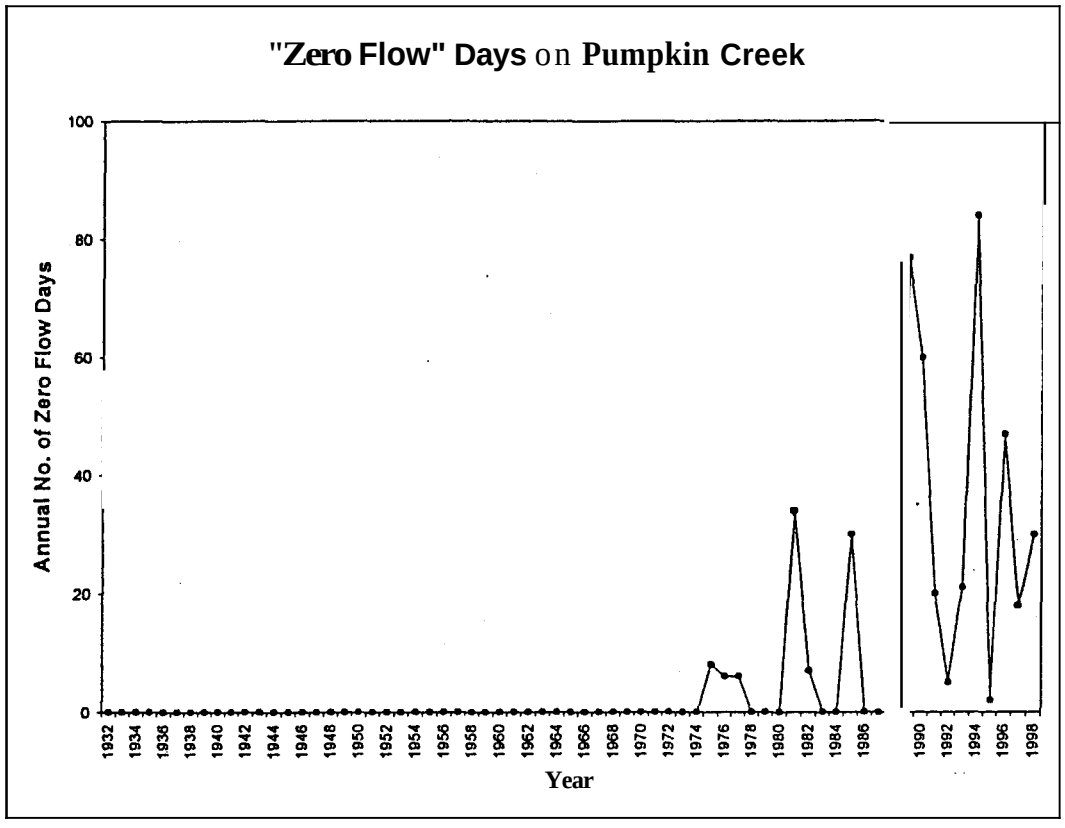

Figure 4. Increasing Occurrences of Zero-Flow Days on Pumpkin Creek

PRECIPITATION ANALYSIS

To this point it has been demonstrated that there has been a dramatic decline in Pumpkin Creek streamflow, and that the decline corresponds in time with a dramatic increase in groundwater development within the basin. It is still necessary, however, to compare the streamflow declines against watershed precipitation, to determine whether or not some of the streamflow decline can be attributed to a decline in precipitation. To this end, two analyses are performed; a simple comparison of average annual precipitation for different time periods, and a double-mass-curve analysis of streamflow versus precipitation.

Table 1 compares average precipitation in the Pumpkin Creek area Nebraska Department of Natural Resources, 2002) and average annual Pumpkin Creek streamflows (Nebraska Department of Natural Resources, 2001) for two thirty-year periods, The two periods compared are the period from 1969-1998, which covers the time of declining pumpkin Creek streamflows, and the period from 1932 to 1961, which is the period of lowest average precipitation for the period of streamflow record prior to 1970. From the table it can be seen that although the period from 1969 to 1998 had higher precipitation than the period from 1932 to 1961, the corresponding streamflows in Pumpkin Creek were much lower, discounting the possibility that the streamflow declines are the result of a long term drought.

Table 1. Precipitation and Streamflow Comparisons for *Selected* 30-Year Periods

30-Year Period	Average Annual Precipitation (inches)	Average Annual Streamflow (acre-feet)
1932 to 1961	16.58	23,574
1969 to 1998	17.02	11,209

Because all water inputs to the Pumpkin Creek watershed come from precipitation within the watershed, and because the watershed is small and has limited aquifer storage space, it would be expected that a double mass curve analysis of cumulative streamflow and precipitation should show a nearly linear relationship. A graph of cumulative Pumpkin Creek streamflow (Nebraska Department of Natural Resources, 2001) and cumulative area precipitation (Nebraska Department of Natural Resources, 2002) is given in Figure 5. As can be seen in the graph, cumulative streamflow and precipitation for Pumpkin Creek have a linear relationship until approximately 1970. After approximately 1970, however, the graphed relationship deviates downward from the pre-1970 linear relationship. This deviation from the linear relationship indicates that there was a fundamental change in the watershed characteristics around approximately 1970 that has had an adverse effect on streamflow, and that the change was not in any way related to variability in precipitation. Furthermore, because the plotted relationship continues to bend downward rather than establishing a new linear relationship with a lower slope, it can be concluded that watershed conditions have continued to degrade after approximately 1970 to the detriment of streamflow.

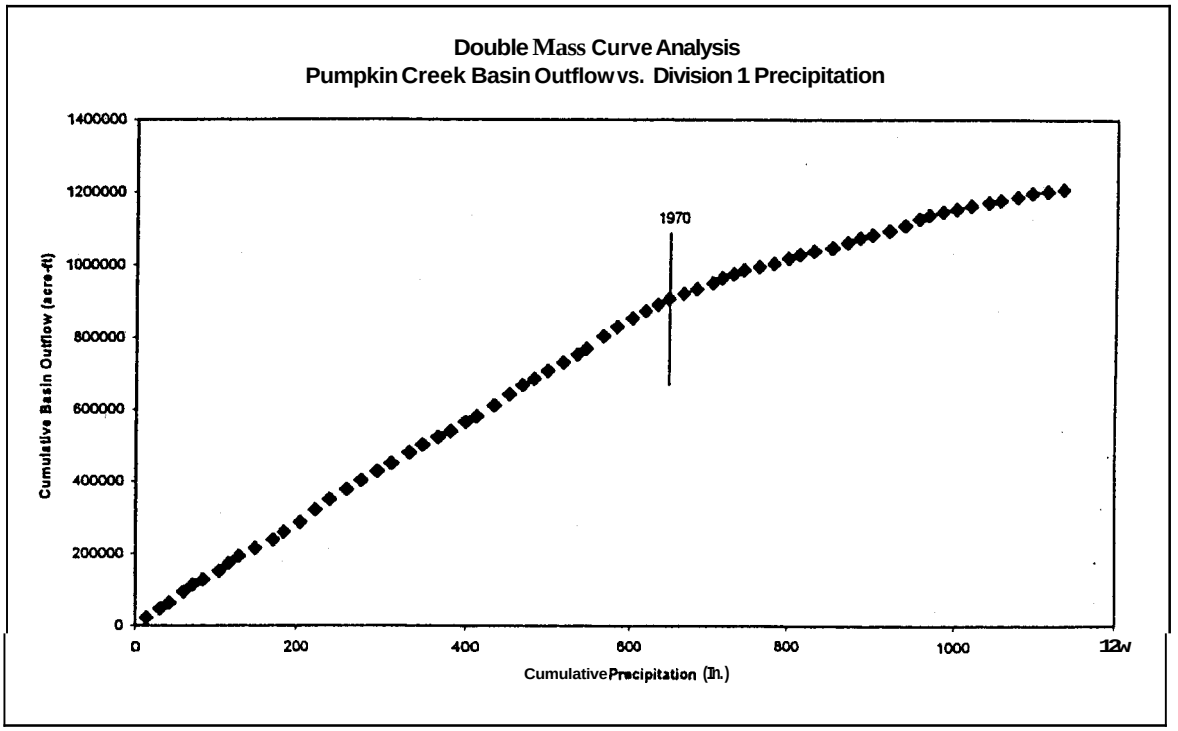

Figure 5. Cumulative Precipitation and Streamflow for Pumpkin Creek

CONCLUSIONS

Graphs of well registrations in the Pumpkin Creek watershed show a dramatic increase in the amount of groundwater development in the watershed since approximately the 1960s to 1970s. Analyses of canal diversions, annual watershed outflow, and zero-flow days demonstrate a significant decline in Pumpkin Creek streamflow during the same approximate period. Comparisons of average annual precipitation and a double-mass curve analysis suggest that the streamflow declines are not related to watershed precipitation. The analyses support the hypothesis that groundwater development in the Pumpkin Creek watershed that streamflow has caused significant declines in Pumpkin Creek streamflow, and discounts the potential alternative hypothesis that streamflow declines are the result of natural variability in watershed precipitation.

ACKNOWLEDGMENTS

I would like to thank Steve M Peterson, Hydrogeologist for The Central Nebraska Public Power and Irrigation District, for his assistance in acquiring the data, and for his suggestions with regard to some of the analyses. I would like to thank Dr. Gary Lewis of Parsons Engineering Science, Inc., for his review and comments.

REFERENCES

Cannia, J., 2001. District Geologist for the North Platte Natural Resources District. Personal communication.

Nebraska Department of Natural Resources, 1999. Registered groundwater wells database. Accessed in 1999 through Nebraska Department of Natural Resources website at http://www.dnr.state.ne.us/.

Nebraska Department of Natural Resources, 2001. Streamflow records database. Accessed in 2001 through Nebraska Department of Natural Resources website at http://www.dnr.state.ne.us/.

Nebraska Department of Natural Resources, 2002. Precipitation database. Accessed in 2002 through Nebraska Department of Natural Resources website at http://www.dnr.state.ne.us/.

Nebraska Department of Water Resources (formerly the Nebraska Department of Roads and Irrigation, currently the Nebraska Department of Natural Resources), 1940-1999. Various editions of the *Biennial Report* and the *Hydrographic Report* from 1940 through 1999, inclusive.

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Verhoeff takes reins of river corridor alliance

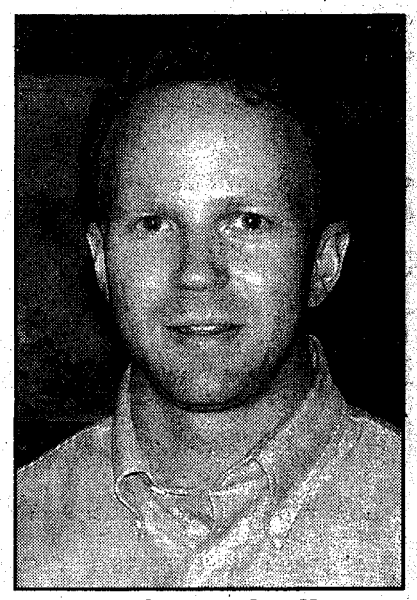
By Kate Grafel
Staff Reporter

LINCOLN – The new coordinator for the Lower Platte River Corridor Alliance is returning home by taking the job.

Rodney Verhoeff, originally from Hickman, started April 14.

The Lower Platte River Corridor Alliance is a consortium of three natural resources districts and six state agencies. Half of its funding comes from the Lower Platte North, Lower Platte South and Papio-Missouri natural resource districts. The other half comes from the Department of Environmental Quality, the University of Nebraska-Lincoln conservation survey division, the Department of Health and Human Services, the Military Department, the Game and Parks Commission and the Department of Natural Resources.

The alliance's purpose is to provide information to local decision-makers regarding water quality, bank stabilization and land use, Verhoeff said.



Rodney Verhoeff

He said the alliance allows several entities to pool their resources, thus being more efficient. He said the alliance was not regulatory nor a decision-making body

"We are the folks that are the catalyst to get these discussions going," he said.

As coordinator, Verhoeff will work with the agencies and entities that support the alliance. Technically, he is an employee of the Lower Platte South NRD, because the alliance can't sign contractors nor obtain grants in its name.

The alliance's dependence on member organizations is its strength, Verhoeff said.

"We didn't have to create a whole new bureaucracy, a whole new level of administration. We can pool the best from the NRD, the best from these agencies," he said.

Verhoeff said he jumped when he saw the position was open. Upon previous opportunities, he had held off from applying in favor of gaining more experience.

"I've watched this alliance from afar," he said. "I really like the concept, I like the organization, I like the idea of pulling in all the stakeholders, getting them involved and then empowering the grassroots Nebraska communities."

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3 Sites set where farmers can discard pesticide applicators in Thurston, Dakota Counties

Thurston and Dakota County farmers and pesticide applicators will again have the opportunity to recycle clean plastic agricultural pesticide containers to help protect water and air quality in northeast Nebraska.

These three collection sites will be slated for inspection and collection during June and July:

Emerson: Northeast Cooperative (former Terra plant, Wednesdays, 9:30 to 10:30 a.m

South Sioux City: Northeast Cooperative (junction of Highways 20 and 110), Wednesdays, 11 a.m. to noon.

Macy: Mother Earth Recycling Center (one and one-half miles east of Macy), Wednesdays, 10 a.m. to noon.

In addition to 1 and 2 1/2 gallon plastic containers, 15, 30 and 50 gallon plastic drums also will be accepted for recycling.

All plastic pesticide containers and drums need to be properly prepared to be acceptable for recycling. This includes being triple-rinsed and power-washed and having the plastic caps and wrappers removed. Containers and drums must be free of visible chemical residue on the inside and outside.

This recycling activity to help protect the environment is made possible through the cooperation of the Omaha Tribe of Nebraska and Iowa, the Papio-Missouri River Natural Resources District (NRD), University of Nebraska Cooperative Extension Service, four agri-businesses, the Nebraska Loess Hills Resource Conservation and Development (RC&D) council and the Agricultural Container Research Council (ACRC).

During 2002, more than 7,000 plastic pesticide containers (over two tons) and nearly 100 plastic drums (over one ton) were inspected, collected and shredded to make more pesticide containers, parking lot stops, pallets and plastic lumber.

Since 1995, more than 70,000 of these containers (over 24 tons) have been recycled in Thurston and Dakota Counties and kept out of the landfills.

For more information about recycling plastic agricultural pesticide containers, contact your local NRD, RC&D or Cooperative Extension office or USDA Service Center.

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Homer School sixth grade students, Joey Vargo (left) and Jake Kunzie show their tree seedlings and wildflower seed packets provided by the Papio-Missouri River Natural Resources District (NRD). Trees and wildflower seed packets were presented to over 1000 fifth and sixth grade students from Dakota and Thurston Counties during the Earth and Arbor Day observances the last week of April. Making presentations to 17 area schools were Blaine Gaer (left) Natural Resources Conservation Service (NRCS), Kelly Fravel, Papio-Missouri River NRD, and Ann Verzani, Nebraska Cooperative Extension Service. Students learned about proper planting and care for both tree seedlings and wildflowers.

Buyouts to ease Cole Creek fear

The city will begin making offers soon to help residents move out of the path of likely flooding

By Joseph Morton
WORLD-HERALDSTAFF WRITER

Every time clouds darken the skies of Omaha, the worrying starts for Lester and Josephine Rosenthal.

Nearly four years ago, downpours caused Cole Creek to sweep over its banks and the 7-foot homemade dike built by Lesterand his neighbors.

It sounded like an explosion when the water broke through a wall of his house and flooded into the basement, nearly drowning Josephine.

Lester, now 77, was able to pull her out of the basement, but that harrowing day is never far from their minds.

The Rosenthals are on a list of **12** residential property owners who will get a buyout offer from the city this summer as part of a plan to move the most vulnerable residents along Cole Creek out of harm's way. Any structures on the properties would be moved or demolished.

The flood-prone creek runs from near 65th Street and Sorensen Parkway southwest to join the Little Papillion Creek near 76th and Cass Streets.

The city recently received about **$1.25** million in federal flood mitigation funds for the voluntary project. It also has about $400,000 from city coffers and from the Papio-Missouri Natural Resources District.

Eventually, city officials want to buy 48 properties along the creek as more federal and local funds become available. For now, there is enough money to make offers to **12** people this

See Creek *Page* 2

MATT MILLER/THE WORLD-HERALD

Lester Rosenthalwalks alongthe 7-foot-high dike he and his neighbors built near Cole Creek.

Creek: City wants eventually to buy 48 properties

Continued from Page 1

summer.

How many more properties they can buy during this round will depend on the appraisals and how many people take the offers.

The whole buyout program is expected to cost more than $4 million and will take years to complete.

The city also plans a couple of construction projects to aid the

Rosenthal

1994, water damaged 150 vehicles at a car dealership, flooded homes and washed away parts of back yards. **A** Cole Creek flood in August 1999 **k** 11e d **a** 79-year-old man when water

during his 35 years there. The oak trees that were saplings when he bought the lot now tower over the house and the hobby-shop garage he built on the property. The home is valued for tax purposes at $80,200.

With its secluded, dead-end road and spacious grounds, it's like a little piece of country in the middle of the city. Rosenthal said he has enjoyed living there, but he can't stand worrying

tomorrow. That's what worries me."

Still, Rosenthal and other homeowners along the creek wondered what kind of offers the city will make them. City **of**ficials said previous buyouts in Omaha have gone well, with everyone who wanted to move able to do so.

"It's not to our advantage to offer people anything but a fair price," said Scott McIntyre, the

War brews over water rights near drought-plagued Big Mac

6-10-02

BY PAUL HAMMEL
WORLD-HERALD BUREAU

LINCOLN — The state's largest irrigation district has moved quickly to assert its claims in a major water-rights dispute.

In a recent complaint, Central Nebraska Public Power and Irrigation District said the "unpermitted diversions" of groundwater by well irrigators above Lake McConaughy violate the Nebraska Constitution.

Roger Patterson, director of the Natural Resources Department, said he has never reviewed such a complaint and is unsure if the state can do what Central requests — shut down center-pivot irrigation systems upriver from drought-depleted Lake McConaughy.

A former state water official, Mike Jess, now the associate director of the conservation and survey division at the University of Nebraska-Lincoln, said the likely answer is no.

That answer would set the stage for a lawsuit by Central to resolve a critical question about who has a greater right to water: surface or groundwater users.

Patterson, who was in Kearney on Monday for a meeting of a task force set up to address the water dispute, said he did not know how long it would take to respond to Central's complaint.

Recent drought conditions have helped bring the groundwater vs. surface-water issue to a head. The level of Lake McConaughy — which Central uses for irrigation, electric generation, wildlife and recreation — is about 49 percent of normal.

Well irrigators, Central argues, have depleted inflows to the lake by about 100,000 acre-feet a year — enough to annually supply all of Central's surface-water customers.

The dispute, which sparked a lawsuit earlier this year, could have far-ranging implications for water users along streams in Nebraska. Those include the cities of Omaha and Lincoln, which have well fields along the Platte River.

The complaint is aimed squarely at the long-running dispute over how to jointly regulate two types of irrigation — well vs. surface-water irrigation — that operate under different regulatory and legal rules.

The board has been struggling with this for several months, said Tim Anderson, a spokesman for Central. Board members, he said, "just felt they needed to move on."

Central filed the formal complaint with the Nebraska Department of Natural Resources on Friday, four days after the Central board authorized such action.

Anderson said the district also is planning to lodge similar comulaints with the North Platte Natural Resources District. The district recently imposed a moratorium on new irrigation wells and other restrictions, but Anderson said that did little to restore stream-Flows.

"Ultimately, this issue is probably going to be decided by the Nebraska Supreme Court," Anderson said.

Plainsman,

No opening set at Summit Lake

About all that stands in the way of the reopening of Summit Lake State Recreation Area is more—more water in the, lake and more funding in the budget, or at least a known amount of funding in the budget.

With the Legislature passing a budget last month, the Nebraska Game and Parks Commission will be able to divvy its piece of the state government pie.

"Our intentions depend on what the new budget reductions are," said Jim Swenson of the Game and Parks office in Lincoln. "We're hopeful we *can* get a level of service returned there. We're evaluating that at this point."

Summit Lake has been closed for renovation for several years. Officials began drawing down the water level in the 190-acre lake in 2000 and reached the 30- to 40-acre level by summer 2001. Construction started in fall 2001. At the same time, any remaining fish were killed and restocking began. Construction on the lake was completed last year.

A completion and reopening date was not set, "not knowing how the lake would recover," Swenson said. "The lake is still coming up. The last I heard, it was approximately 10 feet below optimum pool. So that has an impact and limits recreation opportunities."

Jeff Schuckman of the Game and Parks Norfolk office said that ideally the lake will be full when the recreation area is reopened.

Schuckman said the lake has been deepened in certain areas. Sediment traps have been built in each leg of the lake, to slow and pool the incoming water and allow heavy sediment to drop out.

"Theoretically, you end up with cleaner water and those areas can be cleaned up easier in the future," he said.

Twelve jetties have been built or rebuilt to break up wave action along the shoreline. This protects the shore and provides better access for fishermen and better habitat for the fish, he said.

A gravel-covered underwater island has been built for habitat diversity. The flattop island will come within 4 feet of the water surface, Schuckman said.

A sediment dike was built on the west side of the lake, greatly reducing the distance between the north and south ends of the lake. The sediment trap in the west arm also hosts a road into the campground, making it possible to move the park's main entrance to the south side of the lake.

"This will greatly facilitate access, make it much easier for campers and help with maintenance operations," Swenson said.

The lake has been stocked with largemouth bass, bluegill, channel catfish and walleye. Black crappies will be added in the next year or so, Schuckman said.

More than $1 million was budgeted for the project. Environ-

(Continued on Page 5)

No opening set at Summit Lake

(Continued from Page 1)

mental Trust Fund ($518,000) and Aquatic Habitat Fund ($466,000) were the major contributors. Burt County and the Papio-Missouri River Natural Resources District were among several others that provided funds. No general fund state tax receipts were used in the project, Schuckman said.

Swenson said some maintenance work should soon begin behind closed gates.

"We're hoping to possibly allow some primitive use of the area, with limited access," he said. "As the lake comes up, there's more desire of people to get in there and enjoy it. We're sensitive to that."

Judge dismisses major water suit

6-12-03

By Paul Hammel
WORLD-HERALD BUREAU

LINCOLN — A judge has dismissed a major water lawsuit that pitted a Bridgeport, Neb., rancher along a disappearing creek against his upstream neighbors who pump groundwater.

District Judge Paul Empson of Chadron ruled Tuesday that he lacked jurisdiction to decide the dispute brought by the Spear T Ranch of Bridgeport against 18 other landowners along Pumpkin Creek.

Although the ruling will be appealed and the lawsuit is expected to end up before the Nebraska Supreme Court, the suit's dismissal is a first-round victory for groundwater users and the state's current scheme for deciding conflicts between surface-water and groundwater irrigators.

Empson's decision also raises the prospect that the high court will decide that such water fights should be left to water regulators and the Nebraska Legislature rather than to judges.

"This is a public policy issue that should not be addressed through the court system," said Harriet Hageman, a Cheyenne, Wyo., water-rights attorney who led a team of defense lawyers. "I feel very strongly that the solution is not to sue a groundwater user."

A year ago, the Spear T sued the State of Nebraska, saying the state had failed to protect the ranch's legal right to water in Pumpkin Creek, allowing it to be depleted by withdrawals of nearby groundwater. That lawsuit is still pending.

This spring, the ranch sued the upstream landowners, asking that the court award $4 million in damages for its loss of irrigation water or shut down the upstream wells.

Both lawsuits aim at a long-simmering question about how to manage the use of water when the two major sources — water from streams and water from the ground — are governed by separate legal and regulatory schemes.

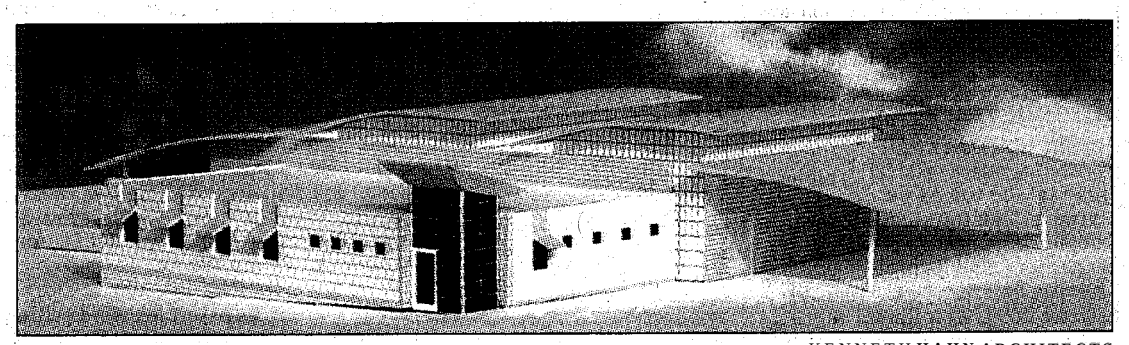
Recent drought conditions have brought the issue to a head, as streams have dropped or dried up and more farmers have sunk wells for irrigation, a step that can further deplete flows in nearby waterways.

Surface-water users, like the Spear T Ranch, obtain water rights from the state. In times of shortage, the oldest water rights have priority and newer water rights are suspended.

Groundwater irrigators are not required to obtain a state water right. In times of drought, they are supposed to share equally in the shortage.

In 1997, the Nebraska Legislature passed a law attempting to resolve conflicts between the two types of water users. It called for water studies and the establishment of water management districts.

Tom Oliver, a Bridgeport attorney who represents the Spear T Ranch, said an appeal is planned.



KENNETH HAHN ARCHITECTS

Construction will begin next week at 4001 S. 120th St. on this $1.2 million facility for recycling household products that cannot safely be dumped in landfills.

Omaha center will recycle household hazardous waste

■ A new building to dispose of such materials as paint and pesticides will be in operation by next spring.

6-17-03

BY NANCY GAARDER
WORLD-HERALD STAFF WRITER

After more than 15 years of talking and six years of serious planning, an Omaha area recycling center for household hazardous waste is under way.

Construction will begin next week on a $1.2 million facility for the safe disposal and recycling of household hazardous waste. By next spring, Douglas and Sarpy County residents will have a free place to drop off old paint, pesticides and cleaners.

Not only that, people will be able to pick up, at reduced or no cost, other residents' unused but still usable pesticides, paints and other household products.

Groundbreaking took place Monday at a gravel and dirt lot just off Interstate 80 at 4001 S. 120th St. Eight people turned a ceremonial spade, and several gave formal remarks as about 50 people looked on.

The new facility, the **second in** the state, addresses a **pressing** need, said Joe Francis, associate director *of* the Nebraska Department of Environmental Quality.

Household chemicals **are the** "most potent part" of municipal trash still going to local landfills, Francis said. "The more that we can keep out, the better."

Nebraska, he said, no longer lags behind the rest of the country in how it handles its waste.

"Nebraska has really leapfrogged to where it needs to be," Francis said. **"We'll be able to look our children in the eyes and** tell them that they won't have to pay for our transgressions."

That so many people turned out for the groundbreaking despite Monday's heat was a reflection of the collaboration that is **making the facility a reality.**

Money for the center will come from trash fees at the Douglas and Sarpy County Landfills, grants from the Nebraska Department of Environmental Quality, the Environmental Trust, the Peter Kiewit Foundation, the City of Omaha, The **Omaha World-Herald Foundation and various other groups.**

"This is a shining example of what committed people can do when they work together," Mayor Mike Fahey told those gathered.

The average household generates about 20 pounds of hazardous waste a year, Fahey said, and until now, there has been no place to safely dispose of or recycle those chemicals. **Un**needed chemicals sitting in basements and garages pose a risk to children. And when people dispose of the chemicals they may be putting trash haulers and the environment **at** risk.

"This facility will make **all** of our homes and neighborhoods safer," the mayor said.

Dike project could end ice jams in river

Cabin owners will have to move or elevate their homes.

BY ALGIS J. LAUKAITIS
6-18-03 Lincoln Journal Star

Ten years ago, Lincoln's drinking water supply was crippled by a 6-mile ice jam on the Platte River.

Water surged over dikes on the river's west bank and through the city's well fields, severing two of three pipelines.

Over the next few days, Lincoln limped along until repairs could be made. Mayor Mike Johanns told reporters the city had dodged a bullet.

City officials later improved the channel near the well fields. But the dikes remained a weak spot. With every major ice jam, there were fears of another disaster.

Those fears could dissipate soon.

This fall, workers will begin smoothing out the Western Sarpy and Clear Creek dikes on both sides of the river north of U.S. 6 in Saunders and Sarpy counties.

The dikes vary in height and offer 20- to 100-year flood protection. Sponsors want to make dikes on both sides more uniform and able to withstand 50-year floods.

Why not upgrade the entire dike system to 100-year-flood protection?

Marlin Petermann, assistant manager of the Omaha-based Papio-Missouri River Natural Resources District, said that could open up the area to development — something project sponsors do not want.

Dikes that can withstand only a 50-year flood prohibit development and leave open areas for farming, wetlands and occasional flooding.

"We think this broad, wide flood plain near the confluence of the Platte and Elkhorn rivers is too hazardous to count on a levee system, especially considering the ice jam conditions," Petermann said.

As part of the $19.8 million project, the owners of 23 cabins along the river will be asked to sell their homes, elevate them or move them to higher ground.

A preliminary study is under way to look at what needs to be done to each cabin and how much it would cost, Petermann said. An appraiser then will set a value on the cabins and land.

"Then we will make offers," Petermann said, adding that owners would have the final choice of what to do with their properties.

Walter Smith of Omaha, who owns a cabin about a half-mile south of the confluence of the Platte and Elkhorn rivers, said his home would likely be elevated. He called the project a good thing.

"The farmers have been getting flooded out there quite a bit," he said.

Work on the cabins should begin next spring or summer, Petermann said. A public meeting with cabin owners will be held in July.

The cabins are along flood-prone stretches of the Platte River north of U.S. 6. Ten are close to the river bank in the Thomas Lakes development on the Saunders County side, Petermann said. Those on the Sarpy County side start about three miles up the river from the highway.

Residents of Beacon View near Linoma Beach will not be affected. A levee was realigned in the area, and four cabin owners moved to higher ground, Petermann said.

One owner decided to sell out.

The project recently was approved by the U.S. Army Corps of Engineers and will be forwarded to the federal Office of Management and Budget for review. About $500,000 in federal money has been approved.

That money will be used for conservation measures to lessen the effects to endangered least terns and piping plovers. Workers will clear a 15-acre island, about 3 miles north of U.S. 6, of brush to create more sandbar habit.

Then workers will focus on making the dikes more uniform. Petermann said he hoped Congress would appropriate enough money to finish the project in two years.

Most of the funds, about $12 million, will come from the federal government. The three main NRD sponsors — Papio-Missouri River, Lower Platte North and Lower Platte South — will make up the balance, along with state and city funds.

Petermann said the project would help protect not only Lincoln's well fields but other key infrastructure in the area, including the U.S. 6 and Interstate 80 bridges.

Dikes along flood-prone Camp Ashland will be improved under a separate, military-sponsored project, Petermann said.

The improved dikes will keep water in the river, which is essential to carry chunks of ice downstream, he said.

Steve Masters, Lincoln's public utilities administrator, said the city had early concerns about the project and asked for a detailed analysis of the flood protection offered by the project.

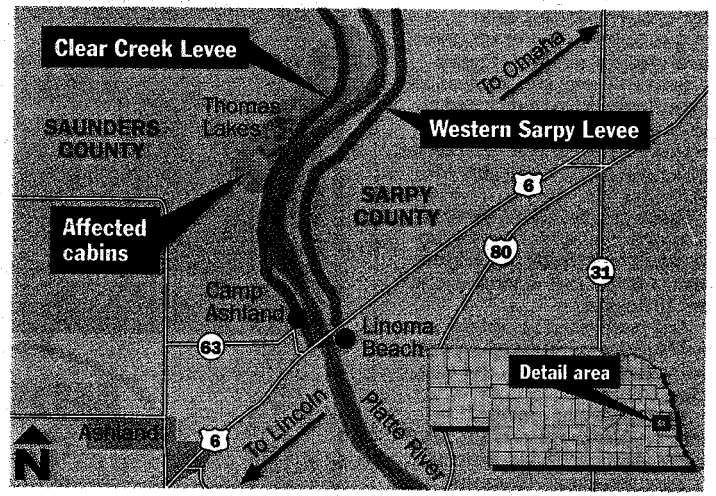
That information, he said, convinced city officials a uniform dike would protect the well fields from future ice jams.

"It gives us a better measure of protection than what we have had," Masters said.

Reach Algis J. Laukaitis at 473-7243 or alaukaitis@journalstar.com.

Western Sarpy/Clear Creek Project

Twenty-three cabins along the Platte River will be affected by the $19.8 million Western Sarpy/Clear Creek Project. Dikes on both sides of the river will be made uniform. Cabin owners will have to choose whether to sell, elevate or move their cabins. Sponsors say the project will protect infrastructure in the area, such as Lincoln's well fields and U.S. 6 and Interstate 80 bridges.



SOURCE: U.S. Army Corps of Engineers D. MATT VAN DRIEST/Lincoln Journal Star

24 June 2003

ems Environmental Media Services
a nonprofit organization dedicated to providing journalists with the most current information on environmental issues

from Environmental Health Perspectives:

FOR IMMEDIATE RELEASE
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Low Sperm Count, Quality in Rural Areas Tied to Herbicides, Pesticides

University of Missouri-Columbia Researcher Calling for Water Testing, Safer Alternatives

Research Triangle Park, N.C. - Following an earlier study that found that men in rural mid-Missouri had lower sperm counts and quality than their peers in urban centers, a University of Missouri-Columbia researcher has identified and linked three agricultural chemicals to the problem. [Download the report]

In November 2002, Shanna Swan, a professor of family and community medicine at the university, announced findings suggesting that fertile men in more rural areas have lower sperm counts and less vigorous sperm than men in urban areas. Through her most recent study, published today in the online edition of the peer-reviewed journal Environmental Health Perspectives (EHP), Swan confirmed that men with lower sperm counts and quality had higher concentrations of alachlor, diazinon, and atrazine metabolites in their urine than men with higher-quality sperm. These three chemicals are commonly used in agriculture operations throughout the Midwest.

Swan's study compared pesticide exposure in two groups: men with low sperm concentration and quality, and men with better semen quality. Although men were drawn from both mid-Missouri (a mostly rural area) and Minneapolis, Minnesota (a highly urban setting), links between pesticides and semen quality were detected only in Missouri men. Swan obtained urine samples from both groups and tested them for 15 currently used pesticides. Samples from Missouri men with poor semen quality contained significantly higher concentrations of alachlor, atrazine, and diazinon metabolites than samples from men with higher-quality

CHEMICALS & HEALTH MALE REPRODUCTIVE

Low Sperm Count, Quality in Rural Areas Tied to Herbicides, Pesticides

U. of Missouri Study

Outside Experts for Comment on Missouri Study (PDF)

Study Q & A (PDF)

sperm. For example, men with high levels of alachlor were 30 times more likely to have poor semen quality than men with low levels. Swan found no correlation between semen quality and pesticides used primarily in the home, such as DEET.

"This is the first study that shows a link between elevated levels of these pesticides in the human body and potential reproductive problems," Swan said. "Since our subjects include a cross-section of men in mid-Missouri, rather than mostly farmers, the pesticide levels we found probably represent the exposure of the general population."

According to a 1995 survey by the U.S. Geological Survey, these pesticides were found in groundwater supplies in rural areas in the Midwest at concentrations exceeding federal reporting levels. In addition, the agency stated that conventional water treatment is ineffective in removing herbicides such as alachlor and atrazine from finished drinking water. Unlike many other contaminants, those herbicides remain in the water following conventional treatment processes such as coagulation and sand filtration.

"We think it is likely that men are ingesting these chemicals through their drinking water," Swan said. "Some water filters do claim to rid the system of these chemicals. We need to analyze men's home tap water and examine alternative water treatment methods to determine levels of these chemicals currently in the water supply and to find effective ways to remove them."

Swan also said that although researchers should examine the water supply and seek methods of removing the pesticides, safer alternatives to these chemicals need to be found. Because women and children are likely to be exposed to these pesticides as well, additional studies examining the impact of these pesticides on the health of the entire family are needed, Swan said.

EHP is the journal of the National Institute of Environmental Health Sciences, part of the U.S. Department of Health and Human Services. More information is available online at http://www.ehponline.org/.

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W-H
6-19-03

Cleaning out the garage

A hazardous waste recycling facility is long-awaited good news.

A bottle of insecticide that still sloshes, even though there's not enough left to draw up through the sprayer for application.

A box filled with the dregs of lawn chemicals that got clumpy and won't go through the spreader.

Bottles of spot-treatment herbicide. Wasp and hornet killers. Five different cans of leftover paint.

It's a common picture of most garages and storage sheds across the Omaha metro area.

Such hazardous household wastes shouldn't be disposed of in the trash or the drain. According to past surveys, most people know that. Still, officials have long been convinced that such materials end up there because residents don't have a good place to take such materials for proper disposal.

Douglas and Sarpy County residents will soon have that place.

Construction of a household hazardous waste recycling center recently got under way and should be finished by spring. Then residents won't have to wait for sporadic collection days or, worse, improperly dump such waste. They'll even be able to pick up still-usable paint or pesticides other residents have dropped off.

After more than 15 years of singing the blues over the lack of a proper facility, the Omaha area will finally be able to try a new tune: Goodbye, old paint.

City has extra $1 million for Cole Creek buyouts

6-20-03

BY JOSEPH MORTON
WORLD-HERALD STAFF WRITER

City officials delivered the news Thursday to residents along Cole Creek — the city has about $1 million more to buy out homes along the creek than it originally thought.

With local and federal money, the city is offering to buy 48 properties along the flood-prone creek that runs from near 65th Street and Sorensen Parkway southwest to join the Little Papillion Creek near 76th and Cass Streets.

About 50 Cole Creek residents attended a Thursday night meeting with city officials to hear about the voluntary buyout process and pose questions like "When do I get my money?"

Initially, Omaha public works officials thought they would have about $1.7 million for the project's first round of buyouts. But they realized a few weeks ago that they had misinterpreted the federal government's award of flood mitigation funds.

The total amount available for the first round actually is closer to $3 million, Scott McIntyre, the city design engineer who has guided the Cole Creek project, told those at the meeting.

Now the city expects it can make offers on at least 20 properties in the first round of buyouts, he said,

Still, not everyone is jumping at the chance to sell. Several residents at the meeting questioned whether the buyout program would be worth it.

Mary Brown said that she is not afraid of flooding and that it would be impossible to find an affordable property elsewhere in the city as nice as the one she has lived in for 10 years near 77th and Cass Streets.

Brown said she has a nice-size plot of land with lots of trees and an outdoor pavilion. "You can't duplicate that anywhere."

City officials hope to start making offers on properties in a couple of weeks.

Cole Creek has flooded during heavy rains in recent years. In 1994, water damaged 150 vehicles at a car dealership, flooded homes and washed away parts of backyards.

A Cole Creek flood in August 1999 killed a 79-year-old man when water rushed through his basement.

Move ahead on merger

6-22-03

Responsive government should focus on what's best for taxpayers, not bureaucracies.

Omaha Mayor Mike Fahey's enthusiastic backing of a city-county merger lends weight to a worthy cause. Guiding Omaha and Douglas County toward a long-term consolidation of governments will be possible only through strong, confident leadership from elected officials.

Merger — the combining of the city and county governments — was recommended last Tuesday on a 6-1 vote by a locally appointed committee as it completed its 13-month study of the issue. Opinion on the Omaha City Council and Douglas County Board, however, appears to be all over the map. Progress toward constructing a more efficient, consolidated governmental structure will be possible only if support can be firmed up among those officials.

This is by no means a partisan issue, as shown by the strong support for merger by County Commissioners Mike Boyle (a strong Democrat) and Kathleen McCallister (a conservative Republican). And just as Fahey, a Democrat, has to embrace merger, so Hal Daub, a Republican and Fahey's predecessor, was an especially vocal booster of the overall issue.

Opposition to merger can be framed in a lot of ways. Some of the arguments are honorable. Some fall far short of legitimacy.

We respect city councilmen and county commissioners, for example, who express doubt that a full merger would produce major savings. But the merger committee has worked hard to make clear that it isn't claiming that big savings would result.

The aim, rather, is to encourage efficiency — plus clearer lines of authority and greater governmental accountability. Those are crucial goals fully worthy of support, and merger can be a useful tool to promote them.

Another honorable objection is that it would be hard to make a smooth transition to a full-blown merger in terms of administrative and logistical changes. No one is urging an abrupt consolidation of departments, however.

Instead, the idea is to agree on city-county merger as an overall goal and develop the practical mechanisms to achieve it, allowing ample time and consideration for a successful transition. It's not as if city-county merger is an unprecedented enterprise.

In the less-than-honorable category are various efforts at bureaucratic turf protection, as well as the lame excuse that "we've always done it this way." Yes, complete merger would indeed mean the end of some departmental fiefdoms. But effective, responsive government should be guided not by the dictates of bureaucratic preservation but by what's best for taxpayers.

At a minimum, state senators from Omaha and Douglas County need to revisit the enabling legislation for city-county merger. The Legislature would do well to clear up the statutory confusion, for example, about how merger would affect state highway funds and rural fire departments.

The current statute also goes too far in granting veto power to numbers of residents, since merger can occur only if approved by the majorities not just in the city and the county but also in SIDs and small owns. As staff writer C. David Kook noted in a World-Herald article, "in Douglas County, that's about 10,000 people who could dictate how nearly 500,000 people are governed."

Omaha and Douglas County have made sound decisions thus far in merging individual programs. Much more can be done, to the benefit of taxpayers. The City Council and County Board should maintain the momentum for this worthwhile endeavor.

Neighbors' views help shape park

6-27-03

By C. David Kotok
WORLD-HERALD STAFF WRITER

Samuel and Beverly Frazier left a parks meeting Thursday amazed that City Hall does listen and wasn't just sticking them with a cookie-cutter park.

"We didn't want a shelter that would just be a gathering place," Beverly Frazier said. "There are enough basketball courts at other parks."

For the small two-lot park near 32nd and Franklin Streets, the city promised to create a space for small children.

Mayor Mike Fahey and Parks Director Larry Foster met with northeast Omaha residents at the Boys and Girls Club at 26th and Hamilton Streets. On Monday, city officials will host another meeting at the Westside Community Conference Center at 3524 S. 108th St. for neighbors of Harvey Oaks Park and Center Park.

"At the end of the day," Foster said, "these decisions will be made by the people who show up."

The effort to individually shape the renovation of each park is somewhat unprecedented, Foster said. "If we get people's input, it's a lot easier," he said.

The Fraziers applauded the approach. They envision their grandchildren and great-grandchildren playing in the small park near their home.

Serving toddlers and young children is the real need in the area, said another neighbor, Ruthie Harpster, who lives near 31st and Decatur Streets.

Fahey opened the meeting by reminding those attending, including City Councilman Frank Brown, that he campaigned on continuing the effort to rebuild downtown while renewing the commitment to neighborhoods and their parks.

('All the parks can't be the same," Fahey said.

X The mayor will formally dedicate Towl Park at 9310 W. Center Road today along with the city's partners from the Papio-Missouri Resources District and the Nebraska Department of Roads.

Plan would clear up water problems

A firm suggests forming a water district for Louisville, South Bend and Ashland.

BY TODD VON KAMPEN
WORLD-HERALD STAFF WRITER

Brown water and aging septic systems along an 11-mile strip including Mahoney State Park could be cured under a plan that an engineering firm will propose tonight.

HDR Inc. will recommend a water district that would tap good, ample water found near South Bend tu improve sewer service and build water lines from Louisville to Ashland over the next decade.

Results of the firm's yearlong study, to be presented at 7 p.m. at the Louisville Senior Citizens Center, have been long-awaited by folks such as Randy Jensen.

Like his Louisville neighbors, Jensen must treat chronically brown water. And when a city well quit operating in 2000, he watched wind and heat wilt his prized lawn and garden.

"There was a time they didn't want anyone to water their lawn at all," said Jensen, who sits on his town's planning commission. "It really struck home with me."

Several local officials said HDR's findings could fuel growth in Louisville and South Bend, and spur more development at Interstate 80's Mahoney Park exit near Ashland.

The study's $400,000 cost was split by the Lower Platte South Natural Resources District and the Army Corps of Engineers. U.S. Rep. Doug Bereuter, R-Neb., helped secure the federal half.

Local officials say the Mahoney corridor's groundwater can be scarce, discolored, smelly and bad tasting. A notion to pipe in treated water from the former Nebraska Ordnance Plant at Mead was dismissed in 1999.

HDR Project Manager Randy Stahmer said Ashland, South Bend, Louisville, Cass County and the NRD will be asked to form the water district.

Mahoney Park corridor water study

What Public meeting on findings

When: 7 p.m. today

Where: Louisville Senior Citizens Center, 423 Elm St.

It first would build water lines to South Bend and Louisville, likely by 2005. Later projects would install sewers in the area, extend water to I-80 and finally run water to Ashland.

Study leaders first looked at tapping Ashland's well field, which is separate from Lincoln's water plant in that city. But South Bend's water source is more centrally located, Stahmer said.

Ashland remains interested in the project as a backup water supply, Mayor Ronna Wiig said. But she agreed that Louisville, a city of 1,046 under orders to improve its water quality, should get water first along with South Bend's 900 or so residents.

Louisville City Supervisor Dan Henry said his town's water, already plagued with nitrates, sulfates and minerals, began to be treated this spring against copper leaching from pipes.

After the failure of one of the city's two wells, state officials licensed a new well in 2001 on condition that Louisville show progress toward a long-term water solution by mid-2003, he said.

Louisville needs more water as it becomes more popular as a bedroom community for Omaha. A proposed Nebraska Highway 66 bypass is expected to boost commercial growth.

South Bend also is likely to attract more homes, said Jack Huntington, chairman of the village's planning commission. The sewer project, he said, would help protect the area's water.

Cass County leaders have contacted several businesses about locating at the Mahoney Park exit, said Lowell Daisley, executive director of the Cass County Economic Development Council.

2nd DRAFT – 7-10-03

FACT SHEET – METRO AREA TRAILS MARKING PROJECT

In conjunction with Rotary International's 100th Anniversary in 2005, every Rotary Club in the world has been charged with developing a Rotary Centennial Community Project. The project must meet and provide a solution to a clearly identifiable community need, must involve personal activity of Rotarians and not simply a financial contribution to a cause, must include a permanent sign or inscription identifying the project as a Rotary Centennial project, and must be completed by February 2005.

After studying potential community projects, the Metro Omaha Area Rotary Clubs have selected as their joint Rotary Centennial Project the marking of established walking and bicycle riding trails in Douglas and Sarpy Counties. The cost is estimated at $300,000.

WHAT: An in-ground marking system tied into the 911 emergency system via Global Positioning System coordinates and covering 125 miles of established walking and bicycling trails in Douglas and Sarpy counties. Weatherproof, maintenance-free color coordinated markers, embedded in the trails every 1/10 of a mile, will identify the trail name and the marker's specific location on that trail to facilitate accurate and timely emergency response. The location of all structures, bollards, gates, bridges and emergency access points will be identified for emergency responders by GPS coordinates.

WHY: **Primary:** To assure timely response on the trails by providing emergency services with the accurate location of an emergency situation. There have been several instances of very serious consequences on the trail because callers were not able to accurately identify their location.
Secondary: To assist trail users in identifying the trail they are using, the distance they have traveled and locations for meeting friends.

HOW: Engineers will be hired to design and supervise construction of the project, including the development of the mapping and marking system using satellite technology, physically marking the location for placement of each marker on the trail and hiring a contractor to embed the markers.

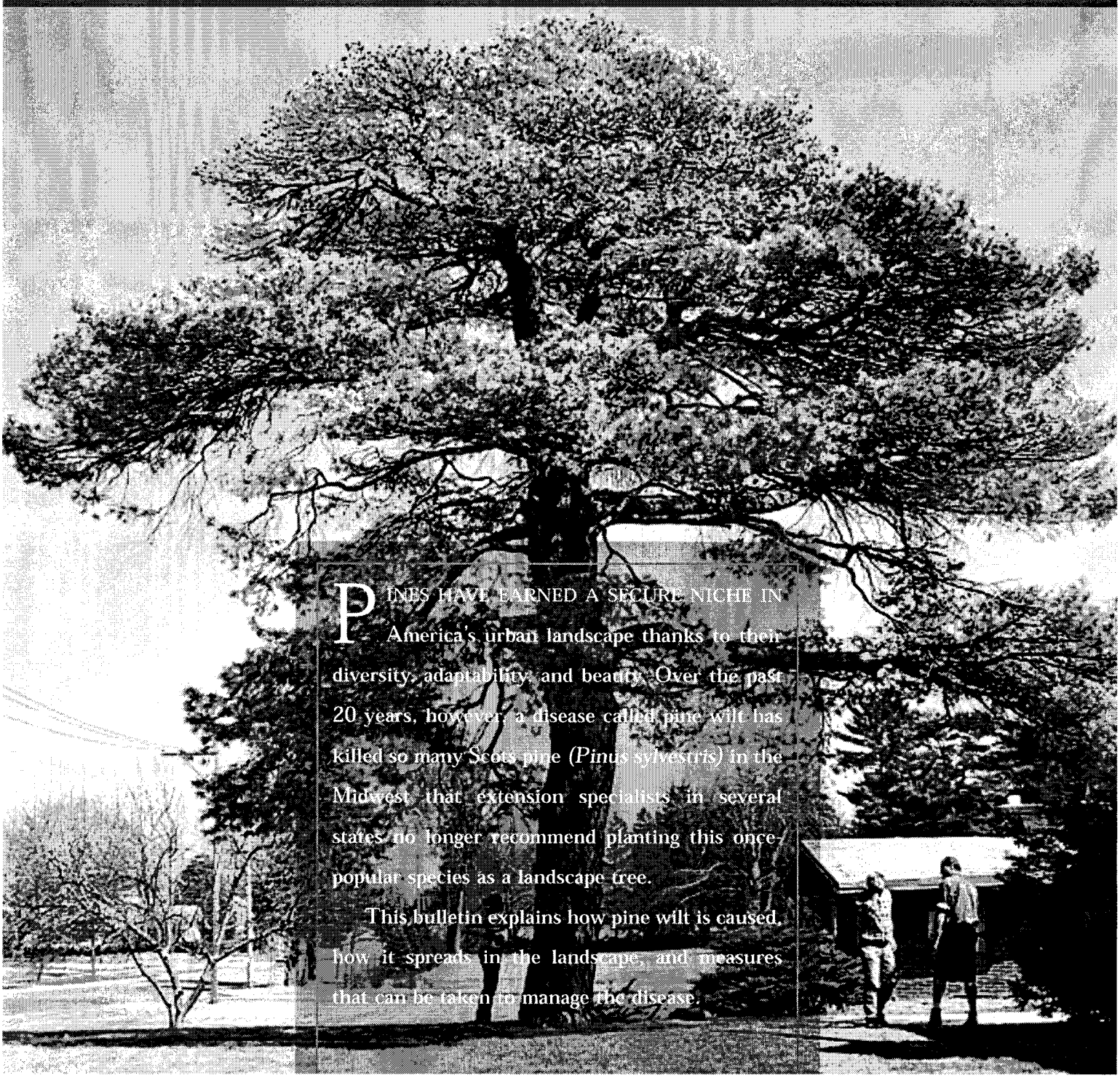
WHO: Ten Metro Omaha Rotary Clubs, working with the Papio/Missouri Valley Natural Resources District, 911 system (covers Douglas, Sarpy & Washington Counties), Omaha Fire Department, Omaha Parks Department, Douglas County Environmental Services and area running, walking, bicycling clubs.

WHEN: Preliminary work, including GPS mapping and marker design, has begun. The project will be completed by February 2005.

Sustainable Urban Landscapes

PINE WILT

A fatal disease of exotic pines in the Midwest



PINES HAVE EARNED A SECURE NICHE IN America's urban landscape thanks to their diversity, adaptability and beauty. Over the past 20 years, however, a disease called pine wilt has killed so many Scots pine (*Pinus sylvestris*) in the Midwest that extension specialists in several states no longer recommend planting this once-popular species as a landscape tree.

This bulletin explains how pine wilt is caused, how it spreads in the landscape, and measures that can be taken to manage the disease.

FIGURE 1
Scots pine, 10 to 12 years old, dying from pine wilt. The diseased tree at right shows more advanced needle browning than the diseased tree at left, whose needles are still primarily green but faded in color.

Symptoms and impact

Pine wilt typically kills Scots pine within a few weeks to a few months (Figures 1–3). The needles initially turn grayish green, then tan-colored to brown (Figure 1). Resin flow from the wood also ceases as the tree declines. Needles remain on the dead tree for a year or more. Scattered branches on a tree may be affected initially (Figure 2), but the problem soon spreads to the remaining branches (Figure 3). In other situations, however, the entire tree turns brown all at once.

Other pine species are occasionally killed by pine wilt, and display a similar pattern of symptoms. The disease appears occasionally in Austrian *(Pinus nigra)*, jack *(P. banksiana)*, mugo *(P. mugo)*, and red *(P. resinosa)* pines, and rarely in white pine *(P. strobus)*. In the Midwest, however, more than 90 percent of the trees killed by pine wilt have been Scots pine. Native pine species are usually not susceptible to pine wilt.

Tree age influences the risk of pine wilt. Almost all cases of the disease have appeared in trees more than 10 years old. Pine wilt has not had a major impact on Christmas tree plantations of Scots pine. However, pine wilt has appeared in Scots pine plantations in which trees older than 10 years have not been harvested, and in abandoned Scots pine plantations. Nevertheless, the primary impact of pine wilt is on Scots pine in landscape plantings and windbreaks.

The center of the pine wilt problem in the United States is in the Midwest. Iowa, Illinois, Missouri, Kentucky, eastern Kansas, and southeastern Nebraska have experienced heavy losses of Scots

FIGURE 2
Scots pine with partial dieback due to pine wilt.

In the Midwest, more than 90 percent of the trees killed by pine wilt have been Scots pine.

FIGURE 3
A Scots pine killed by pine wilt.

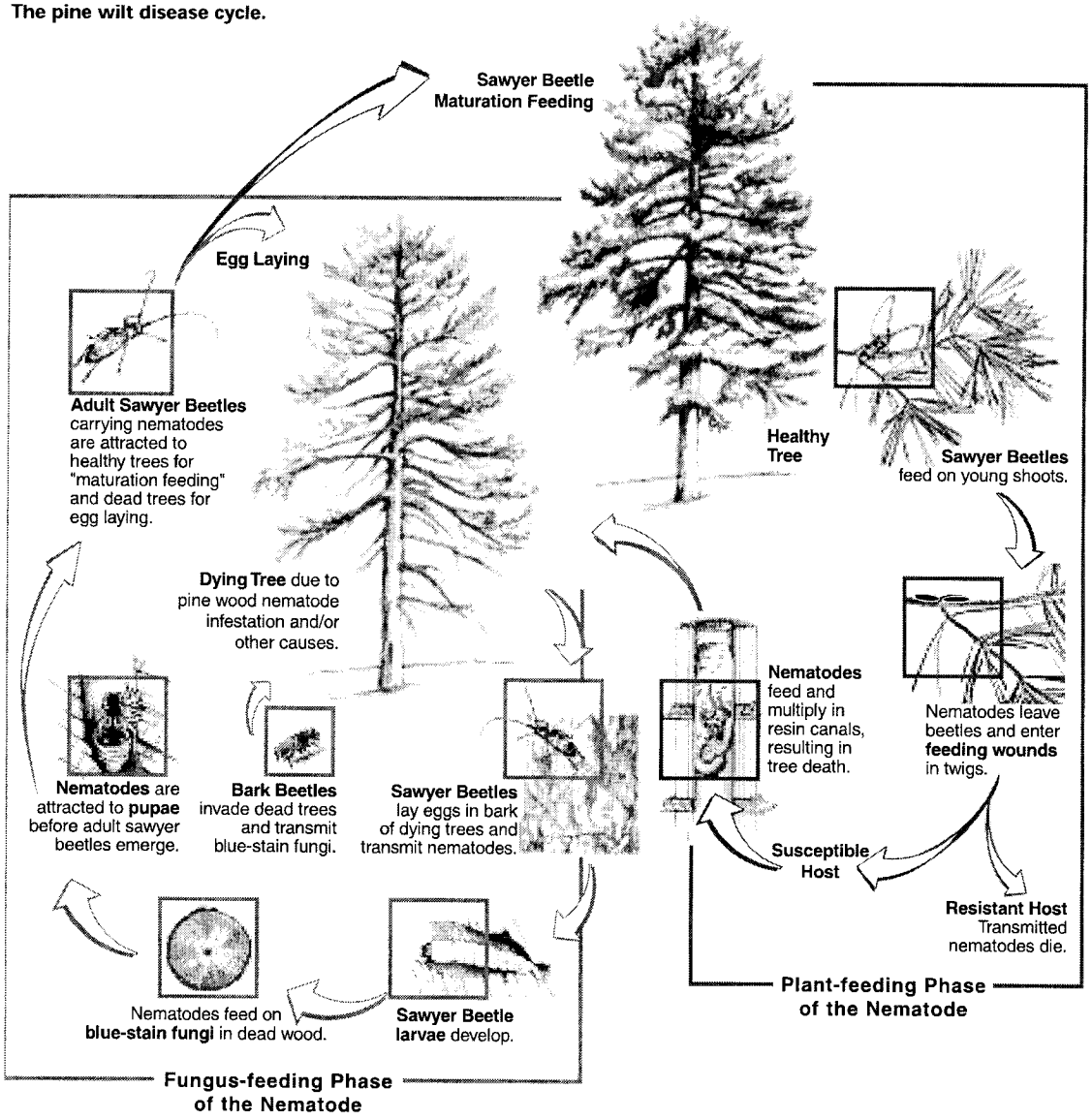
pine. However, neighboring states such as Indiana, Ohio, and Minnesota have reported relatively few cases of pine wilt.

The greatest losses to pine wilt have occurred in Japan. During the 20th century, the disease spread through highly susceptible Japanese black *(P. thunbergiana)* and Japanese red *(P. densiflora)* pine forests with devastating impact. Pine wilt has appeared in China within the past 20 years, and in Korea and Taiwan within the last decade.

How pine wilt attacks pines

Several organisms are involved in pine wilt (Figure 4). The pinewood nematode, *Bursaphelenchus xylophilus*, is probably native to the United States. These microscopic-sized (1 mm in length), worm-like animals (Figures 5 and 6) feed not only on blue-stain fungi (*Ceratocystis* spp.) (Figure 7) that live in the wood of dead and dying pines but also on the living plant cells surrounding the resin canals, or water-conducting passages, of pines.

FIGURE 4
The pine wilt disease cycle.



Interaction of the pine wood nematode with sawyer beetles to cause pine wilt.
Redrawn with permission from Wingfield, ed. (1987) *Pathogenicity of the Pine Wood Nematode*, APS Press, St. Paul, MN.

The pinewood nematode, *Bursaphelenchus xylophilus*, is probably native to the United States.

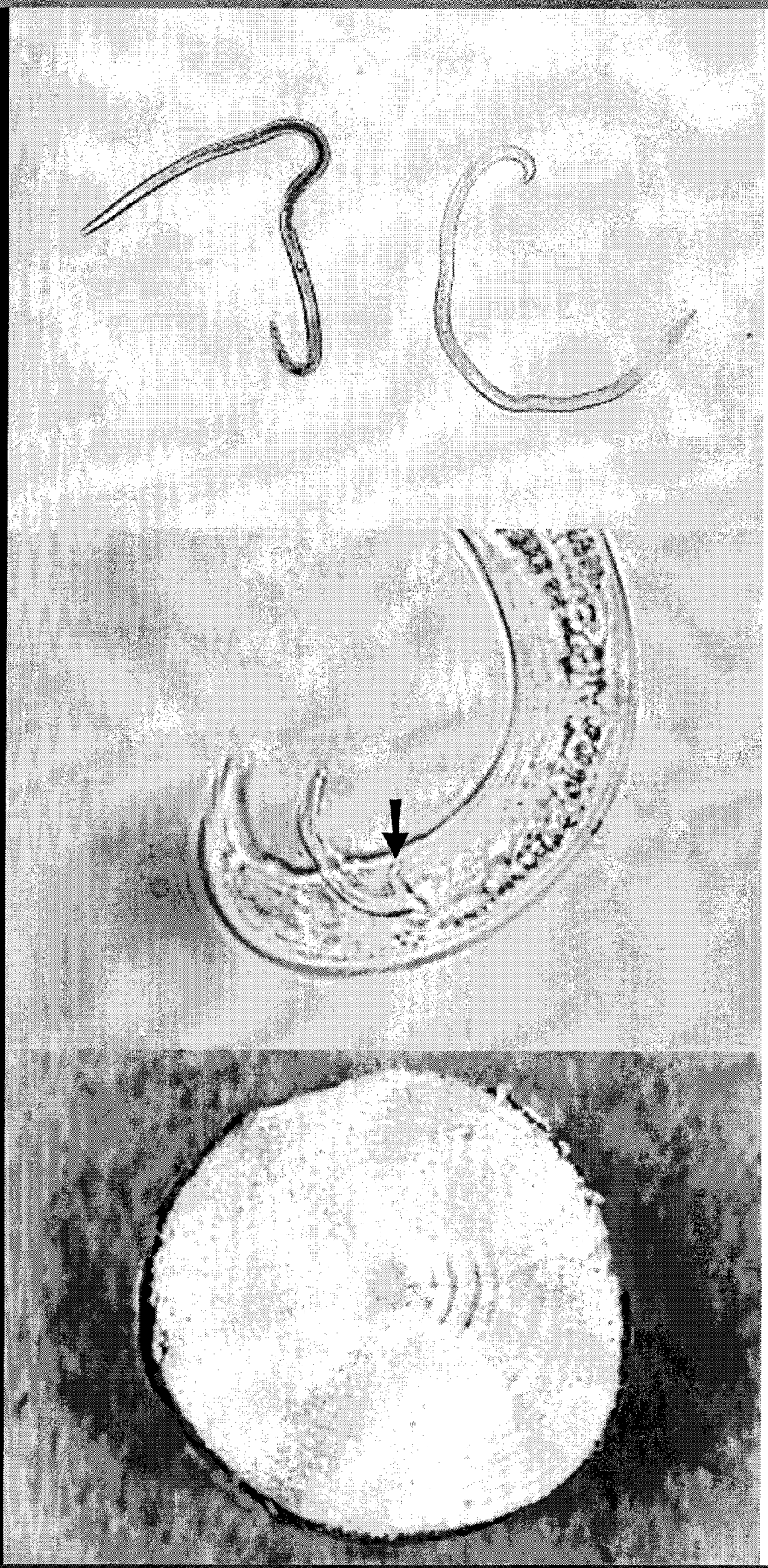


FIGURE 5
Microscopic view of the pinewood nematode.

FIGURE 6
A distinguishing feature of the pinewood nematode is a stirrup-shaped structure called a spicule (see arrow) at the posterior end of the adult male nematode.

FIGURE 7
Sectors of cobalt-blue discoloration in a Scots pine log, caused by blue-stain fungi.

Nematodes are unable to move very far without help from an insect vector. The life cycle of the pine sawyer beetle (*Monochamus* spp.) (Figure 8), also known as the longhorned beetle because of its very long antennae, is closely intertwined with the life cycle of the pinewood nematode. Female pine sawyer beetles lay their eggs under the bark of dead or dying pines, usually during the summer. The grubs hatch and feed under the bark, then tunnel deep into the wood. The grubs form pupae, and then adult beetles, ¾ to 1 ½ inches in length, which emerge from the tree any time from late spring to early fall.

While the sawyer beetle develops within the tree, the nematode also matures. Just after the adult sawyer beetle breaks out of its pupal shell, large numbers of pinewood nematode larvae move into the tracheae (breathing tubes) of the new adult beetle (Figure 9). When the sawyer beetle tunnels to the surface of the bark and flies away (Figure 10), it carries up to tens of thousands of hitch-hiking nematodes.

Pine sawyer beetles are strong fliers and can travel several miles. To mature and breed, the beetles need to feed on twigs of healthy pine trees. This so-called maturation feeding (Figure 11) does little damage to the twigs, but the feeding wounds create points of entry for the pinewood nematode into the healthy tree. The nematodes leave the beetle, probably in response to chemical cues from the injured twig, then enter the twig through the feeding wounds.

If the nematodes enter a resistant pine species, the nematodes soon die. In susceptible pines, though, the nematodes move to the resin canals, then molt to adults, which begin feeding on the living cells lining the resin canals. During warm periods in the summer, pinewood nematodes spread throughout the tree and multiply very rapidly. As they destroy the resin canal cells, the tree's water-moving system becomes clogged and resin flow slows, then stops. At about this time, wilt symptoms develop and the tree dies.

Dying pines attract not only egg-laying pine sawyer beetles but also bark beetles. Bark beetles are not directly involved in the pine wilt disease cycle, but their activities are indirectly related to nutrition of the nematodes. When the bark beetles bore into dying pines, blue-stain fungi living in the beetles also enter. The blue-stain fungi rapidly colonize the wood of the dying tree, leaving behind a characteristic cobalt-blue discoloration (Figure 7). Pinewood nematodes thrive on a diet of blue-stain fungi, so their numbers multiply even faster.

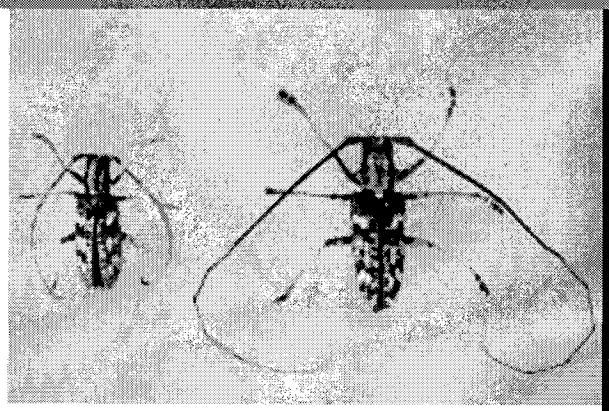


FIGURE 8
Female (left) and male (right) pine sawyer beetle, *Monochamus carolinensis*.

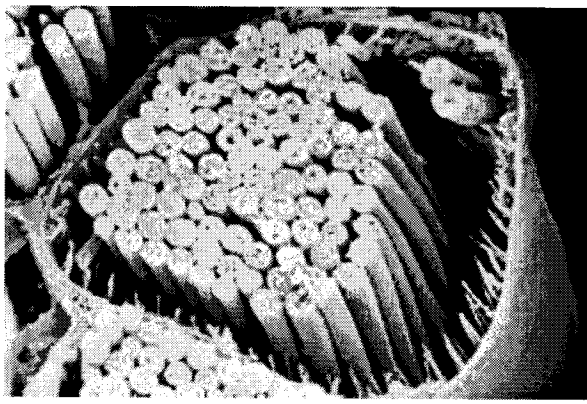


FIGURE 9
Cross-section of trachea (breathing tube) in the thorax of a pine sawyer beetle. The spaghetti-like strands are pinewood nematodes.

FIGURE 10
An adult pine sawyer beetle emerging from a dead pine.

The life cycle of the pine sawyer beetle (*Monochamus* spp.), also known as the longhorned beetle because of its very long antennae, is closely intertwined with the life cycle of the pinewood nematode.

FIGURE 11
Maturation feeding of a pine sawyer beetle on the twig of a healthy pine.

How to sample for pinewood nematode

When a pine dies suddenly, pine wilt is a leading suspect. To confirm the presence of pinewood nematode in a dying or dead pine, it's necessary to extract the nematode from the wood. A wood sample should be taken from the lower trunk or the base of lower limbs. A disk of wood, 1 inch in thickness and 3 to 4 inches across, makes an adequate sample. Alternatively, wood chips (be careful to exclude bark chips) can be collected using a brace and bit. After wood from the suspect tree is submerged in water, the nematodes leave the wood chips and can be examined under a compound microscope. A trained nematologist or diagnostician can identify the pinewood nematode by the distinctively shaped spicules in the posterior end of the male nematode (Figure 6), as well as by other morphological characteristics. Careful microscopic examination is needed to avoid confusing the pinewood nematode with the many harmless species of nematodes that also live in trees. Nematode extraction is usually done in a diagnostic laboratory at a university or private clinic. In Iowa, contact the Plant Disease Clinic, 351 Bessey Hall, Iowa State University, Ames, IA 50011; in Missouri, contact the Plant Diagnostic Laboratory, 42 Agriculture Building, University of Missouri, Columbia, MO 65211; in Kansas, contact the Plant Disease Clinic, Throckmorton Plant Science Complex, Kansas State University, Manhattan, KS 66506; and in Nebraska, contact the Plant & Pest Diagnostic Clinic, 448 Plant Sciences, University of Nebraska, Lincoln, NE 68583-0722.

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Pine wilt in context

Why is pine wilt so severe in parts of the Midwest, yet rare elsewhere in the United States? The Midwest is prone to periods of drought that place pines under stress. High summer temperatures allow explosive reproduction by the pinewood nematode and add to tree stress. Because native pines were scarce in prairie-dominated areas of the Midwest, landscaping has relied heavily on nematode-susceptible, exotic species such as Scots pine. Although no one knew it at the time, planting a susceptible species such as Scots pine into a hot, stress-prone environment turned out to be a recipe for trouble.

Pines sometimes die rapidly even when tests fail to reveal pinewood nematode. Environmental stress—drought and extreme heat are often blamed—coupled with injury by bark beetles also can kill a pine, especially Scots pine. Pines that die for reasons unrelated to nematodes often are colonized by nematodes that enter the tree through oviposition wounds made by sawyer beetles. The nematode is probably only one part of a complex of factors that can attack exotic pines in stressful environments.

It is important to autopsy sick pines for pinewood nematode because its presence poses a clear threat: sawyer beetles can carry it to nearby pines, and susceptible species can succumb. Beetle-induced spread from a single pine can develop into an epidemic that destroys entire windbreaks or groves of Scots pine within a few years.

Cover **PHOTO**
Mature Scots pine suffering from pine wilt.

Management

Despite intensive research, no highly effective management tactics have emerged against pine wilt. Insecticides and nematicides have so far proved to be impractical or ineffective. The "best management practices" today are largely unchanged from 20 years ago, but they can prevent or slow the spread of the disease if followed proactively.

The starting point is containment of the disease through sanitation. Dead pines can become beetle reservoirs, so they should be cut promptly and burned, buried, or chipped. If you spot dead trees in the late fall, you can wait until early spring to remove them because the beetles will not emerge until the weather warms in the spring. Avoid saving wilt-killed pines as firewood because beetles can continue to emerge from the logs.

Is there a risk of spreading pine wilt in infested wood chips? Yes, but it is minimal. Research in Vermont showed that it is possible to transmit the nematode from fresh chips to a young Scots or white pine seedling, but only if the chips are placed in direct contact with wounds on the sapling. Using a few simple precautions, you can safely mulch susceptible pines with chips from pine wilt-killed trees. First, pile the chips for at least 6 weeks; the heating and drying will kill both nematodes and beetles. Second, avoid piling chips against tree trunks when you mulch, and don't mix the chips with soil when planting new trees.

If you are recommending landscape trees, or considering what to plant on your own property, Scots pine should be avoided in Iowa, Missouri, Illinois, eastern Kansas, southeastern Nebraska, and other parts of the Midwest where pine wilt is a major threat. The same goes for Austrian pine, but primarily because it is extremely susceptible to two fungal diseases, Sphaeropsis tip blight (formerly known as Diplodia tip blight) and Dothistroma needle blight. Spruces, firs, hemlocks, white pine, northern white cedar (arborvitae), eastern red cedar, and other junipers face little threat from pine wilt.

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Sustainable Urban Landscapes

PINE WILT

A fatal disease of exotic pines in the Midwest

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