SPRINGS IN ILLINOIS

A REPORT TO THE ILLINOIS NATURE PRESERVES COMMISSION

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Unnamed Spring #90 [Saline Spring].

Location: Gallatin County: 2.86 mi (4.6 km) SE Equality, Shawnee National Forest, Third Principal Meridian, Township 9S, Range 8E, Section 27, SW/4, SW/4, NE/4, SE/4. U.T.M. Zone 16, $^{3}85^{060}$ m^{E} $^{41}73^{865}$ m^{N}. Equality, IL., 7.5'l, 1959 edition, photorevised 1990.

Elevation: 370' (MSL).

Hydrogeology: This saline spring is located within the Shawnee National Forest Boundary west of Saline Springs National Register Site near the Saline River. Water from the spring flows at two prominent locations from the base of a semi-circular stone structure 4 feet high and 6 feet wide, 200 feet to the juncture of an intermittent stream. The juncture is at a stone arch bridge beneath a gravel road paralleling the Saline River with the Shawneetown Fault a major fault system in southeastern Illinois. Water from the two spring openings inside the semi-circular stone structure appear to discharge from a collective group of joint and bedding plane openings probably in the Golconda Limestone of Mississippian age.

Extending away from the semicircular stone structure is a rock flow consisting of blocks of sandstone and limestone two inches in diameter, about three feet wide, and six to eight inches high. The gradient in the spring area to a large cypress tree about 90 feet from the head is 3.4 feet and from the cypress tree to the spring discharge measuring point near the confluence with the intermittent stream is 0.6 feet. Overall, the gradient to the measuring point is 4.0 feet or about 2.5 feet per 10 feet.

Physical and chemical measurements given in Appendix I

Fauna: Spring Head: Mollusca: Pelecypoda: Sphaeriidae: *Pisidium* sp. (uncommon). Insecta: Diptera: Dixidae: *Dixa* sp. (uncommon), Stratiomyidae: *Odontomyia* sp. (rare), Tipulidae: *Antocha* sp. (rare), *Tipula* sp. (uncommon); Heteroptera: Mesoveliidae: *Mesovelia mulsanti* (common); Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common), *G. pseudolimnaeus* (common); Isopoda: Asellidae: *Caecidotea brevicauda* (common); Decapoda: Cambaridae: *Cambarus diogenes* (rare); Ostrocoda: *Candona* nr. *albicans* (rare). Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (common).

Spring Outflow: Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common), *G. pseudolimnaeus* (common); Isopoda: Asellidae: *Caecidotea brevicauda* (uncommon); Ostrocoda: *Ilyocypris bradyi* (rare, typical of permanent springs). .

Flora: inventory conducted by Dr. L. R. Phillippe, Center for Biodiversity, INHS. This saline Spring is the source of a stream that begins from the base of a wooded slope. The water immediately fans out over shallow fragmented rocks and then quickly forms a narrow channel through the woods. The dominant trees associated with this saline spring are *Celtis laevigata* Willd. (sugarberry), *Fraxinus pennsylvanica* Marsh (green ash) and *Ulmus rubra* Muhl. (slippery elm). *Morus rubra* L. (red mulberry) is the dominant shrub and *Leersia virginica* Willd. (white grass), *Aster lateriflorus* (L.) Britt. (side-flowered aster), and *Boehmeria cylindrica* (L.) Sw. (false nettle) are the dominant herbs. *Parthenocissus quinquefolia* (L.) Planch (Virginia creeper) is the dominant vine.

Other trees associated with this saline spring are *Diospyros virginiana* L. (common persimmon), *Liquidambar styraciflua* L. (sweet gum), *Quercus rubra* L. (red oak), and *Taxodium distichum* (L.) Rich (bald cypress).

Other shrubs associated with this saline spring are *Cephalanthus occidentalis* L. (buttonbush), *Cercis canadensis* L. (redbud), *Hydrangea arborescens* L. (wild hydrangea), *Ilex decidua* Walt. (swamp holly), *Lindera benzoin* (L.) Blume (spicebush), *Rubus* sp. (blackberry), and *Symphoricarpos orbiculatus* Moench. (coralberry).

Other herbs associated with this saline spring are *Acalypha rhomboidea* Raf. (three-seeded mercury), *Bidens vulgata* Greene (tall beggar-ticks), *Carex lacustris* Willd. (sedge), *Carex muskingumensis* Schwein (sedge), *Cassia marilandica* L. (Maryland senna), *Chasmanthium latifolium* (Michx.) Yates (sea oats), *Cryptotaenia canadensis* (L.) DC. (honewort), *Desmodium paniculatum* (L.) DC. (panicled tick trefoil), *Elymus virginicus* L. (Virginia wild rye), *Eupatorium coelestinum* L. (mistflower), *Geum canadense* Jacq. (white avens), *Nasturtium officinale* R. Br. (water cress), *Pilea pumila* (L.) Gray (clearweed), *Poinsetta dentata* (Michx.) Kl. & Garcke. (wild

poinsetta), *Polygonum punctatum* Ell. (smartweed), *Ruellia strepens* L. (smooth ruellia), *Samolus valerandii* L. (brookweed), *Scutellaria incana* Biehler (downy skullcap), *Senecio glabellus* Poir. (butterweed), *Spigelia marilandica* L. (Indian pink), and *Viola* sp. (violet).

Other vines associated with this saline spring are *Campsis radicans* (L.) Seem. (trumpet creeper), *Cocculus carolinus* (L.) DC. (snailseed), *Dioscorea* sp. (wild yam), *Lonicera japonica* Thunb. (Japanese honeysuckle), *Toxicodendron radicans* (L.) Kuntze (poison ivy), and *Vitis* sp. (grape).

This is a basic water spring with a modest flow and a high salinity level for Illinois streams. The spring head is dominated by two species of amphipods and one species of isopod. No fish or amphibians were collected from the spring. To-date, no distinctively unique organisms were collected at this spring.

APPENDIX 1.
Water quality parameters measured for the Springs of Illinois project: salt well spring, April 1991-April 1992.

	Water Body	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow		
	County	Gallatin	Gallatin	Gallatin	Gallatin	Gallatin	Gallatin	Gallatin		
	Location	SE Equality	SE Equality	SE Equality	SE Equality	SE Equality	SE Equality	SE Equality		
	Station #	11a	36a	48	dw 91-65	dw 91-71	dw 92-42	dw 92-93		
	Sample Date	15 Apr 1991	10 Jun 1991	12 Aug 1991	07 Oct 1991	05 Dec 1991	10 Feb 1992	06 Apr 1992		
PARAMETERS *	Standard**									
Field Measurements										
Air Temperature (° C)	-	17.0	23.0	25.7	11	11	2	9.6 ??		
Water Temperature (° C)	-	12.5	14.0	13.5	13.0	13	11	12.0		
Dissolved Oxygen	never < 5.0	2.5	8.6	8.3	8.6	10.8	9.8	9.6		
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.46	7.5	7.3	7.8	7.5	8.0	6.9		
Alkalinity, as CaCO3	-	116	308.	292	278	265	300	270.		
Field Conductivity (µmhos/cm)		297	1600	2290	2160	920	2150	950		
Specific Conductivity (µmhos/cm)	-	386	2010	2908	2778	1183	2898	1250		
(corrected to 25° C)										
Laboratory Measurements										
Total Carbon	-	35.9	151	122.4	159.3	169.2	179.8	174.3		
Total Inorganic Carbon	-	30.8	75.2	73.2	66.3	66.7	69.3	67.0		
Total Organic Carbon	-	5.1	75.8	49.1	93	102.6	110.6	107.3		
Dissolved Organic Carbon	-	3.9	75.5	33.5	92.7	102.5	107.4	99.2		
Particulate Organic Carbon [0.9]	-	1.2	0.3	15.6	0.3	0.1	3.2	8.1		
Total Fluoride [0.01]	1.4	<DL	1.33	1.79	1.87	0.65	1.3	<DL		
Sulfur as Sulfate	500.	20.97	87.08	118.4	113.	50.21	94.7	45.94		
Total Bromide [0.01]	-	0.07	3.93	5.19	8.84	3.22	4.1	0.60		
Ammonia Nitrogen [0.005]	1.5 **	0.27	<DL	<DL	0.14	0.06	0.06	0.05		
Nitrite Nitrogen [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Nitrate Nitrogen [0.005]	-	0.05	0.56	0.59	0.66	<DL	0.46	0.15		
Total Phosphorus	0.05**	<DL	<DL	0.03	<DL	0.084	0.05	0.09		
Orthophosphate P [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Hardness (EDTA)	*	122	464	488	528	331	477.0	340		
Chlorides	500.	56.46	706	1264	1010.	368.3	623.7	111.17		
Total Nitrogen	-	1.31	0.33	0.75	0.31	0.45	0.14	0.24		
Total Kjeldahl Nitrogen	-	1.26	<DL	0.16	<DL	0.45	<DL	0.09		
Total Solids	-	368	1680	2228	2156	924	1928	888		
Total Dissolved Solids	1000.	285	1453	2101	2008.	859	2088	907		
Turbidity (JTU)	-	7	7	18	3	9	43	5		
Total Aluminum [0.045]	-	0.218	<DL	<DL	<DL	<DL	<DL	<DL		
Total Arsenic [0.030]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Boron [0.005]	1.0	<DL	<DL	0.045	<DL	<DL	<DL	<DL		

(Appendix 1 concluded on following page)

APPENDIX 1 (concluded).

	Water Body	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow	salt well spring at outflow		
	County	Gallatin	Gallatin	Gallatin	Gallatin	Gallatin	Gallatin	Gallatin		
	Location	SE Equality	SE Equality	SE Equality	SE Equality	SE Equality	SE Equality	SE Equality		
	Station #	11a	36a	48	dw 91-65	dw 91-71	dw 92-42	dw 92-93		
	Sample Date	15 Apr 1991	10 Jun 1991	12 Aug 1991	07 Oct 1991	05 Dec 1991	10 Feb 1992	06 Apr 1992		
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.03	0.03	0.032	0.033	0.032	0.040	0.032		
Total Beryllium [0.001]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Calcium [0.004]	-	37	137	143	155	116	140.0	107.0		
Total Cadmium [0.002]	0.05	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Cobalt [0.002]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Chromium [0.007]	**	0.014	<DL	<DL	<DL	<DL	<DL	<DL		
Total Copper [0.004]	0.02	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Iron [0.025]	1.0	0.078	<DL	0.162	<DL	<DL	0.086	<DL		
Total Potassium [0.629]	-	1.56	1.85	3.64	4.11	1.94	4.09	<DL		
Total Magnesium [0.003]	-	6.74	29.7	31.8	34.3	18.4	30.80	17.60		
Total Manganese [0.009]	1.0	0.038	<DL	0.039	<DL	<DL	0.041	<DL		
Total Molybdenum [0.006]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Sodium [1.34]	-	37.8	358.0	498.0	560.0	194.0	476.0	156.0		
Total Nickel [0.008]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Lead [0.015]	0.1	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Antimony [0.013]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Selenium [0.031]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Silicon [0.011]	-	9.7	11.4	6.51	7.05	7.79	6.19	8.57		
Total Tin [0.033]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Vanadium [0.007]	-	<DL	0.01	<DL	<DL	<DL	<DL	<DL		
Total Zinc [0.007]	1.0	0.017	0.012	<DL	<DL	0.016	<DL	<DL		
Total Mercury [0.00005]	0.0005	0.000414	0.000065	<DL	<DL	<DL	<DL	<DL		

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

Kaskaskia Spring.

Location: Hardin County: 2.5 mi (4.05 km) SSE Karbers Ridge. Third Principal Meridian, Township 11S, Range 8E, Section 21, NW/4, NE/4, SW/4, SE/4, 1150' N, 1900' W of SE corner. U.T.M. Zone 16, $^{3}82^{830}$ m^{E} $^{4}155^{840}$ m^{N}. Quandrangle: Karbers Ridge, Ill.. 7.5', 1959 edition, photorevised 1979.

Hydrogeology: Kaskaskia Spring and waterway are located in the Shawnee National Forest near the Kaskaskia Experimental Forest. Spring water flows rapidly from three prominent locations at the base of a 30-foot limestone bluff near floodplain elevation into Big Creek 70 feet away. The discharge points appear to emerge along a common bedding plane in the St. Louis Limestone of Mississippian Age. A series of fracture alignments with directions of N 20° E are present in the bluff above the spring. Fifteen feet from the spring opening water cascades 0.8 feet through limestone rubble measuring 5-6 feet in length and 10 feet wide. The blocks of the limestone rubble measure 0.5-1.0 feet along the long axis. Beyond the rubble zone is a side channel reservoir excavated in Cahokia Alluvium sand and gravel of Recent Age. The spring water way forms a pool beyond this point downcutting sand and gravel before crossing a little used road and merging with the intermittent stream. The gradient from the spring head to the intersection with the intermittent creek is 1.8 feet or about 0.25 feet per 10 feet of distance.

Physical and chemical measurements given in Appendix 6.

Elevation: 410' (MSL).

Fauna: Black snails and minnows (Meents 1975).

Fauna: Spring Head: Mollusca: Pelecypoda: Sphaeriidae: *Pisidium* sp. (uncommon). Insecta: Megaloptera: Sialidae, *Sialis* sp. (rare); Diptera: Tipulidae: *Tipula* sp. (uncommon). Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common) Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (common).

Flora: At least two varieties of moss, grass (Meents 1975).

Flora: inventory conducted by Dr. L. R. Phillippe, Center for Biodiversity, INHS. Kaskaskia Springs is located at the base of a small wooded limestone hill. The stream formed from this sprin flows a short distance and then joins Big Creek. This site is dominated by *Platanus occidentalis* L. (sycamore) and *Acer saccharum* Marsh (sugar maple). The dominant shrub is *Rosa multiflora* Thumb. (multiflora rose) and the dominant herbs are *Leersia virginica* Willd. (white grass), *Sanicula gregaria* Bickn. (common snakeroot) and *Pilea fontana* (Lunell) Rydb. (clearweed). The dominant vine id *Lonicera japonica* Thunb. (Japanese honeysuckle). The abundance of multiflora rose and Japanese honeysuckle suggest that this site has been heavily disturbed.

Other trees associated with Kaskaskia Springs are *Acer negundo* L. (box elder), *Asimina triloba* (L.) Dunal (pawpaw), *Carpinus caroliniana* Walt. (blue beech), *Carya cordiformis* (Wang.) K. Koch (bitternut hickory), *Celtis laevigata* Willd. (sugarberry), *Celtis occidentalis* L. (hackberry), *Fraxinus pennsylvanica* Marsh (green ash), *Juniperus virginiana* L. (red cedar), *Gleditsia triacanthos* L. (honey locust), *Juglans nigra* L. (black walnut), *Prunus serotina* Ehrh. (wild black cherry), *Quercus muhlenbergia* Engelm. (Chinkapin oak), and *Ulmus rubra* Muhl. (slippery elm).

Other shrubs associated with Kaskaskia Springs are *Cornus stricta* Lam. (stiff dogwood), *Lindera benzoin* (L.) Blume (spicebush), *Sambucus canadensis* L. (elderberry), and *Symphoricarpos orbiculatus* Moench. (coralberry).

Other herbs associated with Kaskaskia Springs are *Agrimonia parviflora* Ait. (swamp agrimony), *Agrimonia rostellata* Wallr. (woodland agrimony), *Agrostis perennans* (Walt.) Tuckerm. (upland bent grass), *Asplenium platyneuron* (L.) Oakes (ebony spleenwort), *Aster lateriflorus* (L.) Britt. (side-flowered aster), *Boehmeria cylindrica* (L.) Sw. (false nettle), *Campanula americana* L. (American bellflower), *Carex* spp. (sedge), *Chasmanthium latifolium* (Michx.) Yates (sea oats), *Cinna arundinacea* L. (stout wood reed), *Conyza canadensis* (L.) Cronq. (horseweed), *Cryptotaenia canadensis* (L.) DC. (honewort), *Desmodium* sp. (tick trefoil), *Dichanthelium dichotomum* (L.) Gould (panic grass), *Elephantopus carolinianus* Raeusch (elephant's foot), *Elymus virginicus* L. (Virginia wild rye), *Eupatorium rugosum* Houtt. (white snakeroot), *Galium aparine* L. (goosegrass), *Galium triflorum* Michx. (sweet-scented bedstraw),

Geum canadense Jacq. (white avens), *Glyceria striata* (Lam.) Hitchcock (fowl manna grass), *Juncus tenuis* Willd. (path rush), *Lactuca floridana* (L.) Gaertn. (woodland lettuce), *Laportea canadensis* (L.) Wedd. (wood nettle), *Lobelia siphilitica* L. (blue cardinal-flower), *Mimulus alatus* Ait. (winged monkey-flower), *Passiflora lutea* L. (small passion-flower), *Phlox* sp. (phlox), *Phryma leptostachya* L. (lopseed), *Ranunculus* sp. (buttercup), *Ruellia strepens* L. (smooth ruellia), *Rumex* sp. (dock), *Plantago rugelii* Dcne (Rugel's plantain), *Polygonum cespitosum* Blum. (creeping smartweed), *Polystichum acrostichoides* (Michx.) Schott. (Christmas fern), *Sanicula canadensis* L. (Canadian black snakeroot), *Senecio aureus* L. (golden ragwort), *Solidago canadensis* L. (tall goldenrod), *Solidago gigantea* Ait. (late goldenrod), *Verbesina alternifolia* (L.) Britt. (yellow ironweed), and *Viola* sp. (violet).

References: Meents (1975).

Ownership: U.S. Forest Service.

This is basic water spring with moderate flow. The fauna is dominated by one species of amphipod and one species of flatworm. The remaining fauna was rather limited and to-date, no distinctively unique organisms were collected at this spring.

APPENDIX 6.

Water quality parameters measured for the Springs of Illinois project: Kaskaskia Spring, April-October 1991.

	Water Body	Kaskaskia Spring at outflow	Kaskaskia Spring at outflow
	County	Hardin	Hardin
	Location	S Karbers R	S Karbers R
	Station #	17	dw 91-70
	Sample Date	17 Apr 1991	07 Oct 1991
PARAMETERS *	Standard**		
Field Measurements			
Air Temperature (° C)	-	25.0	14
Water Temperature (° C)	-	15.0	16
Dissolved Oxygen	never < 5.0	3.8	2.4
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.2	7.5
Alkalinity, as CaCO3	-	191	192
Field Conductivity (µmhos/cm)		282	309
Specific Conductivity (µmhos/cm) (corrected to 25° C)	-	346	370
Laboratory Measurements			
Total Carbon	-	51.6	114.4
Total Inorganic Carbon	-	50.7	43.9
Total Organic Carbon	-	0.9	70.6
Dissolved Organic Carbon	-	0.7	69.1
Particulate Organic Carbon [0.9]	-	0.2	1.5
Total Fluoride [0.01]	1.4	<DL	0.25
Sulfur as Sulfate	500.	14.68	16.44
Total Bromide [0.01]	-	<DL	<DL
Ammonia Nitrogen [0.005]	1.5 **	0.12	<DL
Nitrite Nitrogen [0.005]	-	<DL	<DL
Nitrate Nitrogen [0.005]	-	0.11	<DL
Total Phosphorus	0.05**	<DL	<DL
Orthophosphate P [0.005]	-	<DL	<DL
Hardness (EDTA)	*	198	220
Chlorides	500.	5.62	8.91
Total Nitrogen	-	1.05	0.13
Total Kjeldahl Nitrogen	-	0.94	0.13
Total Solids	-	308	256
Total Dissolved Solids	1000.	256	273
Turbidity (JTU)	-	2	3
Total Aluminum [0.045]	-	<DL	<DL
Total Arsenic [0.030]	1.0	<DL	<DL
Total Boron [0.005]	1.0	<DL	<DL

(Appendix 6 concluded on following page)

APPENDIX 6 (concluded).

	Water Body	Kaskaskia Spring at outflow	Kaskaskia Spring at outflow							
	County	Hardin	Hardin							
	Location	S Karbers R	S Karbers R							
	Station #	17	dw 91-70							
	Sample Date	17 Apr 1991	07 Oct 1991							
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.027	0.026							
Total Beryllium [0.001]	-	<DL	<DL							
Total Calcium [0.004]	-	65	68.2							
Total Cadmium [0.002]	0.05	<DL	<DL							
Total Cobalt [0.002]	-	<DL	<DL							
Total Chromium [0.007]	**	<DL	<DL							
Total Copper [0.004]	0.02	<DL	<DL							
Total Iron [0.025]	1.0	<DL	<DL							
Total Potassium [0.629]	-	0.738	<DL							
Total Magnesium [0.003]	-	8.67	12.1							
Total Manganese [0.009]	1.0	<DL	<DL							
Total Molybdenum [0.006]	-	<DL	<DL							
Total Sodium [1.34]	-	5.9	8.61							
Total Nickel [0.008]	1.0	<DL	<DL							
Total Lead [0.015]	0.1	<DL	<DL							
Total Antimony [0.013]	-	<DL	<DL							
Total Selenium [0.031]	1.0	<DL	<DL							
Total Silicon [0.011]	-	5.7	4.63							
Total Tin [0.033]	-	<DL	<DL							
Total Vanadium [0.007]	-	<DL	<DL							
Total Zinc [0.007]	1.0	0.05	<DL							
Total Mercury [0.00005]	0.0005	0.000105	<DL							

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

Old Driver Spring.

Location: Hardin County: 3.63 miles (5.85 km) S Karbers Ridge. Third Principal Meridian, Township 11S, Range 8E, Section 28, NW/4, SE/4, SW/4, SW/4, 550' N, 1110' E of SW corner. U.T.M. Zone 16, $^{3}82^{005}$ mE $^{4}153^{940}$ mN. Quadrangle: Karbers Ridge, IL., 7.5', 1959 edition, photorevised 1976.

Elevation: 382' (MSL).

Hydrogeology: Old Driver Spring and waterway is on private property adjacent to the Shawnee National Forest. Water from this spring flows into Big Creek from a collective group of bedding plane openings and joints at two readily discernable locations within the Lower Salem or Upper Ullin Limestones of Mississippian age. The Salem and Ullin are light brown, coarsely crystalline, crinodial limestones at this location.

The primary spring discharge point is at the head of the spring, situated at floodplain level at the base of a bluff on the west side of the Big Creek floodplain. Discontinuous ledges of limestone 2-3 feet thick occur 20-30 feet above the spring head on a leaf-covered hill slope. The ledges intersect Cahokia Alluvium of Recent age and consist of 3-5 feet of clayey, sandy silt underlain by at least 3 feet of sand and gravel. A large circular opening constructed from 3-4 levels of cemented cobbles and boulders 2 feet high, 1 foot wide, and 10 feet in diameter encloses rising water from the spring head. The circular opening is filled with sand and gravel and contains 1 foot of water with several small boils. Water collected in the circular area discharges from a single rectangular clay tile into the main water course.

A second joint spring is present in a collapsed area 640 feet downstream from the primary opening. Water issues from several locations at the base of a large group of randomly orientated rectangular limestone blocks ranging from 6-24 inches in long direction and occupying an area 10-15 feet wide and 15 feet high. At this location, near vertical joints in the limestone bedrock appear oriented N 80° W and N 10° W.

The linear correlation coefficient between the water discharged at the spring head and in the waterway near the confluence of Big Creek is $r = 0.91210$. This indicates that the spring head discharge is directly related to the open discharge near Big Creek. One gallon of discharge at the spring head is equivalent to about 1.7 gallons downstream near Big Creek confluence. The stream gradient from the spring head to the secondary discharge point was 7.8 inches per 100 feet, and from the secondary spring discharge point to the confluence at Big Creek was 8.7 inches per 100 feet. The overall gradient for the outflow distance of 1040 feet is 8.3 inches per 100 feet.

Meents (1981) reported the water temperature at 59° F, discharge 100 gpm.

Physical and chemical measurements given for the spring head in Appendix 3 and for the spring outflow 920 feet downstream in Appendix 2.

Fauna: Spring Head: Fishes: *Forbesichthys agassizi* (spring cavefish, rare); *Lythrurus umbrutilis* (red fin shiner, rare); *Cottus carolinae* (banded sculpin, uncommon). Mollusca: Pelecypoda: Sphaeriidae: *Pisidium* sp. (common). Insecta: Diptera: Ceratopogonidae: *Bezzia* sp. (rare); Dixidae: *Dixa* sp. (uncommon); Tipulidae: *Tipula* sp. (rare). Heteroptera: Mesoveliidae: *Mesovelia mulsanti* (common), Notonectidae: *Buenoa* sp. (rare); Megaloptera: Sialidae: *Sialis* sp. (rare). Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common), *G. pseudolimnaeus* (common); Isopoda: Asellidae: *Caecidotea brevicauda* (uncommon); Decapoda: Cambaridae: *Cambarus tenebrosus* (rare); Ostrocoda: *Potamocypris granulosa* (common). Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (common).

Spring Outflow: Fishes: *Etheostoma squamiceps* (spottail darter, rare); *E. caerueum* (rainbow darter, uncommon); *Cottus carolinae* (banded sculpin, uncommon); *Semotilus atromaculatus* (creek chub, rare). Mollusca: Pelecypoda: Sphaeriidae: *Pisidium* sp. (common). Insecta: Diptera: Ceratopogonidae: *Bezzia* sp. (rare); Dixidae: *Dixa* sp. (common); Psychodidae: Psychodidae: *Psychoda* sp. (rare); Ptychopteridae: *Ptychoptera quadrifasciata* (rare). Tipulidae: *Antocha* sp. (rare), *Tipula* sp. (uncommon). Heteroptera: Gerridae: *Gerris remigis* (common). Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common), *G. pseudolimnaeus* (common); Isopoda: Asellidae: *Caecidotea brevicauda* (uncommon); Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (common).

Flora: Grass (Meents 1981).

Flora: inventory conducted by Dr. L. R. Phillippe, Center for Biodiversity, INHS. Old Driver Spring is bordered by a hayfield on the north and a wooded hillside to the south. The spring flows from the base of the hillside and then runs east along the base of the hill. Trees are represented primarily by overhanging branches of *Acer saccharum* Marsh (sugar maple) from the adjacent dry wooded hillside. The vegetation along the spring is dominated by forbs, *Mentha spicata* L. (spearmint) with locally abundant *Impatiens capensis* Meerb. (spotted tough-me-not), and *Leersia virginica* Willd. (white grass). About 50 meter south of the spring *Lindera benzoin* (L.) Blume (spicebush) is the dominant shrub and *Asimina triloba* (L.) Dunal (pawpaw) is the dominant understory tree. No vines were observed.

Other trees associated with Old Driver Spring are *Juglans nigra* L. (black walnut) and *Liriodendron tulipifera* L. (tulip tree).

Other shrubs observed nearby Old Driver Spring are *Cercis canadensis* L. (redbud) and *Rosa* sp. (rose).

Other herbs associated with Old Driver Spring are *Agrostis alba* L. (red top), *Ambrosia artemisiifolia* L. (common ragweed), *Ambrosia trifida* L. (giant ragweed), *Arctium minus* Bernh. (common burdock), *Aster lateriflorus* (L.) Britt. (side-flowered aster), *Bidens vulgata* Greene (tall beggar-ticks), *Boehmeria cylindrica* (L.) SW. (false nettle), *Campanula americana* L. (American bellflower), *Carex frankii* Kunth (sedge), *Conyza canadensis* (L.) Cronq. (horseweed), *Cyperus strigosus* L. (sedge), *Dichanthelium clandestinum* (L.) Gould (broad-leaved panic grass), *Elymus virginicus* L. (Virginia wild rye), *Epilobium coloratum* Biehler (cinnamon willow herb), *Erigeron annuus* (L.) Pers. (daisy fleabane), *Eupatorium rugosum* Houtt. (white snakeroot), *Festuca pratensis* Huds (meadow fescue), *Galium aparine* L. (goose grass), *Geum canadense* Jacq. (white avens), *Glyceria striata* (Lam.) Hitchcock (fowl manna grass), *Leersia oryzoides* (L.) Swartz. (rice cutgrass), *Lobelia siphilitica* L. (blue cardinal-flower), *Ludwigia alternifolia* L. (seedbox), *Ludwigia palustris* (L.) Ell. (marsh purslane), *Pilea fontana* (Lunell) Rydb. (clearweed), *Pilea pumila* (L.) Gray (clearweed), *Polygonum cespitosum* Blume (creeping smartweed), *Polygonum hydropiper* L. (smartweed), *Polygonum sagittatum* L. (tear thumb.), *Rumex obtusifolius* L. (bitter dock), *Scirpus atrovirens* Willd. (bulrush), *Scrophularia marilandica* L. (late figwort), *Sium suave* Walt. (water parsnip), *Solidago canadensis* L. (tall goldenrod), and*Verbena urticifolia* L. (white vervain),

Reference: Meents (1981),

Ownership: Waldo Rude, Rt. 2, Elizabethtown, IL. 62931.

Current Status: Spring head is used for livestock watering.

This is a basic water spring with a high volume of flow. The fauna and the spring head is dominated by chironomids, two species of amphipods, and one species of isopod. Several distinctive genera of chironomids were present in this spring head. Possibly five of these genera have never been collected in Illinois. Because of the uniqueness of the genera and species, the validity of the identification is being verified by Dr. Ole Saether, Zoologisk Museum, Bergen, Norway). Three species of fish were collected at the spring head, including the spring cavefish. This spring and its outflow stream to Big Creek is probably the most unique and outstanding of the six spring examined in this study.

APPENDIX 2.

Water quality parameters measured for the Springs of Illinois project: Old Driver Spring, downstream of outflow, April 1991-April 1992.

	Water Body	Old Driver	Old Driver	Old Driver	Old Driver	Old Driver	Old Driver	Old Driver		
		Spring	Spring	Spring	Spring	Spring	Spring	Spring		
		920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm		
		outflow	outflow	outflow	outflow	outflow	outflow	outflow		
	County	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin		
	Location	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R		
	Station #	13	37a	50	dw 91-66	dw 91-72	dw 92-44	dw 92-94		
	Sample Date	16 Apr 1991	10 Jun 1991	12 Aug 1991	07 Oct 1991	05 Dec 1991	10 Feb 1992	06 Apr 1992		
PARAMETERS *	Standard**									
Field Measurements										
Air Temperature (° C)	-	19.0	28.0	27.5	14	12	11	21.0		
Water Temperature (° C)	-	13.0	14.0	17	12	10	10.5	14.0		
Dissolved Oxygen	never < 5.0	9.4	7.4	8.8	9.5	10.5	11.0	9.3		
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.2	7.4	8.1	8.0	7.9	8.3	7.7		
Alkalinity, as CaCO3	-	53	155.	155	156	134	153	110.		
Field Conductivity (µmhos/cm)		92	F250(@21C)	220	210	175	200	172		
Specific Conductivity (µmhos/cm)	-	118	270	258	276	242	273	216		
(corrected to 25° C)										
Laboratory Measurements										
Total Carbon	-	10.7	65.9	51.6	88.3	74.9	84.8	61.2		
Total Inorganic Carbon	-	9.9	39.3	37.9	36.7	30.4	35.0	25.0		
Total Organic Carbon	-	0.8	26.6	13.7	51.6	44.5	49.8	36.2		
Dissolved Organic Carbon	-	<DL	26.4	14.7	51.6	44.5	50.0	35.8		
Particulate Organic Carbon [0.9]	-	0.8	0.2	<DL	0	0	<DL	0.4		
Total Fluoride [0.01]	1.4	<DL	0.05	0.04	<DL	<DL	<DL	<DL		
Sulfur as Sulfate	500.	10.56	5.58	5.31	5.38	3.95	4.3	8.51		
Total Bromide [0.01]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Ammonia Nitrogen [0.005]	1.5 **	0.03	0.01	<DL	0.01	0.04	0.05	<DL		
Nitrite Nitrogen [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Nitrate Nitrogen [0.005]	-	<DL	0.14	<DL	<DL	<DL	0.03	0.04		
Total Phosphorus	0.05**	<DL	<DL	0.05	<DL	0.133	0.07	0.24		
Orthophosphate P [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	0.22		
Hardness (EDTA)	*	56	126	124	134	138	137.0	106		
Chlorides	500.	1.10	13.13	2.29	1.88	1.4	1.3	2.13		
Total Nitrogen	-	0.97	0.3	0.16	0.1	0.21	0.09	0.22		
Total Kjeldahl Nitrogen	-	0.97	0.16	0.16	0.1	0.21	0.06	0.18		
Total Solids	-	204	196	212	192	172	200	180		
Total Dissolved Solids	1000.	92	201	193	206	181	204	163		
Turbidity (JTU)	-	10	3	5	4	8	8	6		
Total Aluminum [0.045]	-	0.073	<DL	<DL	<DL	<DL	<DL	<DL		
Total Arsenic [0.030]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Boron [0.005]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		

(Appendix 2 concluded on following page)

APPENDIX 2 (concluded).

	Water Body	Old Driver	Old Driver	Old Driver	Old Driver	Old Driver	Old Driver	Old Driver		
		Spring	Spring	Spring	Spring	Spring	Spring	Spring		
		920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm	920' dnstrm		
		outflow	outflow	outflow	outflow	outflow	outflow	outflow		
	County	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin		
	Location	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R		
	Station #	13	37a	50	dw 91-66	dw 91-72	dw 92-44	dw 92-94		
	Sample Date	16 Apr 1991	10 Jun 1991	12 Aug 1991	07 Oct 1991	05 Dec 1991	10 Feb 1992	06 Apr 1992		
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.027	0.016	0.026	0.029	0.029	0.026	0.028		
Total Beryllium [0.001]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Calcium [0.004]	-	18.8	43.8	43	46.3	40.8	48.2	36.7		
Total Cadmium [0.002]	0.05	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Cobalt [0.002]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Chromium [0.007]	**	0.014	<DL	<DL	<DL	<DL	<DL	<DL		
Total Copper [0.004]	0.02	<DL	<DL	0.013	<DL	<DL	<DL	<DL		
Total Iron [0.025]	1.0	0.04	<DL	0.048	<DL	<DL	<DL	<DL		
Total Potassium [0.629]	-	0.766	<DL	<DL	<DL	1.16	1.00	<DL		
Total Magnesium [0.003]	-	2.01	4.01	3.90	4.48	4.15	4.10	3.44		
Total Manganese [0.009]	1.0	0.01	<DL	<DL	<DL	<DL	<DL	<DL		
Total Molybdenum [0.006]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Sodium [1.34]	-	2.77	<DL	2.81	<DL	2.58	1.86	<DL		
Total Nickel [0.008]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Lead [0.015]	0.1	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Antimony [0.013]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Selenium [0.031]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Silicon [0.011]	-	5.45	4.21	4.05	4.85	4.39	3.50	4.55		
Total Tin [0.033]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Vanadium [0.007]	-	<DL	0.019	<DL	<DL	<DL	<DL	<DL		
Total Zinc [0.007]	1.0	<DL	0.02	<DL	<DL	<DL	0.011	<DL		
Total Mercury [0.00005]	0.0005	<DL	<DL	<DL	<DL	<DL		<DL		

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

APPENDIX 3.
Water quality parameters measured for the Springs of Illinois project: Old Diver Spring, at outflow, April 1991-April 1992.

	Water Body	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow		
	County	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin		
	Location	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R		
	Station #	14	37b	51	dw 91-67	dw 91-73	dw 92-45	dw 92-95		
	Sample Date	16 Apr 1991	10 Jun 1991	12 Aug 1991	07 Oct 1991	05 Dec 1991	10 Feb 1992	06 Apr 1992		
PARAMETERS *	Standard**									
Field Measurements										
Air Temperature (° C)	-	21.0	28.0	26.5	10	11	12	18.4		
Water Temperature (° C)	-	14.0	17.0	14	14	14	13	13.0		
Dissolved Oxygen	never < 5.0	8.2	9.1	6.6	7.9	8.2	8.2	8.2		
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.35	7.9	7.5	7.4	7.2	7.4	6.9		
Alkalinity, as CaCO3	-	136	142.	156	158	157	160	167.		
Field Conductivity (µmhos/cm)		198	F208	205	222	215	231	241		
Specific Conductivity (µmhos/cm)	-	249	244	257	279	270	297	310		
(corrected to 25° C)										
Laboratory Measurements										
Total Carbon	-	37.5	46.3	44	90	99	90.2	109.1		
Total Inorganic Carbon	-	36.5	35.1	39.7	38.3	40.6	39.4	42.5		
Total Organic Carbon	-	1.0	11.3	4.3	51.8	58.5	50.9	66.6		
Dissolved Organic Carbon	-	0.7	10.5	4.2	51.4	58.2	49.8	59.2		
Particulate Organic Carbon [0.9]	-	0.3	0.8	0.1	0.4	0.3	1.1	7.4		
Total Fluoride [0.01]	1.4	<DL	0.03	0.04	<DL	<DL	<DL	<DL		
Sulfur as Sulfate	500.	7.89	6.31	5.41	5.36	2.99	4.3	7.13		
Total Bromide [0.01]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Ammonia Nitrogen [0.005]	1.5 **	<DL	<DL	0.01	0.03	0.04	0.06	0.02		
Nitrite Nitrogen [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Nitrate Nitrogen [0.005]	-	0.06	0.1	0.08	<DL	<DL	0.04	0.08		
Total Phosphorus	0.05**	<DL	<DL	0.04	<DL	<DL	0.1	0.23		
Orthophosphate P [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	0.23		
Hardness (EDTA)	*	116	121	129	134	173	160.0	172		
Chlorides	500.	1.80	2.49	2.04	1.83	1.42	1.2	2.31		
Total Nitrogen	-	0.92	0.14	0.36	0.07	0.22	0.02	0.28		
Total Kjeldahl Nitrogen	-	0.86	0.04	0.28	0.07	0.22	<DL	0.20		
Total Solids	-	248	188	208	184	188	196	192		
Total Dissolved Solids	1000.	186	183	192	208	201	221	230		
Turbidity (JTU)	-	3	7	6	2	3	3	4		
Total Aluminum [0.045]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Arsenic [0.030]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Boron [0.005]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		

(Appendix 3 concluded on following page)

APPENDIX 3 (concluded).

	Water Body	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow	Old Driver Spring at outflow		
	County	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin	Hardin		
	Location	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R	S Karbers R		
	Station #	14	37b	51	dw 91-67	dw 91-73	dw 92-45	dw 92-95		
	Sample Date	16 Apr 1991	10 Jun 1991	12 Aug 1991	07 Oct 1991	05 Dec 1991	10 Feb 1992	06 Apr 1992		
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.023	0.027	0.024	0.022	0.019	0.019	0.022		
Total Beryllium [0.001]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Calcium [0.004]	-	41.2	41.7	45.1	46.7	46.4	57.6	62.5		
Total Cadmium [0.002]	0.05	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Cobalt [0.002]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Chromium [0.007]	**	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Copper [0.004]	0.02	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Iron [0.025]	1.0	<DL	<DL	0.04	<DL	<DL	<DL	<DL		
Total Potassium [0.629]	-	<DL	<DL	<DL	<DL	0.749	<DL	<DL		
Total Magnesium [0.003]	-	3.27	4.15	3.87	4.17	4.22	3.98	3.91		
Total Manganese [0.009]	1.0	0.015	<DL	<DL	<DL	<DL	<DL	<DL		
Total Molybdenum [0.006]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Sodium [1.34]	-	3.97	<DL	<DL	<DL	2.01	1.72	<DL		
Total Nickel [0.008]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Lead [0.015]	0.1	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Antimony [0.013]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Selenium [0.031]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Silicon [0.011]	-	5.2	4.67	4.21	4.81	4.14	3.47	4.43		
Total Tin [0.033]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Vanadium [0.007]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Zinc [0.007]	1.0	<DL	0.017	0.013	0.016	<DL	<DL	<DL		
Total Mercury [0.00005]	0.0005	<DL	0.000055	<DL	<DL	<DL	<DL	<DL		

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

Rose Spring.

Location: Hardin County: 4.2 mi (6.8 km) SW Karbers Ridge. Third Principal Meridian, Township 11S, Range 8E, Section 31, SW/4, SW/4, NE/4, NE/4, 1150' S, 1050' W of SW corner. U.T.M. Zone 16, $^{3}79^{720}$ m^{E} $^{41}53^{515}$ m^{N}. Quadrangle: Karbers Ridge, IL., 7.5', 1959 editions, photorevised 1976.

Elevation: 440' (MSL).

Hydrogeology: Rose spring and waterway are situated on private property west of Shawnee National Forest land. Discharge from the spring flows into Goose Creek from the base of Hicks Dome, a prominent topographic and geologic feature in southeastern Illinois. Bedrock exposures are rare but those available from a leaf covered slope behind the spring indicate that the outflow is principally from four fractured and jointed bedding plane openings formed in siltstone from the Mississippian New Albany Shale Group. The openings are at the same elevation near floodplain level west of Goose Creek. Water from the largest opening two feet wide and one foot high has been used as a domestic source of water for over 50 years. The water channel from the openings is 1-2 feet wide and flows for a distance of 140 feet in sand and gravel. The channel is flanked by banks of clayey silt, all of Recent Age Cahokia Alluvium. Wood fragments collected from the clayey silt deposit at a depth of 2 feet, 180 feet from the openings, have been dated B.P., indicating a youthful valley infill in this part of the Goose Creek floodplain.

The linear correlation coefficient between water discharged at the spring head and in the waterway 440 feet downstream is r = -1.0 for the period of record, indicating a predictable mathematical relationship between spring head and downstream flow during the wet and dry periods of the year. Seasonal discharge at the downstream measuring location during the April (wet) and October (dry) measurements had 33 and 15 percent increases, respectively, when compared to the collective spring head discharge.

The alignment of the outflow channel segments between 120-140 feet N 35-40° E and between 160-440 N 30° E feet is in general agreement with joint alignments of N 40° W, and N 22° E between 380-420 feet downstream in siltstone bedrock in the creek bed. The gradient from the spring head to the juncture with Goose Creek, a distance of 440 feet is 4.1 feet or about 11 inches per 100 feet.

Meents (1975, 1981) reported a water temperature of 65° F and a discharge of 450 gpm.

Physical and chemical measurements for the spring head are given in Appendix 7 and for the spring outflow 410 feet downstream are given in Appendix 9.

Fauna: Meents (1975, 1981) reported the presence of crayfish, four species of fish, and the two-stripe salamander.

Fauna: Spring Head: Mollusca: Pelecypoda: Sphaeriidae: Pisidium sp. (common); Gastropoda: Pleuroceridae: *Goniobasis costifera* (common). Insecta: Gerridae: *Gerris remigis* (common); Heteroptera: Mesovellide: *Mesovelia mulsanti* (common); Megaloptera: Corydalidae: *Chauloides* sp. (rare). Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common), *G. pseudolimnaeus* (common); Isopoda: Asellidae: *Caecidotea brevicauda* (rare); Annelida: Haplotaxidae: *Haplotaxis gordioides* (rare); Lumbriculidae (rare); Enchytraeidae (rare); Naididae: *Dero digitata* (rare), *Nais communis* (uncommon); Tubificidae: *Limnodrilus hoffmeisteri* (uncommon). Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (rare).

Spring Outflow: Mollusca: Pelecypoda: Sphaeriidae: *Pisidium* sp. (common); Gastropoda: Pleuroceridae: *Goniobasis costifera* (common). Insecta: Diptera: Ceratopogonidae: *Bezzia* sp. (rare); Ptychopteridae: *Ptychoptera quadrifasciata* (uncommon); Stratiomyidae: *Odontomyia* sp. (rare); Tipulide; *Antocha* sp. (rare); Heteroptera: Gelastocoridae: *Gelastocoris oculatus* (rare); Mesovellide: *Mesovelia mulsanti* (common); Notonectidae: *Buenoa* sp. (uncommon); Plecoptera: Isoperlidae: *Isoperla decepta* (uncommon).

Flora: Meents (1975, 1981) reported an abundance of mint and watercress in mats throughout spring area and downstream for approximately 100 yards.

Flora: inventory conducted by Dr. L. R. Phillippe, Center for Biodiversity, INHS. Rose Spring is the source of a stream that begins at the base of a wooded slope. The area about the stream has been cleared of woodland vegetation and is dominated by herbs. This forbland is

dominated by *Mentha spicata* L. (spearmint), *Epilobium coloratum* Biehler (cinnamon willow herb) and *Leersia oryzoides* (L.) Swartz (rice cutgrass). The most important trees in the area are scattered individual trees of *Platanus occidentalis* L. (sycamore) and saplings of *Liquidambar styraciflua* L. (sweet gum). Although no shrubs are abundant, *Lindera benzoin* (L.) Blume is the most common. The most abundant vine is *Apios americana* Medic. (groundnut).

Other trees associated with Rose Spring are represented by saplings of *Carya cordiformis* (Wang.) K. Koch (bitternut hickory), *Cornus florida* L. (flowering dogwood), *Diospyros virginiana* L. (common persimmon), *Juniperus virginiana* L. (red cedar), *Prunus serotina* Ehrh. (wild black cherry), *Ulmus alata* Michx. (winged elm), and *Ulmus rubra* Muhl. (slippery elm).

Other shrubs associated with Rose Spring are *Aralia spinosa* L. (Hercules' club), *Corylus americana* Walt. (hazelnut), *Rhus copallina* L. (dwarf sumac), *Rosa* sp. (rose), *Rubus* sp. (blackberry), *Salix sericea* Marsh (silky willow), and *Symphoricarpos orbiculatus* Moench. (coralberry).

Other herbs associated with Rose Spring are *Agrimonia parviflora* Ait. (swamp agrimony), *Agrostis alba* L. (red top), *Andropogon virginicus* L. (broom sedge), *Asplenium platyneuron* (L.) Oakes (ebony spleenwort), *Aster lateriflorus* (L.) Brotton (side-flowered aster), *Bidens cernua* L. (nodding bur marigold), *Bidens vulgata* Greene (tall beggar-ticks), *Carex frankii* Kunth (sedge), *Carex lurida* Wahlenb. (sedge), *Conyza canadensis* (L.) Cronq. (horseweed), *Cyperus strigosus* L. (sedge), *Desmodium glabellum* (Michx.) DC. (tick trefoil), *Dichanthelium clandestinum* (L.) Gould (broad-leaved panic grass), *Eleocharis erythropoda* Steud. (spike rush), *Elephantopus carolinianus* Raeusch (Elephant's-foot), *Erechtites hieracifolia* (L.) Raf. (fireweed), *Eupatorium coelestinum* L. (mistflower), *Eupatorium perfoliatum* L. (common boneset), *Eupatorium rugosum* Houtt. (white snakeroot), *Eupatorium serotinum* Michx. (late boneset), *Festuca pratensis* Huds (meadow fescue), *Geum canadense* Jacq. (white avens), *Glyceria striata* (Lam.) Hitchcock (fowl manna grass), *Hypericum mutilum* L. (dwarf St. John's wort), *Hypericum punctatum* Lam. (spotted St. John's wort), *Juncus tenuis* Willd. (path rush), *Leersia virginica* Willd. (white grass), *Lobelia inflata* L. (Indian tobacco), *Lobelia siphilitica* L. (blue cardinal-flower), *Pilea pumila* (L.) Gray (clearweed), *Ludwigia alternifolia* L. (seedbox), *Plantago rugelii* Dcne (Rugel's plantain), *Polygonum hydropiper* L. (smartweeed), *Prunella vulgaris* L. (self-heal), *Rumex* sp. (dock), *Polystichum acrostichoides* (Michx.) Schott. (Christmas fern), *Ranunculus* sp. (buttercup), *Samolus valerandii* L. (brookweed), *Sisyrinchium* sp. (blue-eyed grass), *Solidago canadensis* L. (tall goldenrod), *Solidago nemoralis* Ait. (field goldenrod), *Trifolium* sp. (clover), *Verbena urticifolia* L. (white vervain), and *Vernonia missurica* Raf. (Missouri ironweed).

Other vines associated with Rose Spring are *Lonicera japonica* Thunb. (Japanese honeysuckle), *Smilax rotundifolia* L. (catbrier), *Toxicodendron radicans* (L.) Kuntze (poison ivy), and *Vitis* sp. (grape).

Ownership: Mrs. Callie Robinson, RR. Elizabethtown, IL. 62931.

Reference: Meents (1975, 1981).

Current Status: Initiallly supplied Old Wolrad Iron Mill, now supplies one home with drinking and cooking water.

This is a basic water spring with a fairly high volume of flow. The spring head is dominated by two species of amphipods and one species of snail. To-date, no distinctively unique organisms were collected at this spring.

APPENDIX 7.

Water quality parameters measured for the Springs of Illinois project: Rose Spring, April-October 1991.

	Water Body	Rose Spring at outflow	Rose Spring at outflow
	County	Hardin	Hardin
	Location	S Karbers R	S Karbers R
	Station #	25	dw 91-68
	Sample Date	23 Apr 1991	07 Oct 1991
PARAMETERS *	Standard**		
Field Measurements			
Air Temperature (° C)	-	22.0	14
Water Temperature (° C)	-	17.0	18
Dissolved Oxygen	never < 5.0	4.6	3.6
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.5	7.4
Alkalinity, as CaCO3	-	181	170
Field Conductivity (µmhos/cm)		279	338
Specific Conductivity (µmhos/cm) (corrected to 25° C)	-	327	388
Laboratory Measurements			
Total Carbon	-	45.4	97.1
Total Inorganic Carbon	-	45.3	40.3
Total Organic Carbon	-	0.1	56.8
Dissolved Organic Carbon	-	0.1	56.6
Particulate Organic Carbon [0.9]	-	<DL	0.2
Total Fluoride [0.01]	1.4	0.52	1.49
Sulfur as Sulfate	500.	29.98	27.97
Total Bromide [0.01]	-	0.12	<DL
Ammonia Nitrogen [0.005]	1.5 **	0.01	0.03
Nitrite Nitrogen [0.005]	-	<DL	<DL
Nitrate Nitrogen [0.005]	-	0.06	<DL
Total Phosphorus	0.05**	<DL	<DL
Orthophosphate P [0.005]	-	<DL	<DL
Hardness (EDTA)	*	178	173
Chlorides	500.	14.39	17.27
Total Nitrogen	-	2.49	0.08
Total Kjeldahl Nitrogen	-	2.43	0.08
Total Solids	-	348	260
Total Dissolved Solids	1000.	242	286
Turbidity (JTU)	-	2	2
Total Aluminum [0.045]	-	<DL	<DL
Total Arsenic [0.030]	1.0	<DL	<DL
Total Boron [0.005]	1.0	<DL	<DL

(Appendix 7 concluded on following page)

APPENDIX 7 (concluded).

	Water Body	Rose Spring at outflow	Rose Spring at outflow							
	County	Hardin	Hardin							
	Location	S Karbers R	S Karbers R							
	Station #	25	dw 91-68							
	Sample Date	23 Apr 1991	07 Oct 1991							
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.127	0.164							
Total Beryllium [0.001]	-	<DL	<DL							
Total Calcium [0.004]	-	52.8	48							
Total Cadmium [0.002]	0.05	<DL	<DL							
Total Cobalt [0.002]	-	<DL	<DL							
Total Chromium [0.007]	**	<DL	<DL							
Total Copper [0.004]	0.02	<DL	<DL							
Total Iron [0.025]	1.0	<DL	<DL							
Total Potassium [0.629]	-	0.762	<DL							
Total Magnesium [0.003]	-	11.3	13							
Total Manganese [0.009]	1.0	<DL	<DL							
Total Molybdenum [0.006]	-	<DL	<DL							
Total Sodium [1.34]	-	10.2	13							
Total Nickel [0.008]	1.0	<DL	<DL							
Total Lead [0.015]	0.1	<DL	<DL							
Total Antimony [0.013]	-	<DL	<DL							
Total Selenium [0.031]	1.0	<DL	<DL							
Total Silicon [0.011]	-	6.59	6.46							
Total Tin [0.033]	-	<DL	<DL							
Total Vanadium [0.007]	-	<DL	<DL							
Total Zinc [0.007]	1.0	0.017	0.01							
Total Mercury [0.00005]	0.0005	0.000113	<DL							

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

APPENDIX 9.

Water quality parameters measured for the Springs of Illinois project: Rose Spring creek, downstream of outflow, April-October 1991.

	Water Body	Rose Spring creek	Rose Spring creek
		410' dnstrm outflow	410' dnstrm outflow
	County	Hardin	Hardin
	Location	S Karbers R	S Karbers R
	Station #	27	dw 91-69
	Sample Date	23 Apr 1991	07 Oct 1991
PARAMETERS *	Standard**		
Field Measurements			
Air Temperature (° C)	-	25.1	13
Water Temperature (° C)	-	18.0	18.5
Dissolved Oxygen	never < 5.0	6.6	7.8
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.7	7.9
Alkalinity, as CaCO3	-	98	167
Field Conductivity (µmhos/cm)		320	330
Specific Conductivity (µmhos/cm) (corrected to 25° C)	-	367	374
Laboratory Measurements			
Total Carbon	-	44.3	96.3
Total Inorganic Carbon	-	43.9	38.2
Total Organic Carbon	-	0.4	58.1
Dissolved Organic Carbon	-	0.1	55
Particulate Organic Carbon [0.9]	-	0.3	3.1
Total Fluoride [0.01]	1.4	0.44	1.49
Sulfur as Sulfate	500.	27.36	31.87
Total Bromide [0.01]	-	0.02	<DL
Ammonia Nitrogen [0.005]	1.5 **	0.05	<DL
Nitrite Nitrogen [0.005]	-	<DL	<DL
Nitrate Nitrogen [0.005]	-	0.02	<DL
Total Phosphorus	0.05**	<DL	<DL
Orthophosphate P [0.005]	-	<DL	<DL
Hardness (EDTA)	*	154	172
Chlorides	500.	12.01	15.42
Total Nitrogen	-	1.94	0.14
Total Kjeldahl Nitrogen	-	1.92	0.14
Total Solids	-	344	280
Total Dissolved Solids	1000.	271	276
Turbidity (JTU)	-	9	6
Total Aluminum [0.045]	-	<DL	<DL
Total Arsenic [0.030]	1.0	<DL	<DL
Total Boron [0.005]	1.0	<DL	<DL

(Appendix 9 concluded on the following page)

APPENDIX 9 (concluded).

	Water Body	Rose Spring creek	Rose Spring creek							
		410' dnstrm outflow	410' dnstrm outflow							
	County	Hardin	Hardin							
	Location	S Karbers R	S Karbers R							
	Station #	27	dw 91-69							
	Sample Date	23 Apr 1991	07 Oct 1991							
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.128	0.142							
Total Beryllium [0.001]	-	<DL	<DL							
Total Calcium [0.004]	-	44	47.4							
Total Cadmium [0.002]	0.05	<DL	<DL							
Total Cobalt [0.002]	-	<DL	<DL							
Total Chromium [0.007]	**	<DL	<DL							
Total Copper [0.004]	0.02	<DL	<DL							
Total Iron [0.025]	1.0	<DL	0.037							
Total Potassium [0.629]	-	0.666	2.13							
Total Magnesium [0.003]	-	10.8	13.1							
Total Manganese [0.009]	1.0	<DL	<DL							
Total Molybdenum [0.006]	-	<DL	<DL							
Total Sodium [1.34]	-	9.08	13.2							
Total Nickel [0.008]	1.0	<DL	<DL							
Total Lead [0.015]	0.1	<DL	<DL							
Total Antimony [0.013]	-	<DL	<DL							
Total Selenium [0.031]	1.0	<DL	<DL							
Total Silicon [0.011]	-	6.48	6.54							
Total Tin [0.033]	-	<DL	<DL							
Total Vanadium [0.007]	-	<DL	<DL							
Total Zinc [0.007]	1.0	<DL	<DL							
Total Mercury [0.00005]	0.0005	<DL	<DL							

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

Clear Spring.

Location: Jackson County: 5.33 mi (8.75 km) NE LaRue. Third Principal Meridian, Township 10S, Range 3W, Section 27, SW/4, NE/4, SE/4, SE/4. U.T.M. Zone 16, $^{2}86^{5}35$ m^{E} $^{4}165^{9}20$ m^{N}. Quadrangle: Wolf Lake Ill.-Mo., 7.5', 1974 edition, photorevised 1978.

Elevation: 435' (MSL).

Hydrogeology: Clear Creek Spring and waterway are located within the LaRue-Pine Hills Natural Landmark area of the Shawnee National Forest. Discharge from the spring flows into an unnamed tributary to the Big Muddy River. Water from the spring flows from a 3 sided rectangular-shaped, man-made structure at floodplain level from four readily discernable bedding plane openings in the Glen Dean Limestone of Mississippian age. The rectangular area enclosing the spring head is 8 feet square with a height of 3.5 feet. The stone blocks in the enclosure average 0.7 feet high and about 1 foot long are composed of limestone and sandstone. The enclosure contains a stepstone and a considerable amount of silt channeled in places. Stones also line the sides of the creek outflow away from the stone enclosure for a distance of 10-15 feet. Flow was observed beneath and between stones along the east side of the stone alignment. Outflow from the waterway moves north 300 feet parallel to a gravel road entering an 18-inch E-W corrugated culvert beneath the road on the east and discharging into a plunge pool on the west side of the road. The waterway gradient from the springhead to the culvert is feet which is about feet of slope per hundred feet.

Physical and chemical measurements are given in appendix 5.

Fauna: Spring Head: Mollusca: Pelecypoda: Sphaeridae: *Pisidium* sp. (uncommon). Insecta: Diptera: Psychodidae: *Psychoda* sp. (rare); Heteroptera: Gerridae: *Gerris remigis* (common); Mesoveliidae: *Mesovelia mulsanti* (common); Plecoptera: Nemouridae: *Amphinemura* sp. (rare); Perlidae: *Perlinella drymo* (rare). Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common); Ostrocoda: At least three unknown species of ostrocods, one of which lives in groundwater (Brandon Curry). Annelida: Lumbriculidae (rare); Enchytraeidae (rare); Tubificidae: Tubificinae sp. (rare). Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (common).

Spring Outflow: Mollusca: Pelecypoda: Sphaeridae: *Pisidium* sp. (common). Insecta: Diptera: Psychodidae: *Psychoda* sp. (rare); Heteroptera: Gerridae: *Gerris remigis* (common); Mesoveliidae: *Mesovelia mulsanti* (common); Simuliidae: *Simulium* nr *venustum* (uncommon). Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (common).

Flora: inventory conducted by Dr. L. R. Phillippe, Center for Biodiversity, INHS. Clear Creek Spring is located at the base of a mesic wooded slope and flows between the base of that slope and a gravel road. The dominat trees along this spring are *Platanus occidentalis* L. (sycamore), *Liquidambar styraciflua* L. (sweet gum), and *Fagus grandifolia* Ehrh. (beech). The dominant shrubs are *Lindera benzoin* (L.) Blume (spicebush) and *Hydrangea arborescens* L. (wild hydrangea). Although this area supports a high diversity of herbaceous species, it is dominated by a large colony of *Equisetum hyemale* L. (scouring rush) that occurs along the spring source and the main stream of Clear Creek spring. The dominant vine along Clear Creek Spring is *Parthenocissus quinquefolia* (L.) Planch (Virginia creeper).

Other trees associated with Clear Creek Spring are *Acer saccharum* Marsh (sugar maple), *Carpinus caroliniana* Walt. (blue beech), *Carya cordiformis* (Wang.) K. Koch (bitternut hickory), *Cornus florida* L. (flowering dogwood), *Fraxinus pennsylvanica* Marsh (green ash), *Liriodendron tulipifera* L. (tulip tree), *Prunus serotina* Ehrh. (wild black cherry), *Quercus alba* L. (white oak), *Quercus muhlenbergii* Engelm. (chinquapin oak), *Quercus rubra* L. (red oak), and *Ulmus rubra* Muhl. (slippery elm)

Other shrubs associated with Clear Creek Spring are *Asimina triloba* (L.) Dunal. (pawpaw), *Cornus drummondii* C.A. Mey (rough-leaved dogwood), *Euonymus atropurpurea* Jacq. (wahoo), *Ilex decidua* Walt. (swamp holly), and *Sambucus canadensis* L. (elderberry),

Other herbaceous plants associated with Clear Creek Spring are *Adiantum pedatum* (Tourn.) L. (maidenhair fern), *Agrimonia parviflora* Ait. (swamp agrimony), *Agrimonia rostellata* Wallr. (woodland agrimony), *Agrostis perennans* (Walt.) Tuckerm. (upland bent grass), *Ambrosia trifida* L. (giant ragweed), *Aster cordifolius* L. (blue wood aster), *Aster lateriflorus* (L.) Britt. (side-

flowered aster), *Boehmeria cylindrica* (L.) Sw. (false nettle), *Campanula americana* L. (American bellflower), Carex sp. (sedge), *Chasmanthium latifolium* (Michx.) Yates (sea oats), *Cinna arundinacea* L. (stout woodreed), *Circaea lutetiana* Aschers. & Magnus (enchanter's nightshade), *Cryptotaenia canadensis* (L.) DC. (honewort), *Elymus virginicus* L. (Virginia wild rye), *Dichanthelium* sp. (panic grass), *Eupatorium coelestinum* L. (mistflower), *Eupatorium purpureum* L. (purple Joe-Pye-weed), *Eupatorium rugosum* Houtt. (white snakeroot), *Galium triflorum* Michx. (sweet-scented bedstraw), *Geum canadense* Jacq. (white avens), *Glyceria striata* (Lam.) Hitchcock (fowl manna grass), *Impatiens capensis* Meerb. (spotted touch-me-not), *Impatiens pallida* Nutt. (pale touch-me-not), *Lactuca floridana* (L.) Gaertn. (woodland lettuce), *Laportea canadensis* (L.) Wedd. (wood nettle), *Leersia virginica* Willd. (white grass), *Lobelia siphilitica* L. (blue cardinal-flower), *Mimulus alatus* Ait. (winged monkey-flower), *Perilla frutescens* (L.) Britt. (beefsteak plant), *Phlox divaricata* L. (common phlox), *Pilea pumila* (L.) Gray (clearweed), *Plantago rugelii* Dcne (Rugel's Plantain), *Poinsetta dentata* (Michx.) Kl. & Garcke (wild poinsetta), *Polemonium reptans* L. (Jacob's ladder), *Polygonum cespitosum* Blum (creeping smartweed), *Polystichum acrostichoides* (Michx.) Schott. (Christmas fern), *Prenanthes altissima* L. (tall white lettuce), *Prunella vulgaris* L. (self-heal), *Ranunculus* sp. (buttercup), *Samolus valerandii* L. (brookweed), *Sanicula gregaria* Bickn. (common snakeroot), *Solidago caesia* L. (woodland goldenrod), *Stachys tenuifolia* Willd. (smooth hedge nettle), *Verbesina alternifolia* (L.) Britt. (yellow ironweed), and*Woodsia obtusa* (Spreng.) Torr. (common woodsia).

Other vines associated with Clear Creek Spring are *Amphicarpa bracteata* (L.) Fern. (hog peanut), *Campsis radicans* (L.) Seem (trumpet creeper), *Dioscorea* sp. (wild yam), *Lonicera japonica* Thunb. (Japanese honeysuckle), *Smilax hispida* Muhl. (bristly catbrier), *Toxicodendron radicans* (L.) Kuntze (poison ivy), and *Vitis* sp. (grape).

Reference: West 1980.

This is a basic water spring with a moderate to low. Although the spring head is dominated by one species of amphipod, this spring has the most unique fauna of the six springs studied. Several very strange annelid worms and ostrocods were collected, a number of these are totally unknown. No fish were collected in this spring.

APPENDIX 5.

Water quality parameters measured for the Springs of Illinois project: Clear Creek Spring, April 1991-April 1992.

	Water Body	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow		
	County	Jackson	Jackson	Jackson	Jackson	Jackson	Jackson	Jackson		
	Location	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue		
	Station #	28	39	54	dw 91-72	dw 91-75	dw 92-49	dw 92-97		
	Sample Date	24 Apr 1991	11 Jun 1991	13 Aug 1991	08 Oct 1991	06 Dec 1991	11 Feb 1992	07 Apr 1992		
PARAMETERS *	**Standard****									
Field Measurements										
Air Temperature (° C)	-	9.8	21.0	21.5	12.2	7.5	9	12 ??		
Water Temperature (° C)	-	12.1	13.5	13.6	13	11	11	8.4		
Dissolved Oxygen	never < 5.0	9.7	8.4	7.6	7.9	7.6	8.8	9.6		
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.8	7.8	7.7	7.7	7.7	7.9	7.2		
Alkalinity, as CaCO3	-	192	295.	336	309	133	239	156.		
Field Conductivity (µmhos/cm)		267	F389	403	440	215	324	238		
Specific Conductivity (µmhos/cm) (corrected to 25° C)	-	351	494	511	566	290	437	342		
Laboratory Measurements										
Total Carbon	-	49	103.9	120.1	174.6	80.9	137.4	95.3		
Total Inorganic Carbon	-	48.7	73.5	82.5	68.1	30	50.9	37.4		
Total Organic Carbon	-	0.3	30.4	37.6	106.5	50.9	86.5	58.0		
Dissolved Organic Carbon	-	0.1	19.8	35.9	105.1	50.5	85.6	54.8		
Particulate Organic Carbon [0.9]	-	0.2	10.6	1.7	1.4	0.4	0.9	3.2		
Total Fluoride [0.01]	1.4	<DL	0.29	0.42	<DL	<DL	0.05	<DL		
Sulfur as Sulfate	500.	27.22	33.35	36.84	19	13.81	26.5	24.00		
Total Bromide [0.01]	-	<DL	0.05	2.62	<DL	<DL	0.2	<DL		
Ammonia Nitrogen [0.005]	1.5 **	0.05	<DL	<DL	0.02	0.04	0.04	<DL		
Nitrite Nitrogen [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Nitrate Nitrogen [0.005]	-	0.09	0.21	0.15	0.01	<DL	0.09	0.13		
Total Phosphorus	0.05**	0.07	<DL	0.01	<DL	<DL	0.06	0.24		
Orthophosphate P [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	0.22		
Hardness (EDTA)	*	156	316	349	341	150	249.0	151		
Chlorides	500.	4.12	7.65	10.2	5.26	2.8	6.5	4.46		
Total Nitrogen	-	1.48	0.28	0.37	0.29	0.46	0.05	0.44		
Total Kjeldahl Nitrogen	-	1.39	0.07	0.22	0.28	0.46	<DL	0.31		
Total Solids	-	320	360	448	416	200	332	256		
Total Dissolved Solids	1000.	260	363	375	415	216	322	253		
Turbidity (JTU)	-	8	5	2	6	11	7	10		
Total Aluminum [0.045]	-	0.086	0.100	<DL	<DL	<DL	<DL	<DL		
Total Arsenic [0.030]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Boron [0.005]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		

(Appendix 5 concluded on following page)

APPENDIX 5 (concluded).

	Water Body	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow	Clear Creek Spring at outflow		
	County	Jackson	Jackson	Jackson	Jackson	Jackson	Jackson	Jackson		
	Location	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue	NNE LaRue		
	Station #	28	39	54	dw 91-72	dw 91-75	dw 92-49	dw 92-97		
	Sample Date	24 Apr 1991	11 Jun 1991	13 Aug 1991	08 Oct 1991	06 Dec 1991	11 Feb 1992	07 Apr 1992		
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.062	0.071	0.070	0.067	0.047	0.580	0.057		
Total Beryllium [0.001]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Calcium [0.004]	-	42.9	90.2	99	97.3	37.8	73.4	45.1		
Total Cadmium [0.002]	0.05	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Cobalt [0.002]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Chromium [0.007]	**	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Copper [0.004]	0.02	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Iron [0.025]	1.0	0.116	<DL	0.059	<DL	0.056	<DL	<DL		
Total Potassium [0.629]	-	0.972	<DL	<DL	<DL	1.78	<DL	<DL		
Total Magnesium [0.003]	-	11.8	21.9	24.6	23.9	8.28	16.00	9.30		
Total Manganese [0.009]	1.0	<DL	<DL	<DL	<DL	<DL	0.014	<DL		
Total Molybdenum [0.006]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Sodium [1.34]	-	10.8	15.3	15.5	18	7.14	11.80	6.93		
Total Nickel [0.008]	1.0	<DL	<DL	<DL	<DL	<DL	0.009	<DL		
Total Lead [0.015]	0.1	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Antimony [0.013]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Selenium [0.031]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Silicon [0.011]	-	10.2	11.4	9.52	9.6	7.61	7.53	8.14		
Total Tin [0.033]	-	<DL	0.051	<DL	<DL	<DL	<DL	<DL		
Total Vanadium [0.007]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Zinc [0.007]	1.0	0.035	<DL	<DL	<DL	<DL	<DL	<DL		
Total Mercury [0.00005]	0.0005	<DL	0.000055	<DL	<DL	0.334	<DL	<DL		

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

McGee Hill Spring.

Location: 0.85 mi (1.4 km) ESE LaRue, at south edge of LaRue-Pine Hills Ecological Area (along road to old SIU-Carbondale/Otter Pond research facility), in Shawnee National Forest, Union County. Third Principal Meridian, Township 11S, Range 3W, Sec. 21, NE/4, SW/4, SE/4, SE/4,. U.T.M. Zone 16, $^{2}84^{575}$ m^{E}, $^{4}157^{600}m^{N}$. Quadrangle: Wolf Lake, IL.-Mo., 7.5', 1947 edition, photorevised 1978.

Elevation: 355' (MSL).

Hydrogeology: This spring is located near the base of McGee Hiil, a prominent near vertical bluff rising 350 feet above the Mississippi river floodplain south of the LaRue-Pine Hills National Natural Landmark in Shawnee National Forest. Spring water emerges and percolates from the base of a semicircular man-made catchment 1 feet in width and 1-2 feet high in a limestone talus. The catchment which contains 1.5-2 inches of water is constructed of local limestone blocks 0.4-0.6 feet thick and 0.5-1.5 feet long. The talus rises 9-10 feet above the spring opening and is derived from a fissure in the bluff 45 feet east of the catchment. The fissure has a general aligment of N 70° E and may be associated with a crevice or joint system in the bluff. The bluff consists of light gray, fine-grained argillaceous limestone and chert of the Bailey Limestone of Lower Devonian age. Outflow from the spring flows about 80 feet in a north to south circular loop across a field road which overrides the talus then moves directly westward 350 feet through Cahokia Alluvium to an unnamed stream. Water from an auxiliary spring opening is 40 feet southwest of the spring forms a waterway in the Cahokia Alluvium and merges with the main waterway 100 feet from the catchment.

The waterway gradient from the spring head to the lowermost part of the roadway is 0.55 feet which is about 0.14 feet of slope for 10 feet of distance. A small but undetermined amount of underflow is present in the rodway area of the spring waterway.

Physical and chemical measurements are given in 4.

Fauna: Spring Head: Fishes: *Forbesichthys agassizi* (spring cavefish, common). Mollusca: Pelecypoda: Sphaeriidae: *Pisidium* sp. (uncommon). Insecta: Diptera: Dixidae: *Dixa* sp. (uncommon); Ptychopteridae; *Ptychoptera quadrifasciata* (uncommon); Tipulidae: *Antocha* sp. (rare), *Limnophila* sp. (rare); Heteroptera: Mesoveliidae: *Mesovelia mulsanti* (common). Crustacea: Amphipoda: Gammaridae: *Gammarus minus* (common); Decapoda: Cambaridae: *Cambarus diogenes* (rare); Ostrocoda: *Candona* nr. *albicans* (rare). Flatworms: Turbellaria: Planariidae: *Phagocata gracilis* (common).

Flora: inventory conducted by Dr. L. R. Phillippe, Center for Biodiversity, INHS. McGee Hill Spring is the source of a small stream that begins at the base of a wooded slope and then flows through a floodplain woods. The dominant trees along this stream are *Acer negundo* L. (box elder), *Fraxinus pennsylvanica* Marsh (green ash), and *Liquidambar styraciflua* L. (sweet gum). *Lindera benzoin* (L.) Blume (spicebush) dominates the shrub layer; however, only one other shrub is present, *Ilex decidua* Walt. (swamp holly). Although the herb layer is composed of many species, the dominant herb is *Polygonum cespitosum* Blume (creeping smartweed) with locally abundant *Impatiens capensis* Meerb. (spotted touch-me-knot). The dominant vine is *Toxicodendron radicans* (L.) Kuntze (poison ivy).

Other trees associated with McGee Hill Spring are *Acer saccharum* Marsh (sugar maple), *Carya cordiformis* (Wang.) K. Koch (bitternut hickory), *Gleditsia triacanthos* L. (honey locust), *Liriodendron tulipifera* L. (tulip tree), and *Ostrya virginiana* (Mill.) K. Koch (hop hornbeam).

Other herbs associated with McGee Hill Spring are *Acalypha rhomboidea* Raf. (three-seeded mercury), *Agrimonia pubescens* Wallr. (soft agrimony), *Anemone virginiana* L. (tall anemone), *Arabis laevigata* (Muhl.) Poir. (smooth rock cress), *Asarum canadense* L. (wild ginger), *Aster lateriflorus* (L.) Britt. (side-flowered aster), *Athyrium pycnocarpon* (Spreng.) Tidestrom (narrow-leaved spleenwort), *Bidens vulgata* Greene (tall beggar-ticks), *Blephilia* sp. (pagoda plant), *Boehmeria cylindrica* (L.) Sw. (false nettle), *Carex* spp. (sedge), *Cinna arundinacea* L. (stout wood reed), *Cryptotaenia canadensis* (L.) DC. (honewort), *Dichanthelium* sp. (panic grass), *Elymus villosus* Muhl. (slender wild rye), *Eupatorium rugosum* Houtt. (white snakeroot), *Galium triflorum* Michx. (sweet-scented bedstraw), *Geum canadense* Jacq. (white avens), *Glyceria striata*

(Lam.) Hitchcock (fowl manna grass), *Hydrophyllum canadense* L. (broad -leaf waterleaf), *Laportea canadensis* (L.) Wedd. (wood nettle), *Leersia virginica* Willd. (white grass), *Lysimachia ciliata* L. (fringed loosestrife), *Mimulus alatus* Ait. (winged monkey-flower), *Perilla frutescens* (L.) Britt. (beefsteak plant), *Phlox paniculata* L. (garden phlox), *Polymnia uvedalia* (L.) L. (bear's foot), *Ranunculus* sp. (buttercup), *Ruellia strepens* L. (smooth ruellia), *Rumex* sp. (dock), *Sanicula gregaria* Bickn. (common snakeroot), *Saururus cernuus* L. (lizard's-tail), *Tovara virginianum* L. (Virginia knotweed), *Viola* sp. (violet), and *Woodsia obtusa* (Spreng.) Torr. (common woodsia).

Other vines associated with McGee Hill Spring are *Menispermum canadense* L. (moonseed), *Parthenocissus quinquefolia* (L.) Planch (Virginia creeper), and *Smilax hispida* Muhl. (bristly catbrier).

This is a basic water spring with low flow. The spring cavefish is abundant in the spring head as well as along the outflow stream. The spring head is dominated by one species of amphipod and flatworm. To-date, no distinctively unique organisms were collected at this spring.

	Water Body	'McGee Hill' spring	'McGee Hill' spring	'McGee Hill' spring	'McGee Hill' spring	'McGee Hill' spring	'McGee Hill' spring	'McGee Hill' spring		
APPENDIX 4.		LaRue -	LaRue -	LaRue -	LaRue -	LaRue -	LaRue -	LaRue -		
Water quality parameters measured		Pine Hills	Pine Hills	Pine Hills	Pine Hills	Pine Hills	Pine Hills	Pine Hills		
for the Springs of Illinois project:	County	Union	Union	Union	Union	Union	Union	Union		
McGee Hill spring, April 1991-	Location	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue		
April 1992.	Station #	21	38	53	dw 91-71	dw 91-74	dw 92-48	dw 92-96		
	Sample Date	22 Apr 1991	11 Jun 1991	13 Aug 1991	08 Oct 1991	06 Dec 1991	11 Feb 1992	07 Apr 1992		
PARAMETERS *	Standard**									
Field Measurements										
Air Temperature (° C)	-	12.4	21.0	21.5	12	7	10	9.7 ??		
Water Temperature (° C)	-	12.5	14.0	14.5	13.5	12	11.9	12.1		
Dissolved Oxygen	never < 5.0	8.6	7.6	6.8	10.1	8.4	8.4	9.4		
Hydrogen Ion Concentration (pH)	6.5 to 9.0	7.4	7.3	7.2	7.3	7.1	7.4	7.0		
Alkalinity, as CaCO3	-	108	108.	103	102	80	114	118.		
Field Conductivity (µmhos/cm)		178	F175	150	148	140	170	165		
Specific Conductivity (µmhos/cm)	-	232	220	186	188	184	224	217		
(corrected to 25° C)										
Laboratory Measurements										
Total Carbon	-	28.2	29.3	29.5	58.8	52.2	62.7	71.0		
Total Inorganic Carbon	-	27.9	25.8	25.4	22.2	21.1	26.2	29.2		
Total Organic Carbon	-	0.3	3.5	4.1	36.5	31.1	36.6	41.8		
Dissolved Organic Carbon	-	0.1	<DL	3	32.4	30.9	35.9	42.2		
Particulate Organic Carbon [0.9]	-	0.2	3.5	1.1	4.1	0.2	0.7	<DL		
Total Fluoride [0.01]	1.4	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Sulfur as Sulfate	500.	20.97	12.5	7.52	6.88	8.8	5.6	15.98		
Total Bromide [0.01]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Ammonia Nitrogen [0.005]	1.5 **	0.04	<DL	0.01	<DL	0.04	0.04	0.04		
Nitrite Nitrogen [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Nitrate Nitrogen [0.005]	-	0.29	0.28	0.15	0.19	0.19	0.23	0.57		
Total Phosphorus	0.05**	<DL	<DL	0.01	<DL	<DL	0.07	0.27		
Orthophosphate P [0.005]	-	<DL	<DL	<DL	<DL	<DL	<DL	0.26		
Hardness (EDTA)	*	108	108	94	99	88	112.0	115		
Chlorides	500.	2.39	2.86	2.54	2.18	1.19	1.2	2.05		
Total Nitrogen	-	1.62	0.4	0.32	0.28	1.3	0.3	0.74		
Total Kjeldahl Nitrogen	-	1.33	0.12	0.17	0.09	1.11	0.07	0.17		
Total Solids	-	268	184	152	176	152	176	180		
Total Dissolved Solids	1000.	174	165	141	142	139	168	163		
Turbidity (JTU)	-	8	6	5	14	10	7	5		
Total Aluminum [0.045]	-	0.138	<DL	<DL	<DL	<DL	<DL	<DL		
Total Arsenic [0.030]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Boron [0.005]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		

(Appendix 4 concluded on following page)

APPENDIX 4 (concluded).

	Water Body	'McGee Hill' Spring LaRue - Pine Hills	'McGee Hill' spring LaRue - Pine Hills	'McGee Hill' spring LaRue - Pine Hills	'McGee Hill' spring LaRue - Pine Hills	'McGee Hill' spring LaRue - Pine Hills	'McGee Hill' spring LaRue - Pine Hills	'McGee Hill' spring LaRue - Pine Hills		
	County	Union	Union	Union	Union	Union	Union	Union		
	Location	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue	ESE LaRue		
	Station #	21	38	53	dw 91-71	dw 91-74	dw 92-48	dw 92-96		
	Sample Date	22 Apr 1991	11 Jun 1991	13 Aug 1991	08 Oct 1991	06 Dec 1991	11 Feb 1992	07 Apr 1992		
PARAMETERS *	Standard**									
Laboratory Measurements										
Total Barium [0.001]	5.0	0.062	0.049	0.043	0.043	0.047	0.046	0.052		
Total Beryllium [0.001]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Calcium [0.004]	-	31.9	31.3	27.1	28.5	26.2	33.6	35.3		
Total Cadmium [0.002]	0.05	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Cobalt [0.002]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Chromium [0.007]	**	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Copper [0.004]	0.02	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Iron [0.025]	1.0	<DL	<DL	<DL	<DL	0.038	<DL	<DL		
Total Potassium [0.629]	-	1.74	<DL	<DL	<DL	2.14	<DL	<DL		
Total Magnesium [0.003]	-	6.78	7.22	6.33	6.85	5.44	6.88	6.60		
Total Manganese [0.009]	1.0	0.016	<DL	<DL	<DL	<DL	<DL	<DL		
Total Molybdenum [0.006]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Sodium [1.34]	-	4.12	<DL	2.29	<DL	3.09	<DL	<DL		
Total Nickel [0.008]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Lead [0.015]	0.1	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Antimony [0.013]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Selenium [0.031]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Silicon [0.011]	-	8.22	7.08	5.89	6.32	6.57	5.38	6.69		
Total Tin [0.033]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Vanadium [0.007]	-	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Zinc [0.007]	1.0	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total Mercury [0.00005]	0.0005	0.00009	0.000074	<DL	<DL	<DL	<DL	<DL		

*Unless otherwise specified, all measurements expressed in mg/l. Detection limits are listed in brackets after applicable parameters.

**Surface water quality standards are taken from: Illinois Environmental Protection Agency. 1989. Title 35: Environmental Protection. Subtitle C: Water Pollution. Chapter I. Pollution Control Board. Part 302 - Water Quality Standards. Subpart B: General Use Water Quality Standards. Sections 302.201 through 302.212.

Ammonia Nitrogen and Unionized Ammonia: a) Ammonia nitrogen shall in no case exceed 15 mg/l; b) if ammonia nitrogen is less than 15 mg/l and greater than or equal to 1.5 mg/l, then unionized ammonia (as N) shall not exceed 0.04 mg/l; c) Ammonia nitrogen concentrations of less than 1.5 mg/l are lawful regardless of unionized ammonia concentration. [If total ammonia is > 1.5 mg/l, then calculations must be made to determine the unionized ammonia concentration based upon pH and temperature.]

Phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.

Although no current standard for total chromium has been established, the current standard for total hexavalent chromium is 0.05 mg/l; the current standard for total trivalent chromium is 1.0 mg/l; the sum of these two constituents would infer that the total chromium standard is 1.05 mg/l.

Taxonomic Specialists

Dr. Warren U. Brigham, Center for Biogeographic Information, Illinois Natural History Survey, Champaign, IL 61820. Aquatic Coleoptera.
Dr. Tim Cashatt, Illinois State Museum, Springfield, IL. Odonata.
Mr. Patrick Ceas, Center for Biogeographic Information, Illinois Natural History Survey, Champaign, IL 61820. Fish.
Mr. Brandon B. Curry, Illinois State Geological Survey, Champaign, IL. Ostrocoda.
Dr. Anne Marie Hampton. Castleton College, Castleton, VT. Turbellaria.
Mr. Mitchell Harris, Center for Biogeographic Information, Illinois Natural History Survey, Champaign, IL 61820. Plecoptera, Trichoptera.
Dr. Barry B. Miller, Department of Geology, Kent State University, Kent, OH 44242. Gastropoda.
Dr. Larry M. Page, Center for Biodiversity, Illinois Natural History Survey, Champaign, IL 61820. Amphipoda, Decapoda, and Isopoda.
Dr. Ole Saether, Zoologisk Museum, Bergen, Norway. Chironomidae.
Dr. Donald W. Webb, Center for Biodiversity, Illinois Natural History Survey, Champaign, IL 61820. Aquatic Diptera, Megaloptera, Heteroptera.
Mr. Mark J. Wetzel, Center for Biogeographic Information, Illinois Natural History Survey, Champaign, IL 61820. Annelida.

SPRINGS OF ILLINOIS
(October 23, 1992)

Cole Spring.
Location: Adams County. Fourth Principal Meridian, Township 2S, Range 8W, Section 29, SW/4, NW/4, NE/4, NE/4. U.T.M Zone 15, $^{6}41^{640}$ m^{E} $^{44}146^{10}$ m^{N} Longitude 91° 20' 39" W, Latitude 39° 52' 28" N. Quadrangle: Marblehead, Ill.-Mo., 7.5', 1971 edition.
Elevation 540' (MSL).
Current Status: ?

Spring Lake Spring.
Location: Adams County. Fourth Principal Meridian, Township 1S, Range 9W, Section 14, NE/4, NW/4, NE/4, NE/4. U.T.M Zone 15, $^{6}36^{675}$ m^{E} $^{44}28^{090}$ m^{N}. Quadrangle Quincy West, Ill.-Mo., 7.5', 1971 edition.
Elevation: 540' (MSL).
Current Status: ?

Wand Spring.
Location: Adams County: Fourth Principal Meridian, Township 2S, Range 8W, Section 15, SW/4, SW/4, SW/4, SW/4. U.T.M. Zone 15, $^{6}43^{665}$ m^{E} $^{44}16^{710}$ m^{N}. Longitude 91° 19' 11" W, Latitude 39° 53' 25" N. Quadrangle: Quincy East, Ill, 7.5', 1971 edition.
Elevation: 540' (MSL).
Current Status: ?

Unnamed Spring #50.
Location: Adams County: Fourth Principal Meridian, Township 3S, Range 5W, Section 7, SE/4, SW/4, NW/4, NW/4. U.T.M. Zone, 15, $^{6}68^{710}$ m^{E} $^{44}10^{210}$ m^{N}. Quadrangle: Richfield, IL., 7.5', 1981 edition.
Elevation: 730' (MSL).
Current Status: ?

Unnamed Spring #51.
Location: Adams County: Fourth Principal Meridian, Township 3S Range 6W, Section 8, SW/4, NW/4, NW/4, NE/4. U.T.M. Zone 15, $^{6}61^{290}$ m^{E} $^{44}10^{275}$ m^{N}. Quadrangle: Richfield, IL., 7.5', 1981 edition.
Elevation: 720' (MSL).
Current Status: ?

Unnamed Spring #52.
Location: Adams County: Fourth Principal Meridian, Township 3S, Range 7W, Section 8, SE/4, SE/4, SE/4, NE/4. U.T.M. Zone 15, $^{6}52^{015}$ m^{E} $^{44}09^{450}$ m^{N}. Quadrangle: Payson, IL., 7.5', 1981 edition.
Elevation: 650' (MSL).
Current Status: ?

Unnamed Spring #60.
Location: Adams County: Fourth Principal Meridian, Township 1S, Range 6W, Section 5, NE/4, SW/4, SE/4, SE/4. U.T.M. Zone 15, $^{6}61^{380}$ m^{E} $^{44}29^{965}$ m^{N}. Quadrangle: Camp Point, IL., 7.5', 1981 edition.
Elevation: 670' (MSL).
Current Status: ?

Unnamed Spring #61.
Location: Adams County: Fourth Principal Meridian, Township 1S, Range 6W, Section 5, SE/4, SW/4, NE/4, SE/4. U.T.M. Zone 15, $^{6}61^{380}$ mE $^{44}30^{270}$ mN. Quadrangle: Camp Point, IL., 7.5', 1981 edition.
Elevation: 670' (MSL).
Current Status: ?

Unnamed Spring #62.
Location: Adams County: Fourth Principal Meridian, Township 1S, Range 6W, Section 4, SE/4, SE/4, SE/4, NW/4. U.T.M. Zone 15, $^{6}62^{430}$ mE $^{44}30^{690}$ mN. Quadrangle: Camp Point, IL., 7.5', 1981 edition.
Elevation: 690' (MSL).
Current Status: ?

Unnamed Spring #63.
Location: Adams County: Fourth Principal Meridian, Township 1N, Range 8W, Section 30, NE/4, NW/4, NE/4, SW/4. U.T.M. Zone 15, $^{6}39^{130}$ mE $^{44}33^{765}$ mN. Quadrangle: Mendon, IL., 7.5', 1981 edition.
Elevation: 540' (MSL).
Current Status: ?

Unnamed Spring #93.
Location: Adams County: Fourth Principal Meridian, Township 2S, Range 8W, Section 25, SW/4, NE/4, NE/4. Quadrangle: Marblehead, Ill.-Mo., 7.5', 1971 edition.
Elevation: 610' (MSL).
Current Status: ?

Perkins Spring.
Location: Alexander County: Third Principal Meridian, Township 15S, Range 3W, Section 3, SW/4, SW/4, NW/4, SW/4. U.T.M. Zone 16, $^{2}83^{910}$ mE $^{41}23^{820}$ mN. Longitude 89° 26' 12" W, Latitude 37° 14' 16" N. Quadrangle: Thebes, Ill.-Mo., 7.5', 1981 edition.
Elevation: 360' (MSL).
Reference: Meents (1966, 1981).
Current Status: ?

Unnamed Spring #1.
Location: Alexander County: Third Principal Meridian, Township 15S, Range 3W, Section 22, SW/4, SW/4, SE/4, SW/4. U.T.M. Zone 16, $^{2}84^{140}$ mE $^{41}18^{500}$ mN. Quadrangle: Thebes, Ill.-Mo., 7.5', 1966 edition.
Elevation: 400' (MSL).
Current Status: ?

Unnamed Spring #2.
Location: Alexander County: Third Principal Meridian, Township 15S, Range 3W, Section 21, SW/4, SW/4, SE/4, NW/4. U.T.M. Zone 16, $^{2}82^{600}$ mE $^{41}19^{350}$ mN. Quadrangle: Thebes, Ill.-Mo., 7.5', 1966 edition.
Elevation: 340' (MSL).
Current Status: ?

Unnamed Spring #3.
Location: Alexander County: Third Principal Meridian, Township 15S, Range 3W, Section 21, SE/4, SW/4, NW/4, NE/4. U.T.M. Zone 16, $^{2}83^{0}30$ m^{E} $^{4}1^{1}9^{7}30$ m^{N}. Quadrangle: Thebes, Ill.-Mo., 7.5', 1966 edition.
Elevation: 380' (MSL).
Current Status: ?

Kings Spring.
Location: Bond County: Township 4N, Range 4W, Section 35.
Current Status: ?

Unnamed Spring #94.
Location: Bond County: Third Principal Meridian, Township 4N, Range 4W, Section 1, SW/4, SW/4, SW/4, SE/4. U.T.M. Zone 15, $^{2}83^{3}00$ m^{E} $^{4}2^{9}8^{8}60$ m^{N}. Quadrangle: Kellerville, IL., 7.5, 1981 edition.
Elevation: 470' (MSL).
Current Status: ?

Siloam Spring Number 1:
Location: Brown County: Fourth Principal Meridian, Township 2S, Range 4W, Section 18, NE/4, SW/4, SW/4, SW/4. U.T.M. Zone 15, $^{6}78^{2}30$ m^{E} $^{4}4^{1}7^{3}35$ m^{N}. Quadrangle: Kellerville, IL., 7.5, 1981 edition.
Elevation: 630' (MSL).
Reference: Meents (1967, 1975).
Current Status: public.

Siloam Springs Number 2.
Location: Brown County: Fourth Principal Meridian, Township 2S, Range 4W, Section18, NW/4, SE/4, SW/4, SW/4. U.T.M. Zone 15, $^{6}78^{3}40$ m^{E} $^{4}4^{1}7^{3}00$ m^{N}. Quadrangle Kellerville, IL., 7.5', 1981 edition.
Elevation: 520' (MSL).
Reference: Meents (1967, 1975).
Current Status: public.

Versailles (Mineral) Spring.
Location: Brown County: Fourth Principal Meridian, Township 2S, Range 2W, Section16, SW/4, NE/4, NE/4, NW/4. U.T.M. Zone 15, $^{7}01^{9}75$ m^{E} $^{4}4^{1}8^{6}90$ m^{N}. Quadrangle Versailles, IL., 7.5', 1980 edition.
Elevation: 510' (MSL).
Reference: Meents 1967, 1975), Palmer (1909).
Current Status: ?

Cave Spring #1.
Location: Calhoun County: Township 10S, Range 2W, Section 19, SW/4, NE/4, SW/4, NE/4. U.T.M. Zone 15, $^{7}00^{5}65$ m^{E} $^{4}3^{3}8^{2}90$ m^{N}. Longitude 90° 40' 43" W, Latitude 39° 10' 21" N. Quadrangle: Hamburg, Ill.-Mo., 7.5', 1978 edition.
Elevation: 530' (MSL).
Reference: Meents (1975).
Current Status: ?

Cave Spring #2.
Location: Calhoun County: Fourth Principal Meridian, Township 12S Range 3E, Section 17, SE/4, SW/4, NE/4, SW/4. U.T.M. Zone 15, $^{7}01^{980}$ m^{E} $^{43}20^{870}$ m^{N}. Longitude 90° 40' 02" W, Latitude 39° 00' 53" N. Quadrangle: Foley, Mo.-IL., 7.5', 1975 edition.
Elevation: 460' (MSL).
Reference: Meents (1975).
Current Status: ?

Salt Spring.
Location: Calhoun County: Fourth Principal Meridian, Township 11S, Range 2W, Section 8/9. Longitude: 90° 39' 16" W, Latitude 39° 06' 45" N. Quadrangle: Foley, IL., 7.5', 1975 edition.
Current Status: ?

Unnamed Spring #20.
Location: Calhoun County: Fourth Principal Meridian, Township 10S, Range 2W, Section 4, SE/4, NE/4, SE/4, SW/4. U.T.M. Zone 15, $^{7}03^{470}$ m^{E} $^{43}42^{340}$ m^{N}. Quadrangle: Hamburg, Ill.-Mo., 7.5', 1978 edition.
Elevation: 560' (MSL).
Current Status: ?

Unnamed Spring #21.
Location: Calhoun County: Fourth Principal Meridian, Township 8S, Range 3W, Section 5, SE/4, NW/4, SE/4, NW/4. U.T.M. Zone 15, $^{6}91^{675}$ m^{E} $^{43}62^{690}$ m^{N}. Quadrangle Pleasant Hill East, IL., 7.5', 1978 edition.
Elevation: 640' (MSL).
Current Status: ?

Unnamed Spring #25.
Location: Calhoun County, Fourth Principal Meridian, Township 9S, Range 2W, Section 19, SW/4, SW/4, NE/4, NW/4. U.T.M. Zone 15, $^{6}99^{770}$ m^{E} $^{43}48^{050}$ m^{N}. Quadrangle: Pleasant Dale Valley, Ill.-Mo., 7.5', 1978 edition.
Elevation: 640' (MSL).
Current Status: ?

Unnamed Spring #26.
Location: Calhoun County: Fourth Principal Meridian, Township 9S, Range 2W, Section 17, SW/4, SE/4, NE/4, NW/4. U.T.M. Zone 15, $^{7}01^{560}$ m^{E} $^{43}49^{730}$ m^{N}. Quadrangle: Pleasant Dale Valley, Ill.-Mo., 7.5', 1978 edition.
Elevation: 580' (MSL).
Current Status: ?

Unnamed Spring #27.
Location: Calhoun County: Fourth Principal Meridian, Township 8S, Range 3W, Section 12, SW/4, NE/4, SW/4, SE/4. U.T.M. Zone 15, $^{6}98^{270}$ m^{E} $^{43}59^{980}$ m^{N}. Quadrangle: Pleasant Dale Valley, Ill.-Mo., 7.5', 1978 edition.
Elevation: 620' (MSL).
Current Status: ?

Unnamed Spring #28.
Location: Calhoun County: Fourth Principal Meridian, Township 8S, Range 3W, Section 12, SW/4, NE/4, SW/4, SE/4. U.T.M. Zone 15, ^{698700} m^{E} ^{4360030} m^{N}. Quadrangle: Pleasant Dale Valley, Ill.-Mo., 7.5', 1978 edition.
Elevation: 580' (MSL).
Current Status: ?

Unnamed Spring #73.
Location: Carroll County: Fourth Principal Meridian, Township 25N, Range 3E, Section 21, NW/4, NW/4, NW/4, SE/4, 2400' N, 2500' W of SE corner. U.T.M. Zone 15, ^{734320} m^{E} ^{4669600} m^{N}. Quadrangle: Blackhawk, Ill.-Iowa, 7.5', 1953 edition, photorevised 1975.
Elevation: 630' (MSL).
Reference: Meents (1969).
Current Status: ?

Unnamed Spring #74.
Location: Carroll County: Fourth Principal Meridian, Township 25 N, Range 3E, Section 16, SE/4, NW/4, NW/4, NE/4, 700' S, 2300' W of NE corner. U.T.M. Zone 15, ^{734300} m^{E} ^{4671955} m^{N}. Quadrangle: Blackhawk, Ill.-Iowa, 7.5', 1953 edition, photorevised 1975.
Elevation: 615' (MSL).
Reference: Meents (1969).
Current Status: ?

Unnamed Spring #95.
[Spring #1 in Mississippi Palisades State Park (Casler, House & Hutchison 1978)]
Location: Carroll County: Fourth Principal Meridian, Township 25 N, Range 2E, Section 28, NW/4, NE/4, SE/4, SE/4. U.T.M. Zone 15, ^{734940} m^{E} ^{4667370} m^{N}. Quadrangle: Blackhawk, Ill.-Iowa, 7.5', 1953 edition, photorevised 1975.
Elevation: 610' (MSL).
Reference: Casler, House & Hutchison (1978).
Current Status: This spring is capped and used as a public drinking fountain (Webb & Harris 1992).

Unnamed Spring #96
[Spring #2 in Mississippi Palisades State Park (Casler, House & Hutchison 1978)]
Location: Carroll County: Fourth Principal Meridian, Township 25 N, Range 3E, Section 21, SE/4, NW/4, NE/4, SW/4. U.T.M. Zone 15, ^{732990} m^{E} ^{4669490} m^{N}. Quadrangle: Blackhawk, Ill.-Iowa, 7.5', 1953 edition, photorevised 1975.
Reference: Casler, House & Hutchison (1978).
Current Status: This spring is capped (Webb & Harris 1992).

Unnamed Spring #97
[Spring #8 in Mississippi Palisades State Park (Casler, House & Hutchison 1978)]
Location: Carroll County: Fourth Principal Meridian, Township 25 N, Range 3E, Section 16, NW/4, NE/4, SW/4, NW/4. U.T.M. Zone 15, ^{734085} m^{E} ^{4671640} m^{N}. Quadrangle: Blackhawk, Ill.-Iowa, 7.5', 1953 edition, photorevised 1975.
Reference: Casler, House & Hutchison (1978).
Current Status: This spring is capped (Webb & Harris 1992).

Unnamed Spring #98.
Location: Clark County: Second Principal Meridian, Township 11N, Range 13W, Section 36.
Ownership: Dykstra.
Reference: Meents (1981).
Current Status: ?

Sailor Springs.
Location: Clay County: 8 miles east of Louisville. Third Principal Meridian, Township 4N, Range 7E, Section 25, SW/4, NW/4, NE/4, NE/4, 850' W, 300' S of NE corner. U.T.M. Zone 16, $^{3}81^{360}$ m^{E} $^{42}91^{140}$ m^{N}. Quadrangle: Sailor Springs, IL., 7.5', 1985 edition.
Elevation: 439' (MSL)
Hydrogeology: water temperature 56° F; discharge 1/2 gpm.
Ownership: Adam Noll, Clay City.
Reference: Meents (1967, 1981), Palmer (1909).
Current Status: ?

Unnamed Spring #75.
Location: Clay County: Third Principal Meridian, Township 5N, Range 5E, Section 16, NE/4, SE/4, SW/4, NW/4, about 1000' E, 2200' S of NW corner. U.T.M. Zone 16, $^{3}56^{735}$ m^{E} $^{43}04^{515}$ m^{N}. Quadrangle: Edgewood, IL., 7.5', 1985 edition.
Elevation: 520' (MSL).
Ownership: John Liggett.
Reference: Meents (1970).
Current Status: ?

Watson Spring.
Location: Clinton County: Third Principal Meridian, Township 3N, Range 1W, Section 2, NW/4, NW/4, SE/4, SE/4. U.T.M. Zone 16, $^{3}12^{145}$ m^{E} $^{42}88^{420}$ m^{N}. Quadrangle: Boulder, IL., 7.5', 1969 edition.
Elevation: 470' (MSL).
Reference: Meents (1975)
Current Status: ?

Alcyone Spring.
Location: Cook County.
Reference: Palmer (1909).
Current Status: ?

Sylvan Dell Sulpho-Magnesian Spring.
Location: Cook County.
Reference: Palmer (1909).
Current Status: ?

Cumberland Springs.
Location: Cumberland County.
Reference: Palmer (1909).
Current Status: ?

Unnamed Spring #99.
Location: DeKalb County: One mile southeast of Shabbona. Third Principal Meridian, Township 38N, Range 3E, Section 23, SW/4, NE/4, SW/4, NW/4 [Section not a full square]. U.T.M. Zone 16, $^{3}45^{220}$ m^{E} $^{46}24^{140}$ m^{N}. Quadrangle: Waterman, IL., 7.5', 1971 edition.
Current Status: ?

Weldon Springs.
Location: DeWitt County: Third Principal Meridian, Township 19N, Range 2E, Section 12.
Reference: Meents (1981).
Current Status: ?

Unnamed Spring #58.
Location: DeWitt County: Third Principal Meridian, Township 21N, Range 3E, Section 36, NE/4, SW/4, NW/4, NE/4. U.T.M. Zone 16, $^{3}45^{930}$ m^{E} $^{44}55$ 390 m^{N}. Quadrangle: DeWitt, IL., 7.5', 1979 edition.
Elevation: 725' (MSL).
Current Status: ?

Patterson Spring.
Location: Douglas County: Third Principal Meridian, Township 16N, Range 9E, Section 33, NE/4, NW/4, SW/4, SE/4. U.T.M. Zone 16, $^{3}98^{400}$ m^{E} $^{44}05^{420}$ m^{N}. Quadrangle: Villa Grove, IL., 7.5', 1982 edition.
Elevation: 636' (MSL).
Current Status: This spring is encased in a concrete brick housing and flows slowly some 150 feet northeast into the Embarras River. The water is used for drinking water and to fill a swimming pool.

Unnamed Spring #56.
Loction: Douglas County: Third Principal Meridian, Township 15N, Range 10E, Section 12, NW/4, NW/4, NW/4, SW/4. U.T.M. Zone 16, $^{4}10^{600}$ m^{E} $^{44}01^{550}$ m^{N}. Quadrangle: Murdock, IL., 7.5', 1982 edition.
Elevation: 630' (MSL).
Current Status: ?

Unnamed Spring #85.
Location: Edgar County: Third Principal Meridian, Township 15N, Range 11W, Section 31.
Ownership: William Cheatham.
Reference: Meents (1981).
Current Status: ?

Unnamed Spring #110.
Location: Edgar County: Third Principal Meridian, Township 16N, Range 11W, Section 35, SW/4, 1500' west of line, 750' south of line.
Current Status: Bedrock spring?

Unnamed Spring #16.
Location: Fayette County: Third Principal Meridian, Township 5N, Range 1W, Section 21, NW/4, SE/4, NW/4, SW/4. U.T.M. Zone 16, $^{3}08^{315}$ m^{E} $^{43}03^{545}$ m^{N}. Quadrangle: Wildcat Lake, IL., 7.5', 1974 edition.
Elevation: 510' (MSL).
Current Status: ?

Unnamed Spring #18.
Location: Fayette County: Third Principal Meridian, Township 8N, Range 1W, Section 17, NE/4, SW/4, SW/4, SW/4. U.T.M. Zone 16, $^{3}07^{195}$ m^{E} $^{43}33^{515}$ m^{N}. Quadrangle Ramsey Lake, IL., 7.5', 1974 edition.
Elevation: 600' (MSL).
Current Status: ?

Deppler Spring.
Location: Fulton County: Fourth Principal Meridian, Township 5N, Range 3E, Section 8.
Reference: Meents (1975).
Current Status: ?

Red Avon Spring.
Location: Fulton County. Fourth Principal Meridian.
Reference: Palmer (1909).
Current Status: ?

Coulter Spring.
Location: Gallatin County: Township 10S, Range 5E, Section 33.
Reference: Hopkins (1969).
Current Status: ?

Negro Spring Salt Well.
Location: Gallatin County: Third Principal Meridian, Township 9S, Range 8E, Section 26, SW/4, NW/4, SE/4, SW/4. U.T.M. Zone 16, $^{3}85^{890}$ m^{E} $^{4}173^{645}$ m^{N}. Quadrangle: Equality, IL., 7.5', 1959 edition photorevised 1990.
Elevation: 350' (MSL).

Flora: (Floral inventory conducted by Dr. L. R. Phillippe, Center for Biodiversity, INHS). Negro Springs Salt Well is located along a small intermittent stream with banks dominated by *Acer saccharinum* L. (silver maple) and *Fraxinus pennsylvanica* Marsh (green ash). Although a true shrub layer was lacking, young silver maple were dominant in the shrub stratum. The dominant herbaceous vegetation along the course of the spring was *Leersia virginica* Willd. (white grass), *Aster fragilis* (brittle aster), and locally abundant *Boehmeria cylindrica* (L.) Sw. (false nettle). Of the six vine taxa seen along the spring, *Toxicodendron radicans* (L.) Kuntze (poison ivy) was dominant.

Other trees associated with Negro Spring Salt Well were *Carya illinoensis* (Wang.) K. Koch (pecan), *Celtis laevigata* Willd. (sugarberry), *Taxodium distichum* (L.) Rich (bald cypress), and *Ulmus rubra* Muhl. (slippery elm).

Other herbs associated with Negro Spring Salt Well were *Acalypha rhomboidea* Raf. (three-seeded mercury), *Bidens vulgata* Greene (tall beggar-ticks), *Carex* sp. (sedge), *Chasmanthium latifolium* (Michx.) Yates (sea oats), *Elymus virginicus* L. (Virginia wild rye), *Eupatorium coelestinum* L. (mistflower), *Laportea canadensis* (L.) Wedd. (wood nettle), *Lysimachia ciliata* L. (fringed loosestrife), *Phytolacca americana* L. (pokeweed), *Pilea pumila* (L.) Gray (clearweed), *Polygonum hydropiper* L. (smartweed), *Polygonum virginianum* L. (Virginia knotweed), *Ruellia strepens* L. (smooth ruellia), *Tradescantia subaspera* Kerr. (spikerwort), and *Vernonia missurica* Raf. (Missouri ironweed).

Other vines associated with Negro Spring Salt Well were *Campsis radicans* (L.) Seem. (trumpet creeper), *Cocculus carolinus* (L.) DC. (snailseed), *Lonicera japonica* Thunb. (Japanese honeysuckle), *Smilax hispida* Muhl. (bristly catbrier), and *Vitis cinerea* Engelm. (winter grape).

Reference: Meents (1969, 1981).
Ownership: State.
Current Status: ?

Unnamed Spring #90
Listed in text of this report.

Dodson Spring.
Location: Greene County: Third Principal Meridian, Township 9N, Range 12W, Section 22, SW/4, SE/4, SE/4, SE/4. U.T.M. Zone 15, $^{7}23^{620}$ mE $^{43}42^{455}$ mN. Quadrangle: Boyer Creek, IL., 7.5', 1983 edition.
Elevation: 512' (MSL).
Current status: ?

Old Settlers Spring.
Location: Greene County: Third Principal Meridian, Township 11N, Range 13W, Section 23, SW/4, NE/4, NE/4, NE/4. U.T.M. Zone 15, $^{7}14^{500}$ mE $^{43}62^{710}$ mN. Longitude 90° 30' 34" W, Latitude 39° 23' 22" N. Quadrangle: Pearl East, IL., 7.5', 1980 edition.
Elevation: 480' (MSL).
Current Status: ?

Sulphur Spring.
Location: Grundy County: near Coal City. Third Principal Meridian.
Reference: Meents (1975).
Current Status: ?

Calumet Springs.
Location: Hancock County: Fourth Principal Meridian, Township 4N, Range 5W, Section 21, SE/4, NW/4, SW/4, NE/4. U.T.M. Zone 15, $^{6}32^{550}$ mE $^{44}65^{120}$ mN. Longitude 91° 26' 24" W, Latitude 40° 19' 41" N. Quadrangle: Warsaw, Ill.-Mo., 7.5', 1964 edition, photorevised 1975.
Elevation: 490' (MSL).
Current Status: ?

Unnamed Spring #64 (in Wildcat Springs Park).
Location: Hancock County: Fourth Principal Meridian, Township 5N, Range 8W, Section 20, SW/4, SE/4, SW/4, SW/4. U.T.M. Zone 15, $^{6}40^{335}$ mE $^{44}73^{740}$ mN. Quadrangle: Hamilton, Ill.-Iowa, 7.5', 1964 edition, photorevised 1975.
Elevation: 560' (MSL).
Reference: Meents (1973, 1975)
Current Status: ?

Decker Spring.
Location: Hardin County: Third Principal Meridian, Township 11S, Range 9E, Section 36, SW/4, NW/4, SW/4, SW/4 (800' N, 200' E of SE corner). U.T.M. Zone 16, $^{3}86^{660}$ mE $^{41}52^{370}$ mN. Longitude 88° 16' 56" W, Latitude 37° 30' 48" N. Quadrangle: Karbers Ridge, IL., 7.5', 1959 edition, photorevised 1976.
Elevation: 410' (MSL).
Hydrogeology: Spring head length 2', width 6', water temperature 65° F, discharge 500 gpm.
Fauna: Minnows.
Flora: Large elm tree at opening, pink-green water "grass", moss.
Reference: Meents (1968, 1975).
Owner: Sol Winter, Route 2, Box 154, Elizabethtown, IL. 62931
Current Status: Supplies two homes with drinking and cooking water.

Kaskaskia Spring.
Listed in text of this report.

Marsh Spring.
Location: Hardin County: Third Principal Meridian, Township 11S, Range 8E, Section 33.
Reference: Hopkins (1969).
Current Status: ?

Old Driver Spring.
Listed in text of this report.

Rose Spring.
Listed in text of this report.

Round Spring.
Location: Hardin County: 2 miles west of Cave In Rock. Third Principal Meridian, Township 12S, Range 9E, Section 15, SE/4, SE/4, SW/4, SW/4, 20' N, 1100' E of SW corner. U.T.M. Zone 16, $^{3}93^{425}$ m^{E} $^{4}1_{4}7^{095}$ m^{N}. Longitude 88° 12' 20" W, Latitude 37° 27' 59" N. Quadrangle: Cave in Rock, Ky.-IL., 7.5', 1958 edition.
Elevation: 340' (MSL).
Fauna: Fish: *Campostoma anomalum, Pimephales notatus, Semotilus atromaculatus, Etheostoma squamiceps.*
Current Status: ?

Unnamed Spring #7.
Location: Hardin County: Third Principal Meridian, Township 12S, Range 10E, Section 28, SW/4, SE/4, SW/4, NW/4. U.T.M. Zone 16, $^{4}01^{755}$ m^{E} $^{4}1_{5}4^{300}$ m^{N}. Quadrangle: Dekoven, IL., 7.5', 1959 edition.
Elevation: 420' (MSL).
Current Status: ?

Unnamed Spring #65.
Location: Henderson County: Fourth Principal Meridian, Township 8N, Range 6W, Section 34, SE/4, SW/4, SE/4, SE/4. U.T.M. Zone 15, $^{6}63^{750}$ m^{E} $^{4}4_{9}9^{910}$ m^{N}. Quadrangle: Lomax, Ill.-Iowa, 7.5', 1964 edition.
Elevation: 690' (MSL).
Current Status: ?

Unnamed Spring #66.
Location: Henderson County: Third Principal Meridian, Township 8N, Range 6W, Section 33, NE/4, SW/4, NE/4, NE/4. U.T.M. Zone 15, $^{6}62^{110}$ m^{E} $^{4}5_{0}1^{290}$ m^{N}. Quadrangle: Lomax, Ill.-Iowa, 7.5', 1964 edition.
Elevation: 570' (MSL).
Current Status: ?

Miller Spring.
Location: Iroquois County: Cissna Park, covered by pond (Miller Spring Lake?), Second Principal Meridian, Township 25N, Range 13W, Section 30.
Reference: Meents (1975)
Current Status: ?

Ava Cave.
Location: Jackson County: Third Principal Meridian, Township 8S, Range 4W, Section 4, SW/4, NW/4, SW/4, SE/4. U.T.M. Zone 16, $^{2}75^{500}$ m^{E} $^{4}192^{660}$ m^{N}. Quadrangle: Raddle, IL., 7.5', 1968 edition, photorevised 1990.
Ownership: private/public.
Reference: West (1980).
Current Status: ?

Clear Creek Spring.
Listed in text of this report.

Unnamed spring #92.
Location: Jackson County: Third Principal Meridian, Township 8S, Range 5W, Section 23, SW/4, SW/4, SW/4, NE/4. U.T.M. Zone 16, $^{2}67^{440}$ m^{E} $^{4}193^{580}$ m^{N}. Quadrangle: Rockwood, IL., 7.5', 1968 edition.
Elevation: 580' (MSL).
Hydrogeology: This spring has a single small head at the base of sandstone depression with a depth of 1-2 inches. The outflow immediately flows into a 3 foot diameter pool, 1-2 inches deep, then flows north at a width of 6-8 inches and 1-2 inches deep for 50 feet to a culvert under a county road, their forming a small tributary of Little Mill Creek Water temperature 13.8^{o} C, dissolved oxygen 9.5 mg/L,
Flora: no vegetation in spring except moss on rocks; along margin poison ivy, Christmas ferns, *Solidago* sp. with a scattering on White Ash and *Liriodendron tulipifera* trees
Current Status: ?

Unnamed spring #101.
Location: Jackson County: Third Principal Meridian, Township 8S, Range 5W, Section 3, NW/4, SE/4, NE/4, NE/4. U.T.M. Zone 16, $^{2}68^{080}$ m^{E} $^{4}194^{060}$ m^{N}. Quadrangle: Rockwood, IL., 7.5', 1968 edition.
Elevation: 580' (MSL).
Current Status: No spring could be located (Webb 30 September 1992).

Unnamed spring #102 [possibly Boone Spring].
Location: Jackson County: Third Principal Meridian, Township 10S, Range 3W, Section 6, NE/4, SE/4, SW/4. U.T.M. Zone 16, $^{2}81^{230}$ m^{E} $^{4}172^{870}$ m^{N}. Quadrangle: Gorham, IL., 7.5', 1947 edition, photorevised 1978.
Elevation: 420' (MSL).
Hydrogeology: This is a contact spring where sandstone is in contact with underlying shaly limestone.
Current Status: This spring has been refurbished to provide drinking water. A 3 foot diameter and 10 foot long galvanized culvert has been sunk into the spring at the base of a Pennsylvanian sanstone bluff to prevent mixing of surface runoff water; from this runs a 2 inc diameter PVC discharge pipe to the edge of Illinois highway 3 . with a discharge of 10 gpm.

Green Lawn Springs.
Location: Jefferson County.
Reference: Palmer (1909).
Current Status: ?

Clary Spring.

Location: Jersey County: Third Principal Meridian, Township 7N, Range 13W, Section 22, NE/4, SW/4, SE/4, SW/4. U.T.M. Zone 15, $^{7}13^{710}$ m^{E} $^{43}22^{730}$ m^{N}. Longitude: 90° 31' 52" W, Latitude 39° 01' 46" N. Quadrangle: Nutwood, IL., 7.5', 1975 edition.
Elevation: 500' (MSL).
Reference: Meents (1979)
Current Status: ?

Clay Spring.
Location: Jersey County: Third Principal Meridian, Township 7N, Range 13W, Section 22, NE/4, SW/4, SE/4, SW/4. U.T.M. Zone 15, $^{7}13^{710}$ m^{E} $^{43}22^{730}$ m^{N}. Longitude 90° 31' 52" W, Latitude 39° 01' 46" N. Quadrangle: Nutwood, IL., 7.5', 1975 edition.
Elevation: 500' (MSL).
Current Status:

John Dunham Spring.
Location: Jersey County: Third Principal Meridian, Township 8N, Range 12W, Section 5, NW/4, SW/4, NE/4, SW/4. U.T.M. Zone 15, $^{7}19^{480}$ m^{E} $^{43}37^{975}$ m^{N}. Quadrangle: Boyer Creek, IL., 7.5', 1983 edition.
Elevation: 492' (MSL).
Current Status: ?

Unnamed Spring #19.
Location: Jersey County: Third Principal Meridian, Township 8N, Range 12W, Section 8, NW/4, NW/4, NE/4, SE/4. U.T.M. Zone 15, $^{7}20^{340}$ m^{E} $^{43}36^{585}$ m^{N}. Quadrangle: Boyer Creek, IL., 7.5', 1983 edition.
Elevation: 492' (MSL).
Current Status: ?

Bell Pond.
Location: Johnson County: Third Principal Meridian, Township 13S, Range 4E, Section 14, SE/4, SE/4, NE/4, NE/4. U.T.M. Zone 16, $^{3}46^{910}$ m^{E} $^{41}39^{300}$ m^{N}. Quadrangle: Glendale, IL., 7.5', 1962 edition.
Hydrogeology: Water temperature 12.6° C; specific conductivity 562 umHOS; *pH* 6.9; alkalinity 74.0 mg/L^{2} $CaCO_{2}$ (Webb 15 September 1992)
Reference: West (1980).
Current Status: This spring flows slowly into the south edge of Grantsburg swamp (Webb, 15 September 1992).

Bird Spring.
Location: Johnson County: 1.2 mi NNE Belknap, Third Principal Meridian, Township 13S, Range 2E, Section 36.
Current Status: ?

Casey Spring.
Location: Johnson County: Third Principal Meridian, Township 12S, Range 3E, Section 26, NE/4, NW/4, NE/4, SE/4. U.T.M. Zone 16, $^{3}37^{140}$ m^{E} $^{41}45^{640}$ m^{N}. Longitude 88° 50' 29" W, Latitude 37° 26' 43" N. Quadrangle: Bloomfield, IL., 7.5', 1966 edition, photorevised 1978.
Elevation: 440' (MSL).
Current Status: This spring begin as a seep area on the slope of pastureland and is the source of a tributary of Little Cache Creek (Webb 1992).

Shoemaker Spring.
Location: Johnson County: Township 12S, Range 3E, Section 14, NE/4, SE/4, SW/4, SW/4. U.T.M. Zone 16, $^{3}36^{170}$ m^{E} $^{4}1^{48}450$ m^{N}. Quadrangle: Longitude 88° 51' 10" W, Latitude 37° 28' 13" N. Bloomfield, IL., 7.5', 1966 edition, photorevised 1978.
Elevation: 430' (MSL).
Current Status: ?

Unnamed Spring #6.
Location: Johnson County: Third Principal Meridian, Township 13S, Range 2E, Section 30, NE/4, NW/4, NW/4, SW/4. U.T.M. Zone 16, $^{3}19^{120}$ m^{E} $^{4}1^{35}640$ m^{N}. Quadrangle: Cypress, IL., 7.5', 1966 edition.
Elevation: 370'.
Current Status: ?

Unnamed Spring #103.
Location: Johnson County: Township 11S, Range 2E, Section 27, SW/4, NW/4, NE/4, SW/4. U.T.M. Zone 16, $^{3}25^{250}$ m^{E} $^{4}1^{55}370$ m^{N}. Quadrangle: Goreville, IL., 7.5', 1966 edition, photorevised 1978.
Elevation: 650' (MSL).
Hydrogeology: This spring has two openings at the base of a sandstone cliff. Opening number 1 begins as a seep from the base of the cliff with a depth of 1-2" and an estimated flow of 10 gpm; the second opening begins as a seep west of opening number 1 with an estimated flow of 10 gpm. The outflow from these two openings flows north, down the hillside to end in a man-made reservoir. The bottom substrate of the outflow is sand and gravel. Water temperature 12.9° C; specific conductivity 181 umHOS, *pH* 6.2, alkalinity 74 mg/L^{2} $CaCO_2$ (Webb 15 September 1992).

Aurora Lithia Springs.
Location: Kane/Kendall County.
Reference: Palmer (909).
Current Status: ?

Montgomery Magnesia.
Location: Kane/Kendall County.
Reference: Palmer (1909).
Current Status: ?

Zonian Spring.
Location: Kane County.
Reference: Palmer (1909).
Current Status: ?

Min-Ni-Yan Spring.
Location: Kendall County.
Reference: Palmer (1909).
Current Status: ?

Aqua Vitae Spring.
Location: Knox County.
Reference: Palmer (1909).
Current Status: ?

Deerlick Spring.
Location: Lake County.
Reference: Palmer (1909).
Current Status: ?

Glenn Floral Spring.
Location: Lake County.
Reference: Palmer (1909).
Current Status: ?

Purix Spring.
Location: Lake County.
Reference: Palmer (1909).
Current Status: ?

Brookfield Spring.
Location: LaSalle County: Third Principal Meridian, Township 33N, Range 5E, Section 29, NW/4, NW/4, NE/4, SE/4, 800' W, 2500' N of SE corner, just a few feet south of EW road. U.T.M. Zone 16 $^{3}60^{120}$ m^{E} $^{43}73^{515}$ m^{N}. Longitude 88° 40' 12" W, Latitude 41° 18' 11" N. Quadrangle: Marseilles, IL., 7.5', 1970 edition, photorevised 1980.
Elevation: 510' (MSL).
Ownership: C.E. Nicholson "Mullady Farm".
Current Status: ?

St. Joseph Mineral Springs.
Location: LaSalle County: Third Principal Meridian, Township 34N, Range 4E, Section 16, 2250' W, 1350' S of NE corner, a few feet E of Fox River.
Elevation: 500' (MSL).
Reference: Meents (1967).
Current Status: ?

Sanicula Spring.
Location: LaSalle County: Third Principal Meridian.
Reference: Palmer (1909).
Current Status: ?

Stiver Springs.
Location: Lawrence County: Second Principal Meridian, Township 4N, Range 12W, Section 18, SE/4, SE/4, NW/4, SE/4. Longitude 87° 47' 02" W, Latitude 38° 41' 18" N. Quadrangle: Sumner (Berryville 7.5'), 15', 1913 edition.
Elevation: 500' (MSL).
Reference: Meents (1975).
Current Status: ?

Mill Spring.
Location: Lee County: 4 km WNW Franklin Grove, Fourth Principal Meridian, Township 22N, Range 10E, Section 33, SW/4, NW/4, NW/4, NE/4, SE/4. U.T.M. Zone 16, $^{3}05^{225}$ m^{E} $^{46}35^{670}$ m^{N}. Quadrangle: Sumner (Berryville 7.5'), 15', 1913 edition.
Elevation: 709' (MSL).
Current Status: ?

Gold Spring.
Location: Logan County: SE of Union and N of Lincoln. Third Principal Meridian, Township 22N, Range 2W, Section 17, NW/4, SW/4, SE/4, SE/4. Longitude 89° 20' 32" W, Latitude 40° 16' 00" N. Quadrangle: Minier, IL., 15', 1951 edition.
Elevation: 590' (MSL).
Reference: Meents (1962).
Current Status: ?

Boiling Springs.
Location: Macon County: Township 17N, Range 2E, Section 32, 2650' N, 2150" W,of SE corner (about 60'W of bridge and 10' S of road).
Elevation: 625' (MSL).
Ownership: Bayne B. Tomlison, RR 3 Decatur.
Reference: Meents (1967, 1981), Palmer (1909).
Current Status: ?

Rock Spring.
Location: Macon County: Township 16N, Range 1E, Section 19, NE/4, NW/4, NW/4, SW/4. Longitude 89° 01' 38" W, Latitude 39° 49' 26" N. Quadrangle: Niantic, Ill.(SW/4=7.5'), 15', 1954 edition.
Reference: Meents (1975).
Current Status: ?

Unnamed Spring #82.
Location: Macon County: Township 16N, Range 4E, Section 31.
Reference: Meents (1973).
Current Status: ?

Unnamed Spring #84.
Location: Macon County: Township 15N, Range 3E, Section 1,
Elevation: 712' (MSL).
Ownership: Robert Rowe.
Reference: Meents (1981).
Current Status: ?

Diamond Mineral Springs.
Location: Madison County: Township 5N, Range 5W, Section 33, about 1000' E, 300' N of SW corner.
Elevation: 520'-530' (MSL).
Reference: Meents (1969).
Current Status: Meents (1969) reported it as a Spa/Resort.

Unnamed Spring #13.
Location: Marion County: Township 3N, Range 2E, Section 15, NW/4, SE/4, NE/4, SE/4. U.T.M. Zone 16, $^{3}29^{510}$ m^{E} $^{42}84^{830}$ m^{N}. Quadrangle: Salem North, IL., 7.5', 1965, 1978 editions.
Elevation: 575' (MSL).
Current Status: ?

Revis Spring.
Location: Mason County: Township 20N, Range 7W, Section 26, SW/4, NW/4, NE/4, NW/4. U.T.M. Zone 16, $^{2}56^{3}10$ m^{E} $^{4}4^{4}9^{5}50$ m^{N}. Longitude 89° 51' 41" W, Latitude 40° 09' 46" N. Quadrangle: Easton, IL., 7.5', 1971 edition.
Elevation: 530' (MSL).
Reference: Meents (1975).
Current Status: ?

Mill Spring.
Location: Massac County: 6 mi NE of Brookport, Third Principal Meridian, Township 15S, Range 6E, Section 16, NW/4, SE/4, NW/4, NW/4. U.T.M. Zone 16, $^{3}61^{2}40$ m^{E} $^{4}1^{1}9^{9}90$ m^{N}. Quadrangle: Paducah NE, IL., 7.5', 1967 edition.
Hydrogeology: Diameter of spring head 2 feet; water tempterature 14.1° C; Specific conductivity 299 umHOS; dissolved oxygen 4.8 mg/L (Webb October 1, 1992).
Elevation: 380' (MSL).
Current Status: This spring flows from the edge of a tributary to Barren Creek.

Vishnu Springs.
Location: McDonough County: Fourth Principal Meridian, Township 5N, Range 4W, Section 7, 1600' W, 800' N of SE corner,.
Elevation: 600' (MSL).
Reference: Meents (1967, 1975).
Current Status: ?

Unnamed Spring #88.
Location: McLean County: Saybrook, (country club?).
Reference: Meents (1975).
Current Status: ?

Abana Mineral Springs.
Location: McHenry County: Third Principal Meridian, Township 43N, Range 9E, Section 18, SW/4, SW/4, NE/4, NE/4. U.T.M. Zone 16, $^{3}99^{0}25$ m^{E} $^{4}6^{7}3^{0}80$ m^{N}. Quadrangle: Barrington, IL., 7.5', 1960 edition, photorevised 1980.
Elevation: 740' (MSL).
References: Meents (1973, 1975), Palmer (1909).
Current Status: ?

Unnamed Spring #14.
Location: Monroe County: Camp Vanderventer, Third Principal Meridian, Township 2S, Range 10W, Section 21, SE/4, NW/4, SE/4, SE/4. U.T.M. Zone 15, $^{7}44^{3}55$ m^{E} $^{4}2^{4}7^{2}00$ m^{N}. Quadrangle: Waterloo, IL., 7.5', 1954, editionl, photorevised 1974 .
Elevation: 440' (MSL).
Current Status: ?

Unnamed Spring #17.
Location: Monroe County: Third Principal Meridian, Township 2S, Range 9W, Section 19, SW/4, SE/4, SE/4, NE/4. U.T.M. Zone 15, $^{7}50^{8}40$ m^{E} $^{4}2^{4}8^{0}10$ m^{N}. Quadrangle: Waterloo, IL., 7.5', 1954, edition, photorevised 1974 .
Elevation: 650' (MSL).
Ownership: Warren Ostehage.
Current Status: ?

Unnamed Spring #32.
Location: Monroe County: Third Principal Meridian, Township 3S, Range 10W, Section 19, NW/4, SW/4, SW/4, NW/4. U.T.M. Zone 15, $^{7}41^{675}$ m^{E} $^{42}38^{250}$ m^{N}. Quadrangle: Waterloo, IL., 7.5', 1954, edition, photorevised 1974 .
Elevation: 690' (MSL).
Ownership: Floton
Current Status: ?

Unnamed Spring #53 (Valley Spring?).
Location: Monroe County: Waterloo Sportsman Club. Third Principal Meridian, Township 3S, Range 9W, Section 29, NW/4, NW/4, NE/4, NE/4. U.T.M. Zone 15, $^{7}52^{515}$ mE $^{42}37^{495}$ m^{N}. Quadrangle: Paderborn, IL., 7.5', 1954 edition, photorevised 1974.
Elevation: (MSL).
Current Status: ?

Unnamed Spring #54 (Big Spring?).
Location: Monroe County: Third Principal Meridian, Township 4S, Range 9W, Section 27, SW/4, NW/4, SW/4, SE/4. U.T.M. Zone 15, $^{7}54^{035}$ mE $^{42}29^{810}$ m^{N}. Quadrangle: Ames, IL., 7.5', 1970 edition.
Elevation: 600' (MSL).
Current Status: ?

Unnamed Spring #55.
Location: Monroe County: Third Principal Meridian, Township 4S, Range 10W, Section 27, NW/4, SE/4, NW/4, NW/4. U.T.M. Zone 15, $^{7}45^{455}$ m^{E} $^{42}27^{385}$ m^{N}. Quadrangle: Renault, IL., 7.5', 1970 edition.
Elevation: 560' (MSL)
Ownership: Hooten.
Current Status: ?

Unnamed Spring #70.
Location: Monroe County: Third Principal Meridian, Township 2S, Range 10W, Section 7, SW/4, SE/4, SW/4, NE/4. U.T.M. Zone 15, $^{7}40^{650}$ m^{E} $^{42}51^{030}$ m^{N}. Quadrangle: Columbia, IL., 7.5', 1955 edition, photorevised 1974.
Elevation: 420' (MSL).
Current Status: ?

Unnamed Spring #71.
Location: Monroe County: Third Principal Meridian, Township 2S, Range 10W, Section 12, NE/4, NE/4, NW/4, SE/4. U.T.M. Zone 15, $^{7}48^{910}$ m^{E} $^{42}51^{110}$ m^{N}. Quadrangle: Columbia, IL., 7.5', 1955 edition, photorevised 1974.
Elevation: 630' (MSL).
Current Status: ?

Unnamed Spring #72.
Location: Monroe County: Third Principal Meridian, Township 31S, Range 10W, Section 31, NE/4, SE/4, NE/4, NW/4. U.T.M. Zone 15, $^{7}40^{350}$ m^{E} $^{42}54^{800}$ m^{N}. Longitude 90° 14' 50" W, Latitude 38° 24' 40" N. Quadrangle: Columbia, IL., 7.5', 1955 edition, photorevised 1974.
Elevation: 450' (MSL).
Ownership: Terry.
Current Status: ?

Duncan Spring.
Location: Morgan County: Third Principal Meridian, Township 16N, Range 11W, Section 27, SE/4, SW/4, NW/4, NW/4. U.T.M. Zone 15 $^{7}28^{340}$ m^{E} 44 10^{270} m^{N}. Quadrangle: Concord, IL., 7.5', 1983 edition.
Elevation: 522' (MSL).
Current Status: ?

Unnamed Spring #67.
Location: Ogle County: Fourth Principal Meridian, Township 40N, Range 1E, Section 8, SW/4, NW/4, NE/4, NE/4. U.T.M. Zone 16 $^{3}22^{955}$ m^{E} $^{46}47^{400}$ m^{N}. Quadrangle: Chana, IL., 7.5', 1975 edition.
Elevation: 820' (MSL).
Current Status: ?

Unamed Spring #76.
Location: Ogle County: Fourth Principal Meridian, Township 22N, Range 10E, Section 12, NW/4, NW/4, SE/4, SW/4, 1800' E, 1000' N of SW corner. U.T.M. Zone 16, $^{3}09^{460}$ m^{E} $^{46}41^{630}$ mN. Quadrangle: Daysville, IL., 7.5', 1983 edition.
Elevation: 775' (MSL).
Ownership: Bernard DeDecker.
Reference: Meents (1968).
Current Status: ?

Unamed Spring #104.
Location: Ogle County: Fourth Principal Meridian, Township 23N, Range 10E, Section 1, NW/4. U.T.M. Zone 16. Quadrangle: Oregon, IL., 7.5', provisional edition 1983.
Current Status: ?

Unamed Spring #105.
Location: Ogle County: Fourth Principal Meridian, Township 24N, Range 10E, Section 11/12. U.T.M. Zone 16. Quadrangle: Oregon, IL., 7.5', provisional edition 1983.
Current Status: ?

Unamed Spring #106.
Location: Ogle County: Fourth Principal Meridian, Township 23N, Range 9E, Section 9. U.T.M. Zone 16. Quadrangle: Grand Detour, IL., 7.5', provisional edition 1983.
Current Status: ?

Unnamed Spring #77.
Location: Piatt County: Third Principal Meridian, Township 18N, Range 5E, Section 15,1800' N, 2100' E of SW corner (725' S of road). Quadrangle: Monticello, 15'.
Discharge: 2 1/4 gpm.
Ownership: James E. Carney, RR Monticello, IL. 61856 (217-762-2795).
Reference: Meents (1979).
Current Status: ?

Unnamed Spring #86.
Location: Piatt County: Deland.
Reference: Meents (1975)
Current Status: ?

Unnamed Spring #107.
Location: Piatt County: Third Principal Meridian, Township 18N, Range 5E, Section 28, NW/4, NE/4. Quadrangle: Cerro Gordo, IL., 7.5', 1983 edition.
Hydrogeology: This is a perched contact spring with two openings emerging from a hillside.
Current Status: ?

Anderson Spring.
Location: Pike County: 4.0 km North of Valley City, Fourth Principal Meridian, Township 15N, Range 2W, Section 5, SW/4, SW/4, NE/4, SW/4. U.T.M. Zone 15, $^{7}00^{465}$ m^{E} $^{44}01^{450}$ m^{N}. Quadrangle: Griggsville, IL., 7.5', 1980 edition.
Elevation: 450' (MSL).
Current Status: ?

Jennings Spring.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 6W, Section 31, NW/4, NW/4, NW/4, NW/4. U.T.M. Zone 15, $^{6}64^{260}$ m^{E} $^{43}92^{535}$ m^{N}. Longitude 91° 05' 06" W, Latitude 39° 40' 07" N. Quadrangle: Barry, IL., 7.5', 1978 edition.
Elevation: 610' (MSL).
Current Status: ?

Perry Spring.
Location: Pike County: Fourth Principal Meridian, Township 3S, Range 3W, Section 24, 100' E, 20' S of NW corner.
Elevation: 480' (MSL).
Reference: Meents (1975, 1967), Palmer (1909).
Current Status: ?

Weber Spring.
Location: Pike County: Fourth Principal Meridian, Township 4S, Range 6W, Section 23, NE/4, NW/4, SE/4, NW/4. U.T.M Zone 15, $^{6}66^{225}$ m^{E} $^{43}96^{990}$ m^{N}. Longitude 91° 03' 38" W, Latitude 39° 42' 31" N. Quadrangle: Barry, IL., 7.5', 1978 edition.
Elevation: 590' (MSL).
Current Status: ?

Winegar Spring.
Location: Pike County: 2.7 km North of Valley City, Fourth Principal Meridian, Township 15N, Range 2W, Section 8, NE/4, NE/4, NE/4, SW/4. U.T.M. Zone 15, $^{7}00^{870}$ m^{E} $^{44}00^{145}$ m^{N}. Quadrangle: Griggsville, IL., 7.5', 1980 edition.
Elevation: 460' (MSL).
Current Status: ?

Unnamed Spring #22.
Location: Pike County: Fourth Principal Meridian, Township 7S, Range 3W, Section 31, NW/4, NW/4, NW/4, NE/4. U.T.M. Zone 15, $^{6}90^{240}$ m^{E} $^{43}64^{800}$ m^{N}. Quadrange: Pleasant Hill East, IL., 7.5', 1978 edition
Elevation: 600' (MSL).
Current Status: ?.

Unnamed Spring #23.
Location: Pike County: Fourth Principal Meridian, Township 7S, Range 3W, Section 20, NW/4, NE/4, SE/4, SE/4. U.T.M. Zone 15, $692450\ m^E\ 4366865\ m^N$. Quadrangle: Pleasant Hill East, IL., 7.5', 1978 edition.
Elevation: 560' (MSL).
Current Status: ?

Unnamed Spring #24.
Location: Pike County: Fourth Principal Meridian, Township 7S, Range, 4W, Section 4, NW/4, NE/4, NW/4, SE/4. U.T.M. Zone 15, $683710\ m^E\ 4371990\ m^N$. Quadrangle: Pleasant Hill East, IL., 7.5', 1978 edition.
Elevation: 600' (MSL).
Current Status:

Unnamed Spring #29.
Location: Pike County: Fourth Principal Meridian, Township 7S, Range 3W, Section 23, SW/4, SW/4, SW/4, SW/4. U.T.M. Zone 15, $695880\ m^E\ 4366510\ m^N$. Quadrangle: Pearl West, IL., 7.5', 1980 edition.
Elevation: 600' (MSL).
Current Status: ?

Unnamed Spring #30.
Location: Pike County: Fourth Principal Meridian, Township 7S, Range 2W, Section 8, SE/4, NW/4, SE/4, NW/4. U.T.M. Zone 15, $701310\ m^E\ 4370855\ m^N$. Quadrangle: Pearl West, IL., 7.5', 1980 edition.
Elevation: 500' (MSL).
Current Status: ?

Unnamed Spring #31 (Dunton Springs?).
Location: Pike County: Fourth Principal Meridian, Township 7S, Range 3W, Section 1, NW/4, NW/4, NE/4, NE/4. U.T.M. Zone 15, $698700\ m^E\ 4373055\ m^N$. Quadrangle: Pearl West, IL., 7.5', 1980 edition.
Elevation: 580' (MSL).
Current Status: ?

Unnamed Spring #33.
Location: Pike County: Fourth Principal Meridian, Township 7S, Range 2W, Section 15, SE/4, SE/4, SE/4, SW/4. U.T.M. Zone 15, $704580\ m^E\ 4368165\ m^N$. Quadrangle: Pearl East, IL., 7.5', 1980 edition.
Elevation: 460' (MSL).
Current Status: ?

Unnamed Spring #34.
Location: Pike County: Fourth Principal Meridian, Township 7S, Range 2W, Section 15, SE/4, NW/4, NE/4, NW/4. U.T.M. Zone 15, $704385\ m^E\ 4369620\ m^N$. Quadrangle: Pearl East, IL., 7.5', 1980 edition.
Elevation: 460' (MSL).
Current Status: ?

Unnamed Spring #37.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 2W, Section 23, SW/4, NE/4, NW/4, NW/4. U.T.M. Zone 15, $^{7}05^{495}$ m^{E} $^{43}87^{890}$ m^{N}. Quadrangle: Bedford, IL., 7.5', 1980 edition.
Elevation: 430' (MSL).
Current Status: ?

Unnamed Spring #38.
Location: Pike County: Fourth Principal Meridian, Township 6S, Range 4W, Section 21, NE/4, NW/4, NE/4, NW/4. U.T.M. Zone 15, $^{6}83^{090}$ m^{E} $^{43}77^{610}$ m^{N}. Quadrangle: Pittsfield, IL., 7.5', 1981 edition.
Elevation: 630' (MSL).
Current Status: ?

Unnamed Spring #39.
Location: Pike County: Fourth Principal Meridian, Township 6S, Range 4W, Section 33, SW/4, NE/4, SE/4, NW/4. U.T.M. Zone 15, $^{6}83^{230}$ m^{E} $^{43}74^{415}$ m^{N}. Quadrangle: Pittsfield, IL., 7.5', 1981 edition.
Elevation: 540' (MSL).
Current Status: ?

Unnamed Spring #40.
Location: Pike County: Fourth Principal Meridian, Township 6S, Range 4W, Section 33, SW/4, NW/4, SE/4, NW/4. U.T.M. Zone 15, $^{6}83^{035}$ m^{E} $^{43}74^{430}$ m^{N}. Quadrangle: Pittsfield, IL., 7.5', 1981 edition.
Elevation: 520' (MSL).
Current Status: ?

Unnamed Spring #41.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 5W, Section 36, NE/4, SW/4, NE/4, NW/4. U.T.M. Zone 15, $^{6}77^{840}$ m^{E} $^{43}84^{250}$ m^{N}. Quadrangle: Sumner Hill, IL., 7.5', 1981 edition.
Elevation: 660' (MSL).
Current Status: ?

Unnamed Spring #42.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 5W, Section 35, SW/4, SE/4, NW/4, SE/4. U.T.M. Zone 15, $^{6}76^{800}$ m^{E} $^{43}83^{285}$ m^{N}. Quadrangle: Sumner Hill, IL., 7.5', 1981 zone.
Elevation: 620' (MSL).
Current Status: ?

Unnamed Spring #43.
Location: Pike County: Fourth Principal Meridian, Township 6S, Range 5W, Section 4, NE/4, SE/4, NE/4,SE/4. U.T.M. Zone 15, $^{6}74^{000}$ m^{E} $^{43}81^{720}$ m^{N}. Quadrangle: Sumner Hill, IL., 7.5', 1981 edition.
Elevation: 610' (MS).
Current Status: ?

Unnamed Spring #44.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 5W, Section 30, NE/4, SW/4, NE/4, SE/4. U.T.M. Zone 15, 670^{540} m^E 4384^{915} m^N. Quadrangle: Rockport, Ill.-Mo., 7.5', 1978 edition.
Elevation: 600' (MSL).
Current Status: ?

Unnamed Spring #45.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 6W, Section 25, NE/4, NW/4, NW/4, SE/4. U.T.M. Zone 15, 668^{510} m^E 4385^{100} m^N. Quadrangle: Rockport, Ill.-Mo., 7.5', 1978 edition.
Elevation: 600' (MSL).
Current Status: ?

Unnamed Spring #46.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 6W, Section 25, SW/4, NW/4, NW/4, NW/4. U.T.M. Zone 15, 667^{55} m^E 4385^{810} m^N. Quadrangle: Rockport, Ill.-Mo., 7.5', 1978 edition.
Elevation: 600' (MSL).
Current Status: ?

Unnamed Spring #47.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 6W, Section 26, SW/4, NW/4, NW/4, SE/4. U.T.M. Zone 15, 666^{715} m^E 4385^{010} m^N. Quadrangle: Rockport, Ill.-Mo., 7.5', 1978 edition.
Elevation: 540' (MSL).
Current Status: ?

Unnamed Spring #48.
Location: Pike County: Fourth Principal Meridian, Township 5S, Range 5W, Section 20, SW/4, SW/4, SE/4, SW/4. U.T.M. Zone 15, 671^{240} m^E 4386^{010} m^N. Quadrangle: Rockport, Ill.-Mo., 7.5', 1978 edition.
Elevation: 610' (MSL).
Current Status: ?

Unnamed Spring #78.
Location: Pike County: Fourth Principal Meridian, Township 6S, Range 3W, Section 24, SE/4, SW/4, NW/4, SE/4, 1600' N, 1800' W of SE corner. U.T.M. Zone 15, 698^{285} m^E 4376^{830} m^N. Quadrangle: Milton, IL., 7.5', 1981 edition.
Elevation: 555' (MSL).
Hydrogeology: Discharge 20 gpm, water temperatury 54.5° F.
Ownership: Harvey Hack, Milton, IL. 62352.
Reference: Meents (1970, 1981)
Current Status: ?

Bell Smith Springs.
Location: Pope County: Third Principal Meridian, Township 11S, Range 5E, Section 33, 800' W, 2800' S of NE corner .
Discharge: 1-2gpm.
Reference: Meents (1968).
Current Status: This spring flow from beneath a sandstone cliff into Bay Creek.

Caley Spring.

Location: Pope County: 3 mi NW of Hamletsburg, Third Principal Meridian, Township 15S, Range 7E, Section 29, SW/4, NW/4, SW/4, SW/4. U.T.M. Zone 16, $^{3}69^{385}$ m^{E} $^{41}15^{195}$ m^{N}. Longitude 88° 28' 16" W, Latitude 37° 10' 33" N. Quadrangle: Smithland, Ky.-IL., 7.5', 1967 edition.

Elevation: 370' (MSL).

Hydrogeology: The spring opening has a diameter of 3 feet, 1-2 inches deep, with a clay and silt substrate; a four foot high wall of sandstone rocks surrounds three-fourths of the spring opening; water temperature 16.2° C, specific conductivity 218 umHOS, dissolved oxygen 4.7 mg/L. The outflow is 6 inches wide and 1-2 inches deep, and runs some 50 feet east into a tributary of Alcorn Creek; discharge less than 5 gpm (Webb, 1 October 1992). Meets (1971) measured the discharge at 1 gpm.

Flora: Ferns, moss, and liverworts grow on the sandstone walls of the spring head as well as moss in the spring head itself; along the margin of the outflow japanese honeysuckle and multiflora rose are abundant, with scattered plants of *Impatiens biflora* and *Liriondendron tulipifera* saplings (Webb, 1 October 1992).

Reference: Meents (1971)

Current Status: This is a perennial spring which is still active.

Cave Spring.

Location: Pope County: 2 mi NW of Bay City, Third Principal Meridian, Township 14S, Range 6E, Section 27 (550' N, 500' W of SE corner).

Reference: Meents (1971).

Current Status: ?

Claridy Spring.

Location: Pope County: Third Principal Meridian, Township 12S, Range 5E, Section 3, SE/4, NW/4, NE/4, NE/4, SE/4. U. T. M. Zone 16, $^{3}55^{180}$ m^{E} $^{41}51^{820}$ m^{N}. Quadrangle: Stonefort, IL., 7.5', 1961 edition.

Hydrogeology: The single spring head is 3 feet wide and 1 inch deep, flowing from beneath a sandstone cliff; discharge greater than 10 gpm, water temperature 13.3° C, specific conductivity 79, *pH* 6.2, alkalinity 75 mg/L^{2} $CaCO_2$. The outflow initially forms a broad wet area and then flows about 100 feet north as a 1 foot channel, 1-2 inches deep before flowing into a tributary of Spring Branch of Bay Creek (Webb 16 September 1992).

Elevation: 580' (MSL).

Flora: No plants were present in the spring head; the margin of the outflow were dominated by *Impatiens biflora* and grass, with scattered christmas ferns. Sycamores and *Liriodendron tulipifera* were the dominant trees with a few scattered ashes (Webb 16 September 1992).

Reference: Hopkins (1969).

Current Status: This is an active perennial acid spring with a moderate discharge.

Cretaceous Hills Seep Spring 1.

Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section 15, NE/4, SE/4, SW/4, NW/4. U.T.M. Zone 16, $^{3}63^{100}$ m^{E} $^{41}19^{350}$ m^{N}. Quadrangle: Paducah NE, IL., 7.5', 1967 edition.

Elevation: 430' (MSL).

Reference: West (1980).

Ownership: private/public.

Current Status: ?

Cretaceous Hills Seep Spring 2.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section 15, SE/4, NE/4, SW/4, NW/4. U.T.M. Zone 16, $^{3}63^{110}$ m^{E} $^{4}1_{19}^{390}$ m^{N}. Quadrangle: Paducah NE, IL., 7.5', 1967 edition.
Elevation: 440' (MSL).
Reference: West (1980).
Ownership: private/public.
Current Status: ?

Cretaceous Hills Seep Spring 3.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section 15, NW/4, NE/4, SE/4, NW/4. U.T.M. Zone 16, $^{3}63^{370}$ m^{E} $^{4}1_{19}^{500}$ m^{N}. Quadrangle: Paducah NE, IL., 7.5', 1967 edition.
Elevation: 380' (MSL).
Reference: West (1980).
Ownership: private/public.
Current Status: ?

Cretaceous Hills Seep Spring 4.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section, 15, SE/4, NE/4, SE/4, NW/4. U.T.M. Zone 16, $^{3}63^{430}$ m^{E} $^{4}1_{19}^{390}$ m^{N}. Quadrangle: Paducah NE, IL., 7.5', 1967 edition.
Elevation: 380' (MSL)..
Reference: West (1980).
Ownership: private/public.
Current Status: ?

Cretaceous Hills Seep Spring 5.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section, 15, NE/4, SE/4, SE/4, NW/4. U.T.M. Zone 16, $^{3}63^{470}$ m^{E} $^{4}1_{19}^{350}$ m^{N}. Quadrangle: Paducah NE, IL.,7.5', 1967 edition.
Elevation: 390' (MSL).
Reference: West 1980
Ownership: private/public
Current Status: ?

Cretaceous Hills Seep Spring 6.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section, 15, NW/4, SW/4, NW/4, NE/4. U.T.M. Zone 16, $^{3}63^{620}$ m^{E} $^{4}1_{19}^{730}$ m^{N}. Quadrangle: Paducah NE, IL.,7.5', 1967 edition.
Elevation: 400' (MSL).
Reference: West 1980
Ownership: private/public
Current Status: ?

Cretaceous Hills Seep Spring 7.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section, 15, SE/4, NE/4, NE/4, SE/4U.T.M. Zone 16, $^{3}64^{300}$ m^{E} $^{4}1_{19}^{050}$ m^{N}. Quadrangle: Paducah NE, IL.,7.5', 1967 edition.
Elevation: 450' (MSL).
Reference: West (1980)
Ownership: private/public
Current Status: ?

Cretaceous Hills Seep Spring 8.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section, 15, NW/4, SE/4, NW/4, NW/4. U.T.M. Zone 16 , $^{3}62^{965}$ m^{E} $^{41}19^{760}$ m^{N}. Quadrangle: Paducah NE, IL.,7.5', 1967 edition.
Elevation: 460' (MSL).
Reference: West (1980)
Ownership: private/public
Current Status: ?

Cretaceous Hills Seep Spring 9.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section, 15, SW/4, NE/4, NW/4, NW/4. U.T.M. Zone 16, $^{3}62^{960}$ m^{E} $^{41}19^{810}$ m^{N}. Quadrangle: Paducah NE, IL.,7.5', 1967 edition.
Elevation: 460' MSL).
Reference: West (1980)
Ownership: private/public
Current Status: ?

Dixon Springs.
Location: Pope County: Third Principal Meridian.
Reference: Palmer (1909)
Current Status: ?

Klondike Spring.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section 22, U.T.M. Zone 16. Quadrangle: Paducah NE, IL., 7.5', 1967 editon.
Reference: West (1980).
Ownership: Public.
Current Status: This spring is actually a seep in the lowland area north of Dean Cemetary. No discernable flow was evident from this seep into the nearby dry creek bed. (Webb 1 October 1992).

Massac Tower Springs.
Location: Pope County: Third Principal Meridian, Township 15S, Range 6E, Section 24. U.T.M. Zone 16. Quadrangle: Smithland, Ky.-IL., 7.5', 1967 edition.
Ownership: Private/public.
Reference: West (1980)
Current Status: ?

Snow Springs.
Location: Pope County: Third Principal Meridian, Township 15S, Range 7E, Section 30, SE/4, SE/4, SE/4, NW/4. U.T.M. Zone 16, $^{3}68^{470}$ m^{E} $^{41}15^{850}$ m^{N}. Quadrangle: Smithland, Ky.-IL., 7.5', 1967 edition.
Elevation: 420' (MSL).
Ownership: private/public.
Reference: West (1980).
Current Status: ?

Big Spring.
Location: Pulaski County: West of Wetaug, Third Principal Meridian, Township 14S, Range 1W, Section 1, SW/4, NE/4, NW/4, SW/4, (2100' N, 700' E of SW corner). U.T.M. Zone 16, $^{3}07^{480}$ m^{E} $^{41}32^{965}$ m^{N}. Quadrangle: Dongola, IL., 7.5', 1966 edition, photorevised 1978
Elevation: 380' (MSL).
Spring diameter: 4'.
Discharge: 4-6 gpm.
Reference: Eddy (1931), Meents (1971, 1981), Worthen (1966, 1975).
Ownership: Scott Kesler, Dongola, IL. 62926 (618-845-3666)
Current Status: ?

Unnamed Spring #4.
Location: Pulaski County: Third Principal Meridian, Township 14S, Range 1E, Section 22, NW/4, SE/4, NW/4, NW/4. U.T.M. Zone 16, $^{3}14^{140}$ m^{E} $^{41}28^{005}$ m^{N}. Quadrangle: Cypress, IL., 7.5', 1966 edition.
Elevation: 330' (MSL).
Current Status: ?

Unnamed Spring #5.
Location: Pulaski County: Third Principal Meridian, Township 4S, Range 1E, Section 22, SW/4, NW/4, NW/4, NW/4. U.T.M. Zone 16, $^{3}13^{930}$ m^{E} $^{41}28^{155}$ m^{N}. Quadrangle: Cypress, IL., 7.5', 1966 edition.
Elevation: 330'.(MSL).
Current Status: ?

Unnamed spring #89.
Location: Pulaski County: 20.7 mi West on U.S. Route 51 (at Spencer Heights), Third Principal Meridian, Township 16S, Range 1W, Section 10, SW/4, Se/4, SW/4. Quadrangle: Pulaski, IL., 7.5'.
Current Status: ?

Tivoli Spring.
Location: Randolph County.
Reference: Palmer (1909).
Current Status: ?

Unnamed Spring #8.
Location: Randolph County: Third Principal Meridian, Township 5S, Range 8E, Section 17, NW/4, NE/4, SE/4, SE/4. U.T.M. Zone 15, $^{7}53^{269}$ m^{E} $^{42}20^{660}$ m^{N}. Quadrangle: Prairie Du Rocher, Ill.-Mo., 7.5', 1970 edition.
Elevation: 395' (MSL).
Current Status: ?

Unnamed Spring #79.
Location: Randolph County: Third Principal Meridian, Township 8S, Range 5W, Section 5. U.T.M. Zone 15, $^{2}64^{520}$ m^{E} $^{41}92^{520}$ m^{N}. Quadrangle: Rockwood, Ill.-Mo., 7.5', 1968 edition.
Hydrogeology: This spring flows from a 3 inch PVC pipe coming out of a gentle hillside; a 3.5' X 3' concrete housing is situated 8' above this outlet on the hillside, south of the spring, no pool or seep is evident in the housing; water temperature 14.2° C, specific conductivity 428 umHOS, dissolved oxygen 4.8 mg/L. The outflow is a 3-4' wide ditch running 150' north to a culvert under the county road; discharge from the culvert was 5 gpm (measure with 2 gallon

bucket); substrate clay over sandstone rock; the outflow proceeds through an open pasture to form a small creek running west into the Mississippi River (Webb 30 September 1992).

Flora: The dominant flora along the margin of the outflow was *Impatiens biflora*, with scattered multiflora rose and grasses. Hackberry was the dominant tree in the area (Webb 30 September 1992).

Reference: Meents 1970

Current Status: This is an acitive perennnial spring with only a small flow.

Black Hawk.

Location: Rock Island County.

Reference: Palmer (1909).

Current Status: ?

Illinois City Artesian Well.

Location: Rock Island County.

Reference: Palmer (1909).

Current Status: ?

Renna Wells.

Location: Rock Island County.

Reference: Palmer (1909).

Current Status: ?

Falling Spring 1.

Location: Saint. Clair County: Third Principal Meridian, Township 1N, Range 10W, Section 15, SE/4, SE/4, SE/4, SE/4. U.T.M. Zone 15, $^{7}45^{515}$ m^{E} $^{42}68^{130}$ m^{N}. Quadrangle: Cahokia, Ill.-Mo., 7.5', 1954 edition, photorevised 1974.

Elevation: 450' (MSL).

Current Status: ?

Falling Spring 2 .

Location: Saint. Clair County: Third Principal Meridian, Township 1N, Range 10W1, Section 5, SE/4, SE/4, SE/4, SE/4. U.T.M. Zone 15, $^{7}45^{530}$ m^{E} $^{42}68^{160}$ m^{N}. Quadrangle: Cahokia, Ill,-Mo., 7.5', 1954 edition, photorevised 1974.

Elevation: 460' (MSL).

Current Status: ?

Unnamed Spring #15.

Location: Saint. Clair County: Third Principal Meridian, Township 1N, Range 9W, Section 19. U.T.M. Zone 15, $^{7}49^{580}$ m^{E} $^{42}66^{630}$ m^{N}. Quadrangle: Cahokia, Ill.-Mo., 7.5', 1954 edition, photorevised 1974.

Elevation: 460' (MSL).

Current Status: ?

Ross Mineral Springs.

Location: Saline County.

Reference: Palmer (1909).

Current Status: ?

Unnamed Spring #36.
Location: Sangamon County: Third Principal Meridian, Township 14N, Range 7W, Section 14, NE/4, SW/4, SW/4, NW/4. U.T.M. Zone 16, $^{2}55^{440}$ m^{E} $^{43}93^{980}$ m^{N}. Quadrangle: Loami, IL., 7.5', 1981 edition.
Elevation: 595' (MSL).
Current Status: ?

Unnamed Spring #59 (Schuyler County Spring?).
Location: Schuyler County: Fourth Principal Meridian, Township 2N, Range 4W, Section 26, SE/4, SW/4, NE/4, NE/4. U.T.M. Zone 15, $^{6}85^{990}$ m^{E} $^{44}44^{365}$ m^{N}. Quadrangle: Camden, IL., 7.5', 1981 edition.
Elevation: 550' (MSL).
Reference: Palmer 1909
Current Status: ?

Lithia Spring.
Location: Shelby County: Third Principal Meridian, Township 11N, Range 4E, Section 2, NW/4, NE/4, SE/4, NE/4. U.T.M. Zone 16, $^{3}52^{180}$ mE $^{43}65^{625}$ m^{N}. Quadrangle: Middlesworth, IL., 7.5', 1981 edition.
Elevation: 660' (MSL).
Reference: Meents 1975
Current Status: This spring is currently capped. It is covered by a 30' X 15' concrete cistern with a 6" PVC outflow pipe which discharges 125' south into Lithia Springs Creek; discharge at end of pipe 2 gpm (Webb 31 August 1992.

Unnamed Spring #35.
Location: Shelby County: Third Principal Meridian, Township 10N, Range 4E, Section 13, SW/4, SE/4, SW/4, SW/4. U.T.M. Zone 16, $^{3}52^{535}$ m^{E} $^{43}51^{570}$ m^{N}. Quadrangle: Stewardson West, IL., 7.5', 1981 edition.
Elevation: 595' (MSL).
Current Status: ?

Unnamed Spring #83.
Location: Shelby County: Third Principal Meridian, Township 13N, Range 3E, Section 19.
Ownership: Ward Gregory.
Reference: Meents (1981).
Current Status: ?

Unnamed Spring #68.
Location: Stephenson County: Fourth Principal Meridian, Township 29N, Range 7E, Section 21, SW/4, NW/4, SE/4, SW/4. U.T.M. Zone 16, $^{2}77^{555}$ m^{E} $^{47}07^{610}$ m^{N}. Quadrangle: Orangeville, IL., 7.5', 1971 edition.
Elevation: 890' (MSL).
Current Status: ?

Cave Spring Cave.
Location: Union County: Third Principal Meridian, Township 311S, Range 3W, Section 11, NE/4, SE/4, SW/4, NW/4. U.T.M. Zone $^{62}88^{560}$ m^{E} $^{41}63^{240}$ m^{N}. Quadrangle: Wolf Lake, Ill.-Mo., 7.5', 1947 edition, photorevised 1978.
Elevation: 540' (MSL).
Reference: West (1980), Bretz and Harris (1966), Hopkins (1969)
Ownership: private/public.
Current Status: ?

Elm Spring.

Location: Union County: 0.85 mi (1.4 km) ESE LaRue, Third Principal Meridian, Township 311S, Range 3W, Section 21, NE/4, SW/4, SE/4, SE/4. U.T.M. Zone 16, $284575\ mE\ 4157600\ mN$. Quadrangle: Wolf Lake, Ill.-Mo., 7.5', 1947 edition, photorevised 1978.

Elevation: 355' (MSL).

Ownership: private/public.

Reference: West (1980), Jenio (1980), Hopkins (1969).

Current Status: ?

La Rue Spring.

Location: Union County: Third Principal Meridian, Township 11S, Range 3W, Section 9, SE/4.

La Rue spring is a large spring flowing from the base of the limestone bluff into La Rue swamp at Pine Hills.

Hydrogeology: fine mud atop limestone and chert gravel substrate; average temperature 13° C; *pH* range 6.8-7.0; rate of flow 3.8 cm/sec.; width 400 cm; depth 10-28 cm; volume of flow 72,960 cm^3/sec. Outflow length 22.5 m.

Flora: A dominant spring community (Hopkins 1969) of *Nasturtium officinalis* and *Lemna minor* (duckweed); with water starwort (*Callitriche heterophylla*) and water moss (*Fissidens fontana*) with green alga (*Rhizoclonium crassipellatus*) entangled among stems of the moss.

The outflow margin supports a dominant community (Hopkins 1969) of: *Leersia oryzoides* and *Impatiens biflora*; with mild water pepper (*Polygonum hydropiiperoides*), eastern manna grass (*Glyceria septentrionalis*), lizard tail, cat-tail, common arrow-head (*Sagittaria latifolia*), sedge (*Carex comosa*), swamp-dock (*Rumex verticillatus*), and floating foxtail-grass (*Alopecurus aequalis*). By late summer and fall dodder (*Cuscuta compacta*) has profliferated among the marginal vegetation.

The bryophyte community (Hopkins 1969) consists of *Hygroamblystegium irriguum*, *Taxiphyllum taxirameum*, and *Mnium cuspidatus*.

Reference: Hopkins (1969).

Current Status: This spring is still flowing steadily (Webb 1992).

Little Spring.

Location: Union County: Third Principal Meridian, Township 11S, Range 2W, Section 15, SW/4, SW/4.

Hydrogeology: (Hopkin 1969) limestone substrate; average temperature 13° C; pH range 7.0-7.2; rate of flow 4.4 cm/sec.; width 33 cm; depth 2-30 cm; v olume of flow 4356 cm^3/sec. Outflow length 27m.

Flora: (Hopkins 1969) there is no aquatic vegetation at the orifice of the spring. Above the spring is a clay-covered limestone rocks above the orifice with a dominant community of *Fissidens taxifolius, Atrichum undulatum* and *Anthocerous laevis* along with the leafy liverwort *Lophocolea bidentata*. The outflow channel contains a dominant flora of *Glyceria striata* and *Uniola latifolia* (sea oats) along with panic grass (*Panicum anceps, P. boscii, P. polyanthes, P. xalapenbse, P. yadkinense*), moneywort (*Lysimachia nummularia*), alumroot (*Heuchera hirsuticaulis*), chervil (*Chaaerophyllum ainturieri*) and Christmas fern (*Polystichum acrostichoides*). along the banks.

Reference: Hopkins (1969).

Current Status: ?

McCann Spring.

Location: Union County: Third Principal Meridian, Township 11S, Range 3W, Section 41, E/2 W/2 SE/4.

Hydrogeology: Limestone chert substrate; average temperature 13° C; pH range 7.1; rate of flow 1.6 cm/sec.; width of opening 95 cm.; depth 3 cm; volume of flow 456 cm^3/sec. Length of outflow 0.3 km.

Flora: There is a dominant *Saururus cernuus* (lizard tail)/*Ludwigia palustris* var. *americana* (false loosestrife)/*Carex lacustris* community in the shallow, gravelly part of the spring where the water is less than 3 cm deep over an area about 4 m wide. Also occurring along the outflow are: *Porella pinnata* (leafy liverwort); *Nasturtium officinalis* (water cress); *Fraxinus pennsylvanica* var. *subintegerrima* (green ash); sedges (*Carex lurida, C. amphibola, C. frankii, C. vulpinoides*), brookweed (? *parviflorus*); cut-grass (*Leersia oryzoides*), sweet-scented bedstraw (*Galium triflorum*); butter-weed (*Senecio glabellus*), beefsteak plant (*Perilla frutescens*), spotted touch-me-not (*Impatiens biflora*); false nettle (*Boehmeria cylindrica*); monkey flower (*Mimulus alatus*); mistflower (*Eupatorium coelestinum*); and leaf-cup (*Polymnia canadensis*).

The bryophyte community consists of: *Hygroamblystegium irriguulm* and *Eurynchium riparioides*.

The tree and shrub community consists of: bur oak (*Quercus macrocarpa*); spicebush (*Lindera benzoin*); sugar maple (*Acer saccharum*), and green brier (*Smilax rotundifolia*).

Reference: Hopkins (1969).

Current Status: ?

McGee Hill Spring:

Listed in text of this report.

Roaring Spring.

Location: Union County: Third Principal Meridian, Township 13S, Range 1W, Section 20, SE/4, SW/4, NE/4, NE/4. Hopkin (1969) T13S, R2W, Sec. 22, SW/4. U.T.M. Zone 16, $3_{02}{}^{280}$ mE $4_{13}{}_{8}{}^{710}$ m^N. Longitude 89° 13' 59" W, Latitude 37° 22' 34" N. Quadrangle: Anna, IL., 7.5', 1966 edition, photorevised 1978.

This spring emerges 200 meters down the valley from Cricket Cave (Bretz and Harris, 1961) and flows into the tributary of Mill Creek.

Elevation: 440' (MSL).

Hydrogeology: Hopkin (1969) limestone substrate; average temperature 13° C; pH range 7.0-7.2; rate of flow 37.7 cm/sec.; width 200 cm; depth 15 cm; volume of flow 113,100 cm^3/sec.

Flora: The spring community (Hopkin 1969) is dominated by *Batrachospermum* sp. and *Vaucheria geminata* along with *Oscillatoria*.

The bryophyte community (Hopkin 1969) is dominated by *Anomodon attenuatus, Hygroamblystegium irriguum* and *Concoephalum concium* in addition to *Taxiphyllum taxirameum, Thuidium delicatulum, Mnium marginatum*, and *Atrichum undulatum*, and *Callitriche deflex*.

The flora (Hopkin 1969) along the bank is dominated by *Impatiens biflora* and *Leersia virginica* along with *Juncus tenuis*, fowl manna grass, annual blue grass (*Poa annua*), late aboneset (*Eupatorium serotinum*), tall goldenrod (*Solidago altissima*), brookweed, curly dock (*Rumex crispus*), fleabane (*Erigeron philadelphicus*), wild hydrangea (*Hydrangea arborescens*), common plantain (*Plantago rugelii*), irownweed (*Vernonia altissima*), cleavers (*Galium aparine*), and whit vervain (*Verbena urticifolia*). Crevices of limestone rocks offer a niche for a few plants of a brittle fern (*Cystopteris fragilis* var. *protrusa*) and walking fern (*Asplenium rhizophyllum*). Horse nettle (*Solanum carolinianum*) is abundant at the bridge with white vervain, Japanes honeysuckle (*Lonicera japonica*) and common elder (*Sambucus canadensis*).

Reference: Hopkins (1969), Meents (1968).

Current Status: ?

Saratoga Spring.
Location: Union County: Third Principal Meridian, Saratoga.
Reference: Palmer (1909).
Current Status: Capped with hand pump. Water still used occasionally for local consumption. (Webb, 1992).

Unnamed Spring #80 (Clear Creek Spring?).
Location: Union County: Third Principal Meridian, Township 11S, Range 2W, Section 22, SW/4, SW/4, SE/4, NW/4, 2500' S, 140' E of NW corner. U.T.M. Zone 16, $^{2}94^{940}$ m^{E} $^{4}157^{945}$ m^{N}. Quadrangle: Cobden, IL., 7.5', 1947 edition, photorevised 1978.
Elevation: 415' (MSL).
Ownership: Bruce Jones, Kay Roma Ranch, Alto Pass, IL. 62905 (618-893-4197).
Reference: Meents (1970, 1971, 1981), Hopkins 1969?
Current Status: ?

Unnamed Spring #91.
Location: Union County: in Pirtle Hollow, Third Principal Meridian, Township 11S, Range 2W, Section 5, 700' E of SW corner.
Current Status: ?

Unnamed Spring #108.
Location: Union County: 2 km NE Lick Creek. Third Principal Meridian, Township 11S, Range 1E, Section 25, SE/4, SE/4, SE/4, SE/4, NW/4. U.T.M. Zone 16, $^{18}660$ m^{E} $^{41}55^{560}$ m^{N}. Quadrangle: Lick Creek, IL., 7.5', 1966 edition.
Elevation: 430' (MSL).
Hydrogeology: This spring is situated at the base of a sandstone hillside with a single circular spring head with a diameter of 5' and a depth of 10'", with a bottom substrate of sand and sandstone rocks and an estimated flow of approximately 10 gpm. The outflow channel is 2.5' wide, about 2 inches deep, and flowing south about one quarter mile towards Lick Creek, before reentering the soil with a bottom substrated of sand and gravel. Water temperature 12.9° C, specific conductivity 1467 umHOS, *pH* 7.9, alkalinity 215 mg/L^2 $CaCO_2$. (Webb 15 September 1992).
Fauna: amphipods, chironomids, and *Gerris remigis*.
Flora: The vegetation along the outflow margin is sparse, with no dominant plant. The tree flora consists of sugar maple, ash, white oak, walnut, ironwood, and sycamore.

Unnamed Spring #9.
Location: Wayne County: Third Principal Meridian, Township 2S, Range 8E, Section 4, NE/4, NE/4, NE/4, SW/4. U.T.M. Zone 16, $^{3}84^{310}$ m^{E} $^{42}48^{400}$ m^{N}. Quadrangle: Fairfield, IL., 7.5', 1971 edition.
Elevation: 430' (MSL).
Current Status: ?

Unnamed Spring #10.
Location: Wayne County: Third Principal Meridian, Township 1N, Range 9E, Section 17, SW/4, NE/4, SW/4, SE/4. U.T.M. Zone 16, $^{3}93^{010}$ m^{E} $^{42}63^{250}$ m^{N}. Quadrangle: Mount Erie, IL., 7.5', 1971 edition.
Elevation: 475' (MSL).
Current Status: ?

Unnamed Spring #11.
Location: Wayne County: Third Principal Meridian, Township 1N, Range 9E, Section 17, SW/4, NE/4, SW/4, SE/4. U.T.M. Zone 16 $^{3}93^{035}$ m^{E} $^{42}63^{250}$ m^{N}. Quadrangle: Mount Erie, IL., 7.5', 1971 edition.
Elevation: 465' (MSL).
Current Status: ?

Unnamed Spring #12.
Location: Wayne County: Third Principal Meridian, Township 1N, Range 9E, Section 17, NE/4, NE/4, SW/4, SE/4. U.T.M. Zone 16, $^{3}93^{050}$ m^{E} $^{42}63^{310}$ m^{N}. Quadrangle: Mount Erie, IL., 7.5', 1971 edition.
Elevation: 475' (MSL).
Current Status: ?

Mineral Springs.
Location: Whiteside County: Fourth Principal Meridian, Township 20N, Range 3E, Section 24, SE/4, NE/4, NW/4, NW/4. U.T.M. Zone 15, $^{7}40^{700}$ m^{E} $^{46}21^{730}$ m^{N}. Longitude 90° 06' 25" W, Latitude 41° 42' 47" N. Quadrangle: Erie, IL., 7.5', 1982 edition.
Elevation: 620' (MSL).
Current Status: ?

Unnamed Spring #81.
Location: Whiteside County: Fourth Principal Meridian, Township 22N, Range 4E, Section 1, 400' N, 700' W of SW corner. U.T.M. Zone 16. Quadrangle: Clinton NW, IL., 7.5'
Elevation: 670' (MSL).
Spring diameter: 3'.
Number of springs: 2.
Ownership: Clara Smit, 505 Ninth Ave. Fulton, IL. 61252 (815-589-6145).
Reference: Meents (1970).
Current Status: ?

Creal Springs.
Location: Williamson County: Third Principal Meridian. Creal Spring.
Reference: Meents (1975), Palmer (1909).
Current Status: Capped with hand pump (Webb 16 September 1992).

Unnamed Spring #69.
Location: Winnebago County: Fourth Principal Meridian, Township 28N, Range 11E, Section 35, SE/4, NW/4, SE/4, NE/4. U.T.M. Zone 16, $^{3}19^{880}$ m^{E} $^{46}94^{860}$ m^{N}. Quadrangle: Shirland, Ill.-Wis., 7.5', 1971 edition.
Elevation: 750' (MSL).
Current Status: ?