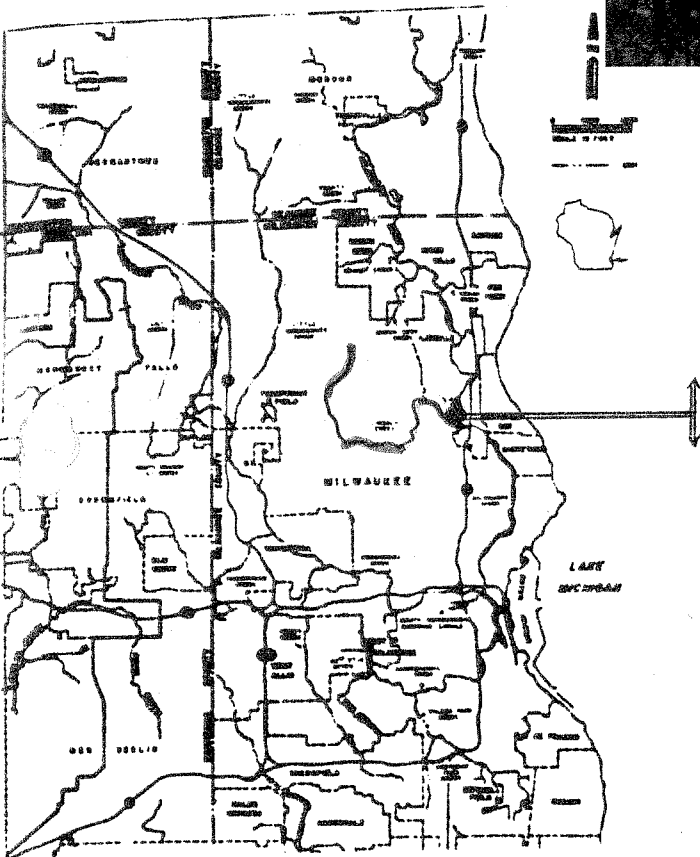


Looking downstream of bridge at Green Bay Ave. Steel retaining wall along short segment of right bank. Note bar formation and sedimentation. Channel along right bank is well scoured.

Milwaukee Co.

Date: 11/ /84



Lincoln Creek

Segment 1

Looking upstream from Green Bay Ave. bridge following pool drawdown in September. Depth lowered by 3'. Sedimentation and bar formation evident. Substrate well sorted deposits of material ranging from silt to coarse gravel. Flow is often diffused across the mud flats following pool drawdown and scour and redeposited as a result of runoff events.

Milwaukee Co.

Date: 11/ /84



Department of Natural Resources

STREAM SYSTEM HABITAT RATING FORM
Form 3200-68 1-85

Stream Lincoln Cr. Reach Location Tuckerton Ave upstream to 32nd Reach Score Rating 206
 County MKE Date Aug 84 Evaluator W. Wawerzja Classification MAR-E
NOV 84

Concrete Channel

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial areas, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 8	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio <7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate. overbank flow common. W/D ratio >25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material. Increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat is obvious. 22
Avg. Depth Riffles and Runs	Cold >1' 0 Warm >1.5' 0	6" to 1' 0 10" to 1.5' 0	3" to 6" 18 6" to 10" 18	<3" 24 <6" 24
Avg. Depth of Pools	Cold >4' 0 Warm >5' 0	3' to 4' 0 4' to 5' 0	2' to 3' 18 3' to 4' 18	<2' 24 <3' 24
Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	1-2 cfs 6 2-5 cfs 6	.5-1 cfs 18 1-2 cfs 18	<.5 cfs 24 <1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles ÷ stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals:

Column Scores E ____ +G ____ +F ____ +P ____ = ____ = Score

<70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

N.A. Not applicable

Stream Little C Reach Location 32nd to 35th St. Reach Score/Rating 189
County M.W. Date August 84 Evaluator H. Hawley Classification INT-D

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio <7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate, overbank flow common. W/D ratio >25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-60% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble, gravel or other stable habitat. Lack of habitat obvious. 24
x Avg. Depth Riffles and Runs	Cold >1'	0 6" to 1'	6 3' to 6"	18 <3"
	Warm >1.5'	0 10" to 1.5'	6 6" to 10"	18 <6"
Avg. Depth of Pools	Cold >4'	0 3' to 4'	6 2' to 3'	18 <2'
	Warm >5'	0 4' to 5'	6 3' to 4'	18 <3'
Flow, at Rep. Low Flow	Cold >2 cfs	0 1-2 cfs	6 .5-1 cfs	18 <.5 cfs
	Warm >6 cfs	0 2-6 cfs	6 1-2 cfs	18 <1 cfs
Pool/Riffle, Run/Bend Ratio (distance between riffles + stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals:

Column Scores E ____ +G ____ +F ____ +P ____ = ____ = Score

<70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor

See reverse side for additional habitat features, water quality impacts and comments.

Department of Natural Resources

STREAM SYSTEM HABITAT RATING FORM
Form 3200-68 1-85

Stream Lincoln Co Reach Location 35th St. to 47th St. Drop structure Reach Score/Rating 212
 County Mich. Date Aug - Nov 84 Evaluator N. W. W. W. W. Classification INT-D

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant erosion. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 8	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 16	<50% density. Many bare areas. Thin grass, few if any tree and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio < 7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate. overbank flow common. W/D ratio > 25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 16	Heavy deposits of fine material. increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 6	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat is obvious. 22
Avg. Depth Riffles and Runs	Cold > 1' 0 Warm > 1.5' 0	6" to 1' 6 10" to 1.5' 6	3' to 6" 18 6" to 10" 18	< 3" 24 < 6" 24
Avg. Depth of Pools	Cold > 4' 0 Warm > 5' 0	3' to 4' 6 4' to 5' 6	2' to 3' 18 3' to 4' 18	< 2' 24 < 3' 24
Flow, at Rep. Low Flow	Cold > 2 cfs 0 Warm > 5 cfs 0	1-2 cfs 6 2-5 cfs 6	5-1 cfs 18 1-2 cfs 18	< .5 cfs 24 < 1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles - stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bands provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	> 25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals:

Column Scores E ____ + G ____ + F ____ + P ____ = ____ = Score

< 70 = Excellent, 71-129 = Good, 130-200 = Fair, > 200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

Department of Natural Resources

STREAM SYSTEM HABITAT RATING FORM
Form 3200-68 1-85

Stream Lincoln Co. Reach Location 47th St. extended to Hampton Ave Reach Score/Rating 189
County Mitw Date Aug Nov 84 Evaluator W. W. Wawrzyn Classification FNT-D

Rating Item	Category			
	Excellent	Good	Fair	Poor
12 Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
16 Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
12 Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
13 Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 8	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
16 Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio <7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate. overbank flow common. W/D ratio >25. 16
15 Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material. increased bar development. 18
18 Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
17 Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat obvious. 22
6 Avg. Depth Riffles and Runs	Cold >1' 0 Warm >1.5' 0	6" to 1' 6 10" to 1.5' 6	3" to 6" 18 6" to 10" 18	<3" 24 <6" 24
18 Avg. Depth of Pools	Cold >4' 0 Warm >5' 0	3' to 4' 6 4' to 5' 6	2' to 3' 18 3' to 4' 18	<2' 24 <3' 24
18 Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	1-2 cfs 5 2-5 cfs 6	5-1 cfs 18 1-2 cfs 18	<5 cfs 24 <1 cfs 24
16 Pool/Riffle, Run/Bend Ratio (distance between riffles ÷ stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
12 Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals:

Column Scores E _____ +G _____ +F _____ +P _____ = _____ = Score

<70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor

See reverse side for additional habitat features, water quality impacts and comments.

Stream Lincoln Cr. Reach Location Hampton Ave to drop structure Reach Score/Rating 208
 County Minn. Date Aug Nov 84 Evaluator W. W. W. W. W. Classification MAR-E

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly banked over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 8	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio < 7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate. overbank flow common. W/D ratio > 25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 8	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble, gravel or other stable habitat. Lack of habitat is obvious. 22
Avg. Depth Riffles and Runs	Cold > 1' 0 Warm > 1.5' 0	6" to 1' 6 10" to 1.5' 6	3" to 6" 18 6" to 10" 18	< 3" 24 < 6" 24
Avg. Depth of Pools	Cold > 4' 0 Warm > 5' 0	3' to 4' 6 4' to 5' 6	2' to 3' 18 3' to 4' 18	< 2' 24 < 3' 24
Flow, at Rep. Low Flow	Cold > 2 cfs 0 Warm > 5 cfs 0	1-2 cfs 6 2-5 cfs 6	.5-1 cfs 18 1-2 cfs 18	< .5 cfs 24 < 1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles + stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	> 25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics. outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals:

Column Scores E +G +F +P = Score

< 70 = Excellent, 71-129 = Good, 130-200 = Fair, > 200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

N.A. Not Applicable.

HABITAT Absent.

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly beamed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	60-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio < 7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate, overbank flow common. W/D ratio > 25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-60% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble, gravel or other stable habitat. Lack of habitat obvious. 22
Avg. Depth Riffles and Runs	Cold > 1' 0 Warm > 1.5' 0	6" to 1' 0 10" to 1.5' 0	3" to 6" 18 6" to 10" 18	< 3" 24 < 6" 24
Avg. Depth of Pools	Cold > 4' 0 Warm > 6' 0	3' to 4' 0 4' to 5' 0	2' to 3' 18 3' to 4' 18	< 2' 24 < 3' 24
Flow, at Rep. Low Flow	Cold > 2 cfs 0 Warm > 5 cfs 0	1-2 cfs 0 2-5 cfs 0	5-1 cfs 18 1-2 cfs 18	< .5 cfs 24 < 1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles + stream width)	5-7. Variety of habitat. Deep riffle and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	> 25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

PARK

See reverse side for additional habitat features, water quality impacts and comments.

Stream Lincoln Reach Location Mill Rd. to headwaters at Reach Score/Rating 217
Bradford County, Pa.
 County Adm Date Nov 84 Evaluator J. W. W. W. Classification INT-0.

Rating Item	Category			
	Excellent	Good	Fair	Poor
12 Watershed Erosion <i>Little Active Development</i>	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
14 Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agricultural). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
12 Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
15 Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 8	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
16 Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio < 7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate, overbank flow common. W/D ratio > 25. 18
16 Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
18 Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
20 Bottom Substrate/Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble, gravel or other stable habitat. Lack of habitat obvious. 24
18 Avg. Depth Riffles and Runs	Cold > 1' 0 Warm > 1.5' 0	6" to 1' 6 10" to 1.5' 6	3" to 6" 18 6" to 10" 18	< 3" 24 < 6" 24
24 Avg. Depth of Pools	Cold > 4' 0 Warm > 5' 0	3' to 4' 6 4' to 5' 6	2' to 3' 18 3' to 4' 18	< 2' 24 < 3' 24
24 Flow, at Rep. Low Flow	Cold > 2 cfs 0 Warm > 5 cfs 0	1-2 cfs 6 2-5 cfs 6	5-1 cfs 18 1-2 cfs 18	< 5 cfs 24 < 1 cfs 24
16 Pool/Riffle, Run/Bend Ratio (distance between riffles + stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	> 25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
12 Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or unpastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals:

Column Scores E ____ + G ____ + F ____ + P ____ = ____ = Score

< 70 = Excellent, 71-129 = Good, 130-200 = Fair, > 200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

Appendix 4

TABLE 3

Havenwoods Species List of Wildlife

Birds

Night Hawk	<u>Chordeiles minor minor</u>
Rose-breasted Grosbeak	<u>Peucaeticus ludovicianus</u>
White-breasted Nuthatch	<u>Sitta carolinensis cookei</u>
Green Heron	<u>Butorides virescens</u>
Solitary Sandpiper	<u>Tringa solitaria</u>
Bobolink	<u>Dolichonyx orizivorus</u>
Kingbird	<u>Tyrannus tyrannus</u>
Fox Sparrow	<u>Passerella iliaca</u>
Red-tailed Hawk	<u>Buteo jamaicensis borealis</u>
Killdeer	<u>Charadrius vociferus</u>
Brown Thrasher	<u>Toxostoma rufum</u>
Owl	sp. ?
Mourning Dove	<u>Zenaidura macroura carolinensis</u>
Pheasant	<u>Phasianus colchicus torquatus</u>
Hungarian Partridge	<u>Perdix perdix perdix</u>
Finch	sp. ?
Warblers	Many species during migration
Northern Flicker	<u>Colaptes auratus luteus</u>
Yellow-bellied Sapsucker	<u>Sphyrapicus varius varius</u>
Red-headed Woodpecker	<u>Melanerpes erythrocephalus erythrocephalus</u>
Cowbird	<u>Molothrus ater ater</u>
Mallard	<u>Anas platyrhynchos platyrhynchos</u>
American Redstart	<u>Setophaga ruticilla</u>
Fly Catcher	sp. ?
Robin	<u>Turdus migratorius migratorius</u>
Swamp Sparrow	<u>Melospiza georgiana</u>
Indigo Bunting	<u>Passerina cyanea</u>
Cedar Waxwing	<u>Bombycilla cedrorum</u>
Bluejay	<u>Cyanocitta cristata</u>
Black-capped Chickadee	<u>Parus atricapillus atricapillus</u>
Red-winged Blackbird	<u>Agelaius phoeniceus phoeniceus</u>
Bronzed Grackle	<u>Quiscalus versicolor</u>
Crow	<u>Corvus brachyrhynchos brachyrhynchos</u>
Slate-colored Junco	<u>Junco hyemalis hyemalis</u>

Mammals

White-tailed Deer	<u>Odocoileus virginianus borealis</u>
Red Fox	<u>Vulpes fulva fulva</u>
Gray Squirrel	<u>Sciurus carolinensis hypophaeus</u>
Gray Chipmunk	<u>Tamias striatus griseus</u>
13-striped Ground Squirrel	<u>Citellus tridecemlineatus tridecemlineatus</u>
Raccoon	<u>Procyon lotor hirtus</u>
Opossum	<u>Didelphis marsupialis virginiana</u>
Woodchuck	<u>Marmota monax monax</u>
Muskrat	<u>Ondatra zibethicus zibethicus</u>
Badger	<u>Taxidea taxus jacksoni</u>
Cottontail Rabbit	<u>Sylvilagus floridanus mearnsii</u>
Northern Plains Skunk	<u>Mephitis mephitis hudsonica</u>
Meadow Mouse	<u>Microtus pennsylvanicus pennsylvanicus</u>

Reptiles & Amphibians

Garter Snake	Eastern
Frog, Leopard	<u>Rana pipiens</u>
Spring Peeper	<u>Hyla crucifer crucifer</u>
Toad	<u>Bufo americanus americanus</u>
Gray Tree Frog or	<u>Hyla versicolor versicolor</u>
Cope's Tree Frog	<u>Hyla versicolor chrysocelis</u>
Central Newt	<u>Desmictylus viridescens louisianensis</u>

SCIENTIFIC NAME	COMMON NAME	FAMILY	SPECIAL STATUS	SPECIES MODALITY	FREQUENCY
ACER NEGUNDO	BOX ELDER	ACERACEAE	NONE	SW	
ACER RUBRUM	RED MAPLE	ACERACEAE	NONE	NDM	
ACER SACCHARINUM	SILVER MAPLE	ACERACEAE	NONE	SW	
ACER SACCHARUM	SUGAR MAPLE	ACERACEAE	NONE	SM	
ACHILLEA MILLEFOLIUM	YARROW	ASTERACEAE	NONE	PM	
*AGROPYRON REPENS	QUACK GRASS	POACEAE	NONE		
AGROPYRON TRACHYCAULUM	SLENDER WHEAT GRASS	POACEAE	NONE	BC	
AGROSTIS ALBA	A. GIGANTEA	POACEAE	NONE		
*AGROSTIS GIGANTEA	REDTOP	POACEAE	NONE	BC	
AMBROSIA ARTEMISIIFOLIA	COMMON RAGWEED	ASTERACEAE	NONE		
ANDROPOGON GERARDI	BIG BLUESTEM GRASS	POACEAE	NONE	PM	
ANEMONE CANADENSIS	MEADOW ANEMONE	RANUNCULACEAE	NONE	SS	
ANGELICA ATROPURPUREA	GREAT ANGELICA	APIACEAE	NONE	SS	
*ARCTIUM MINUS	COMMON MURDOCK	ASTERACEAE	NONE		
ASCLEPIAS SYRIACA	COMMON MILKWEED	ASCLEPIADACEAE	NONE	PNM	
ASCLEPIAS VERTICILLATA	WHORLED MILKWEED	ASCLEPIADACEAE	NONE	PD	
ASTER ERICOIDES	HEATH ASTER	ASTERACEAE	NONE	PDM	
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	ASTERACEAE	NONE	PNM	
ASTER PILOSUS	HAIRY ASTER	ASTERACEAE	NONE	PDM	
ASTER SAGITTIFOLIUS	ARROW LEAVED ASTER	ASTERACEAE	NONE	SDM	
ASTER SAGITTIFOLIUS DRUMMONDII	DRUMMONDS ASTER	ASTERACEAE	NONE		
*ATRIPLEX PATULA	COMMON ORACH	CHENOPODIACEAE	NONE		
*BRASSICA KALER PINNATIFIDA	CHARLOCK	BRASSICACEAE	NONE		
*BROMUS INERMIS	HUNGARIAN BROME	POACEAE	NONE		
*CARDUUS NUTANS	MUSK THISTLE	ASTERACEAE	NONE		

PRELIMINARY LIST OF VASCULAR PLANTS, HAVENWOODS, MILWAUKEE CO.

SCIENTIFIC NAME	COMMON NAME	FAMILY	SPECIAL STATUS	PAGE	SPECIES MODALITY	FREQUENCY
FRAGARIA VIRGINIANA	WILD STRAWBERRY	ROSACEAE	NONE			
FRAXINUS PENNSYLVANICA	RED ASH	OLEACEAE	NONE		SMH	
GEUM ALEPPICUM STRICTUM	YELLOW AVENS	ROSACEAE	NONE		AT	
GLYCERIA GRANDIS	REED MANNA GRASS	POACEAE	NONE		AT	
*HESPERIS MATRONALIS	DAMES ROCKET	BRASSICACEAE	NONE			
MORDEUM JUBATUM	SQUIRREL TAIL GRASS	POACEAE	NONE			
*IPOMOEA HEDERACEA	IVY LEAVED MORNING GLORY	CONVOLVULACEAE	NONE			
*KOCHIA SCORPARIA	BURNING BUSH	CHENOPODIACEAE	NONE			
*LEONURUS CARDIACA	MOTHERWORT	LAMIACEAE	NONE			
LEPIDIUM SP	PEPPER-GRASS	BRASSICACEAE	NONE			
*LINARIA VULGARIS	BUTTER-AND-EGGS	SCROPHULARIACEAE	NONE			
*LONICERA TATARICA	TARTARIAN HONEYSUCKLE	CAPRIFOLIACEAE	NONE			
*MALVA NEGLECTA	COMMON MALLOW	MALVACEAE	NONE			
*MATRICARIA MATRICARIOIDES	PINEAPPLE WEED	ASTERACEAE	NONE			
*MEDICAGO LUPULINA	BLACK MEDICK	FABACEAE	NONE			
*MEDICAGO SATIVA	ALFALFA	FABACEAE	NONE			
*MELILOTUS ALBA	WHITE SWEET CLOVER	FABACEAE	NONE			
*MELILOTUS OFFICINALIS	YELLOW SWEET CLOVER	FABACEAE	NONE			
MONARDA FISTULOSA	WILD BERGAMOT	LAMIACEAE	NONE		CG	
*MORUS ALBA	WHITE MULBERRY	MORACEAE	NONE			
*NEPETA CATARIA	CATNIP	LAMIACEAE	NONE			
OENOTHERA BIENNIS	COMMON EVENING PRIMROSE	ONAGRACEAE	NONE		PDM	
OXALIS EUROPAEA	*O. STRICTA	OXALIDACEAE	NONE			
OXALIS STRICTA	TALL WOOD SORREL	OXALIDACEAE	NONE		PDM	
PARTHENOCLISSUS INSERTA	THICKET CREEPER	VITACEAE	NONE		SD	

Table 3

Department of Natural Resources

STREAM SYSTEM HABITAT RATING FORM
Form 3200-68 1-85

Stream Lincoln Creek Reach Location Mile R to Tenthia Ave Reach Score Rating FAL-B
 County ME Date Aug 84 Evaluator W. Naweyn Classification 171-191
NOV 84

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion 12	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 18
Watershed Nonpoint Source 16	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm field). 10	Moderate sources (small wetlands, tile fields, urban area, intense agricultural). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure 16-18	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection 9-15	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 8	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 8	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity 14	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio < 7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate, overbank flow common. W/D ratio > 25. 16
Lower Bank Deposition 18	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition 16	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate Available Cover 12	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble, gravel or other stable habitat. Lack of habitat obvious. 18
Avg. Depth Riffles and Runs	Cold > 1' 0 Warm > 1.5' 0	6" to 1' 6 10" to 1.5' 6	3' to 6' 18 6' to 10' 18	< 3' 24 < 6' 24
Avg. Depth of Pools	Cold > 4' 0 Warm > 5' 0	3' to 4' 6 4' to 5' 6	2' to 3' 18 3' to 4' 18	< 2' 24 < 3' 24
Flow, at Rep. Low Flow	Cold > 2 cfs 0 Warm > 5 cfs 0	1-2 cfs 6 2-5 cfs 6	.5-1 cfs 18 1-2 cfs 18	< .5 cfs 24 < 1 cfs 24
Pool/Riffle Run/Bend Ratio (distances between riffles - stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	> 25. Essentially a straight stream. Generally all flat water or shallow riffles. Poor habitat. 20
Aesthetics PARKWAY	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals:

Column Scores E + G + F + P = Score

< 70 = Excellent, 71-129 = Good, 130-200 = Fair, > 200 = Poor

See reverse side for additional habitat features, water quality impacts, and comments.

Appendix (cont.)

MACROINVERTEBRATE IDENTIFICATION

Surface Water: Lincoln Cr Site No.: Sample No.:
 Site Location: Downstream 37th Street County: Mississippi
 Sample Collected By: WW Date: 5-1-84 Sample Type: O-NET
 Sample Sorted By: WW Date: 5-15-84 Identified By: BW Date: 5-23-84
 Chironomidae Mounted By: R. Randall Date: 6-13-84 Identified By: R. Randall Date: 7-10-84
 Oligochaeta Mounted By: Date: Identified By: Date:
HBE Subsample No. 1 Chironomidae Mounted: 1 slide

[illegible]

Total No. of Organisms 17 Total No. Per Sq. Ft.

*L - Larval; P - Pupal; A - Adult; I - Early Instar

Checked by: _____ Date: _____

Site H#1 $\frac{2.59}{F_{500}}$

Appendix (cont.)

MACROINVERTEBRATE FIELD SAMPLING DATA Form 3200-52 4-81

WASIN: 050 STREAM: Lincoln Cr COUNTY Milwaukee SAMPLE NO. 02

PRIMARY STATION NO. _____ LOCATION: NE 1/4, SW 1/4, S Q1, T 27N, R 21E WATERSHED Milwaukee

DATE: 05/01/84 Last stream of 373 SF. N 50' BIOTIC INDEX: _____

Chemical Sample? yes no

15:25 TIME (24 hr) AT SAMPLE 50 AVG. WIDTH (ft) _____

102.60 DO (mg/l) SITE: 0.5 AVG. DEPTH (ft) _____

13.3 TEMP (°C) _____ AVG. VELOCITY (measured fps) _____

_____ pH (s.u.) 0.35 EST. VELOCITY (fps) 1. very slow (.2); 2. slow _____

_____ CONDUCTIVITY (umhos) (1.2-3); 3. moderate (.5-1.5); 4. fast (1.5)

SAMPLED HABITAT: 1. Riffle 2. Run 3. Pool

SAMPLER: 1. D Frame Net 2. Artificial Substrate _____ 3. Other _____

SUBSTRATE AT SITE LOCATION (%):

Bedrock _____ Rubble (2 1/2 - 10" dia.) _____ Sand _____ Clay _____ Muck _____

Boulders (10" dia.) _____ Gravel (1/10 - 2 1/2" dia.) _____ Silt _____ Detritus _____ Debris & Vegetation _____

SUBSTRATE SAMPLED (%): SAME AS ABOVE OR/

Bedrock _____ Rubble (2/12 - 10" dia.) 60 Sand 10 Clay _____ Muck _____

Boulders (10" dia.) 20 Gravel (1/10 - 2 1/2" dia.) 10 Silt _____ Detritus _____ Debris & Vegetation _____

AQUATIC VEGETATION: 10 % of Total Stream Channel at Sample Site

OBSERVED INSTREAM CONDITIONS AT SAMPLING SITE LIMITING W.Q.

	not present	slight	moderate	significant	Comments
Sludge Deposits	n	sl	m	s	Water w/ a green hue. No more solvent odor as at lower station.
Silt & Sediment Deposits	n	sl	m	s	
Turbidity	n	sl	m	s	
Chlorine or Toxic Scour	sl	sl	m	s	
Macrophytes	sl	sl	m	s	
Filamentous Algae	n	sl	m	s	
Planktonic Algae	sl	sl	m	s	
Slimes	sl	sl	m	s	
Iron Bacteria	sl	sl	m	s	

FACTORS WHICH MAY BE AFFECTING SAMPLING SITE

degree of influence:	General Watershed			At Site direct impact	Comments
	not present	possible	important		
Livestock Pasturing	np	pos	imp	d1	None or very few organisms collected. Possibly due to toxics and/or scour from two later heavy rains. Flow ~ 10 ft/s. ~ 500' section sampled.
Barnyard Runoff	np	pos	imp	d1	
Cropland Runoff	np	pos	imp	d1	
Tile Drains	np	pos	imp	d1	
Septic Systems	np	pos	imp	d1	
Streambank Erosion	np	pos	imp	d1	
Channel Ditching & Straightening	np	pos	imp	d1	
Downstream Impoundment	np	pos	imp	d1	
Upstream Impoundment	np	pos	imp	d1	
Low Flow	np	pos	imp	d1	
Wetlands	np	pos	imp	d1	SSD, new
Urban Runoff	np	pos	imp	d1	
Construction Runoff	np	pos	imp	d1	
Point Source (specify type)	np	pos	imp	d1	
Other (specify)	np	pos	imp	d1	

PERCEIVED WATER QUALITY: 1. Excellent 2. Good 3. Fair 4. Poor 5. Very Poor

SAMPLE TRACKING INFORMATION

Time Spent Collecting Sample (minutes) 15 Replicate #'s _____

Sampler Collector WAWRZEN Sorter W WAWRZEN Identifier _____

Date 5/1/84 Date 5-15-84 Date _____

Dates Artificial Sampler In _____ Out _____

MACROINVERTEBRATE IDENTIFICATION

[illegible]

Total No. of Organisms 42 Total No. Per Sq. Ft.

Total No. of Organisms _____
 *L - Larval; P - Pupal; A - Adult; I - Early Instar
 Checked by: _____ Date: _____

Site HBI 3.86

MACROINVERTEBRATE IDENTIFICATION

[illegible]

Total No. of Organisms 12 Total No. Per Sq. Ft. _____
 *L - Larval; P - Pupal; A - Adult; I - Early Instar
 Checked by: _____ Date: _____ Site HBI 2.55
Pool
 #142 (Rev. 12/80)

Appendix (cont.)

MACROINVERTEBRATE FIELD SAMPLING DATA Form 3200-52 4-81

BASIN: 052 STREAM: LINCOLN Cr. COUNTY: MILWAUKEE SAMPLE NO. 21

PRIMARY STATION NO. _____ LOCATION: NW 1/4, SW 1/4, S 31, T 8 N, R 2 E WATERSHED: MILWAUKEE

DATE: 05/01/84 no day yr. Along Lincoln Cr. Parkway across St. Martin Ave on Village Ave BIOTIC INDEX: _____

Chemical Sample? yes/no _____

14:55 TIME (24 hr) AT SAMPLE SITE: 4 AVG. WIDTH (ft) _____

14:20 DO (mg/l) _____ SITE: 0.4 AVG. DEPTH (ft) _____

13.9 TEMP (°C) _____ AVG. VELOCITY (measured fps) _____

_____ pH (s.u.) _____ EST. VELOCITY (fps) 1. very slow (.2); 2. slow (.2-.5); 3. moderate (.5-1.5); 4. fast (1.5)

_____ CONDUCTIVITY (umhos) _____

SAMPLED HABITAT: 1. Riffle 2. Run 3. Pool

SAMPLER: 1. D Frame Net 2. Artificial Substrate _____ 3. Other _____

SUBSTRATE AT SITE LOCATION (%):

Bedrock _____ Rubble (2 1/2 - 10" dia.) 50 Sand 10 Clay _____ Muck _____

Boulders (10" dia.) 10 Gravel (1/10 - 2 1/2" dia.) 10 Silt _____ Detritus _____ Debris & Vegetation _____

SUBSTRATE SAMPLED (%): ✓ SAME AS ABOVE OR

Bedrock _____ Rubble (2 1/2 - 10" dia.) _____ Sand _____ Clay _____ Muck _____

Boulders (10" dia.) _____ Gravel (1/10 - 2 1/2" dia.) _____ Silt _____ Detritus _____ Debris & Vegetation _____

AQUATIC VEGETATION: _____ % of Total Stream Channel at Sample Site

OBSERVED INSTREAM CONDITIONS AT SAMPLING SITE LIMITING W.Q.

	not present	slight	moderate	significant	Comments
Sludge Deposits	<u>n</u>	sl	m	s	di
Silt & Sediment Deposits	n	sl	m	s	
Turbidity	n	sl	m	s	
Chlorine or Toxic Scour	n	sl	m	s	
Macrophytes	n	sl	m	s	
Filamentous Algae	<u>n</u>	sl	m	s	Few if any organisms collected. May be due to toxic conditions or some other previous harmful agent. 5/1/84, 1/1/84 sampled.
Planktonic Algae	<u>n</u>	sl	m	s	
Slimes	<u>n</u>	sl	m	s	
Iron Bacteria	<u>n</u>	sl	m	s	

FACTORS WHICH MAY BE AFFECTING SAMPLING SITE

degree of influence:	General Watershed			At Site	Comments
	not present	possible	important	direct impact	
Livestock Pasturing	np	pos	imp	di	Slight solvent odor at sample site.
Barnyard Runoff	np	pos	imp	di	
Cropland Runoff	np	pos	imp	di	
Tile Drains	np	pos	imp	di	
Septic Systems	np	pos	imp	di	
Streambank Erosion	np	pos	imp	di	Water w/ green shale - flow in stream.
Channel Ditching & Straightening	np	pos	imp	di	
Downstream Impoundment	np	pos	imp	di	
Upstream Impoundment	np	pos	imp	di	Light oily stream across entire stream.
Low Flow	np	pos	imp	di	
Wetlands	np	pos	imp	di	Flow ~ 10 ft/s
Urban Runoff	np	pos	imp	di	
Construction Runoff	np	pos	imp	di	CSO, SSO, INDUSTRIAL effluent usually impounds in Milwaukee R. during the summer months.
Point Source (specify type)	np	pos	imp	di	
Other (specify)	np	pos	imp	di	

PERCEIVED WATER QUALITY: 1. Excellent 2. Good 3. Fair 4. Poor 5. Very Poor 5. Very Poor

SAMPLE TRACKING INFORMATION

Time Spent Collecting Sample (minutes) 15 Replicate #'s _____

Sampler Collector W. W. W. W. Sorter W. W. W. W. Identifier B. W. W. W.

Date 5/1/84 Date 5-15-84 Date 5-22-84

Dates Artificial Sampler In _____ Out _____

APPENDIX

(CONT.)

Community Structure of Macroinvertebrates
in the Lower Milwaukee River Basin

	<u>LMR-1M</u>	<u>LMR-2M</u>	<u>LMR-3M</u>	<u>LC-1M</u>
Number of Individuals ($\bar{X}$) ¹	2749.7	6616.2	869.4	615.5
Total Taxa	38	33	30	22
Intolerant Number ($\bar{X}$) ¹	85.6	294.7	41.5	0.4
Intolerant Taxa	8	8	3	1
Tolerant Number ($\bar{X}$) ¹	1863.2	4897.2	595.2	103.6
Tolerant Taxa	17	17	16	5
Very Tolerant Number ($\bar{X}$) ¹	779.3	1422.3	229.7	509.5
Very Tolerant Taxa	10	7	10	14
Unclassified Number ($\bar{X}$) ¹	21.6	2.0	3.0	2.0
Unclassified Taxa	3	1	1	2
Community Diversity	2.22	2.33	2.47	2.21
Intolerant Diversity	0.05	0.05	0.03	0.00
Tolerant Diversity	1.21	1.44	1.28	0.19
Very Tolerant Diversity	0.19	0.15	0.38	1.54
Unclassified Diversity	0.01	0.00	0.00	0.00
Diversity of Tolerance Groups	0.76	0.69	0.78	0.48
Biotic Index	2.45	2.92	3.61	3.98
No. of Taxa Included in Biotic Index	23	20	17	7

Simpson's Similarity Index

	<u>LMR-2M</u>	<u>LMR-3M</u>
<u>LMR-1M</u>	0.86	0.49
<u>LMR-2M</u>	-	0.80

¹No. per sq. ft.

Appendix (cont.)

18.

	Tolerancy ¹	Biotic Index	Hypotheses ²		LMR-1M			LMR-2M			LMR-3M			LC-1M		
			H'	H''	X	SD	Qual. ³	X	SD	Qual.	X	SD	Qual.	X	SD	Qual.
<i>Branchiura</i>	V	*	A	A	5.9	15.2		-	-	P	-	-	P	-	-	
<i>Dero</i>	V	*	-	-	-	-		-	-		-	-		4.0	13.3	
<i>Ilyodrilus</i>	V	*	A	A	-	-		-	-		4.0	11.31	P	3.0	8.2	
<i>Limnodrilus</i>	V	*	A	A	8.6	11.9	B	211.4	113.2		23.5	25.9		29.0	31.6	P
<i>Nais</i>	V	*	A	A	5.0	6.5		28.5	40.9		12.7	15.9		62.0	53.8	
<i>Pelosoolex</i>	V	*	A	A	6.1	9.5		3.3	9.4		-	-		12.0	24.7	
<i>Tubifex</i>	V	*	A	A	5.0	8.7		6.9	12.8		4.1	6.2		46.0	34.4	
Oligochaeta w/chaetae	V	*	A	A	11.8	13.0	B	-	-		3.1	6.1		25.8	55.0	
Oligochaeta w/o chaetae	V	*	A	A	8.9	11.5		34.2	39.1		27.3	29.7		44.1	50.7	

¹Intolerant (I); Tolerant (T); Very Tolerant (V); Unclassified (*)

²Analysis of variance calculated for the three Lower Milwaukee River stations only - Accepted (A), Rejected (R)
H': The mean number of individuals were equal at all stations
H'': The mean number of individuals were equal in all subsamples

³Qualitative sample areas - Riffle (R); Pool (P); Submerged Vegetation (V); Backwater (B)
Mean ($\bar{X}$); Standard Deviation (SD)

Appendix (cont.)

17.

	Tolerancy ¹	Biotic Index	Hypotheses ²		LMR-1M			LMR-2M			LMR-3M			LC-1M		
			H'	H''	$\bar{X}$	SD	Qual. ³	$\bar{X}$	SD	Qual.	$\bar{X}$	SD	Qual.	$\bar{X}$	SD	Qual.
<i>Tanytus</i>	T	*	A	A	2.4	7.6		-	-		-	-		-	-	
<i>Zavrelimyia</i>	T	4	A	A	53.6	72.2		134.4	209.1		16.4	9.8		13.0	26.3	
<i>Stenelmis</i>	T	3	A	A	128.0	225.6		83.0	58.3	R, P	36.5	47.4	R	-	-	
<i>Asellus</i>	V	5	A	A	3.2	5.6	P, B	-	-	P	4.0	7.7		0.4	1.3	R, P
<i>Hyallala</i>	T	4	A	A	7.2	11.0		2.0	5.7	R, B	-	-	V	7.0	8.6	R, P
<i>Nematoda</i>	*	*	R	R	5.6	7.6		-	-		-	-		0.4	1.3	
<i>Planaria</i>	T	*	R	R	-	-		75.0	52.2		38.0	84.6		-	-	
<i>Sigara</i>	*	*			-	-	P, B	-	-	R, P	-	-	P, V	-	-	P, V
<i>Sperchon</i>	*	*			1.6	5.6		2.0	5.7		-	-		-	-	
<i>Sphaerium</i>	T	*			-	-	P, B	62.0	46.4	R, B	83.5	72.7	R, V	-	-	
<i>Amnicola</i>	*	*			-	-		-	-		-	-		1.6	5.1	
<i>Ferriessia</i>	V	*			-	-		-	-		14.5	16.1	V	19.0	16.1	
<i>Heliosoma</i>	V	*			-	-		-	-		-	-		4.8	9.8	
<i>Physa</i>	V	*			-	-		5.0	7.3		1.5	3.0	R, V	228.0	140.5	R, P, V
<i>Decapoda</i>	*	*			-	-		-	-	P, B	-	-		-	-	
<i>Hirudinea</i>	*	*			-	-		-	-	P, B	3.0	5.6	V	-	-	
<i>Aulodrilus</i>	V	*	-	-	-	-	B	-	-		-	-		31.0	31.9	

References

- Ball, Joseph. 1982. Stream Classification Guidelines for Wisconsin. Technical Bulletin.
- Bannerman, R., M. F. Bohn, and J. G. Konrad. 1984. The IJC Menomonee River Watershed Study. Surface Water Quality 1975-1979. Volume 12. U.S. EPA Region V, EPA-905/4-79-029-L.
- Bannerman, R., J. G. Konrad, and D. Becker. 1979. The Menomonee River Pilot Watershed Study. Surface Water Quality Monitoring Data. Volume 3. U.S. EPA Region V, EPA-905/4-79-029-C.
- Blendell, Steven. 1984. Correspondence with Superintendent of the Bluemound Country Club Golf Course, January 13. *North Shore WW*
- Chesters, G., J. G. Konrad, and S. V. Simsiman. 1979. The Menomonee River Pilot Watershed Study. Summary and Recommendations. Volume 1. U.S. EPA Region V, EPA-905/4-79-020-A.
- City of Milwaukee Health Department. 1977. Fecal Coliform Monitoring Data for Milwaukee County, 1974-1977 (unpublished).
- CH2M Hill. 1983. Report on Pike River Fish Kill Investigations. Completed under contract with SC Johnson & Sons. January, 2nd edition.
- Fago, Donald M. 1973. Distribution and Relative Abundance of Fishes in Wisconsin IV: Milwaukee River Basin. Technical Report (Rough draft).
- Hilsenhoff, W. L. 1982. Using a Biotic Index to Evaluate Water Quality in Streams. Wisconsin Department of Natural Resources Technical Bulletin 132.
- Sheffy, T. B., J. R. St. Amant, and M. E. Pariso. 1981. Toxic Substances Survey of Lake Michigan, Superior and Tributary Streams; Second Annual Report. Wisconsin Department of Natural Resources, October.
- Southeastern Regional Wisconsin Regional Planning Commission. 1970. A Comprehensive Plan for the Milwaukee River Watershed: Inventory Findings and Forecasts. Planning Report No. 13, Vol.1, December.
- Southeastern Wisconsin Regional Planning Commission. 1978. A Regional Water Quality Management Plan for Southeast Wisconsin. Inventory Findings. Volume 1. Planning Report No. 30. September.
- Southeastern Wisconsin Regional Planning Commission. 1982. Flood Control Plan for Lincoln Creek: Community Assistance Planning. Report No. 13, (second edition). September.

Southeastern Wisconsin Regional Planning Commission. 1983. Evaluation of Urban Nonpoint Source Pollution Management in Milwaukee County, Wisconsin: Volume II, Feasibility and Application of Urban Nonpoint Source Water Pollution Abatement Measures. B84-114172.

Southeastern Wisconsin Regional Planning Commission. 1984. Water Quality Data for Lakes and Streams in Southeastern Wisconsin: 1975-76. (unpublished).

United States Environmental Protection Agency. 1977. Guidelines for the Pollutational Classification of Great Lakes Harbor Sediments. USEPA Region V, April.

Wisconsin Department of Natural Resources. 1975. Lincoln Creek. Milwaukee County. Southeast District Water Resource Management file.

Wisconsin Department of Natural Resources. 1976. Milwaukee River Basin Assessment Report in Milwaukee County: Biological and Physiochemical Chapters. Southeast District Water Resource Management files, (unpublished).

Wisconsin Department of Natural Resources. 1983. Lincoln Creek Stream Classification-Havenwoods Preserve. January 4, Southeast District Water Resource Management Section files.

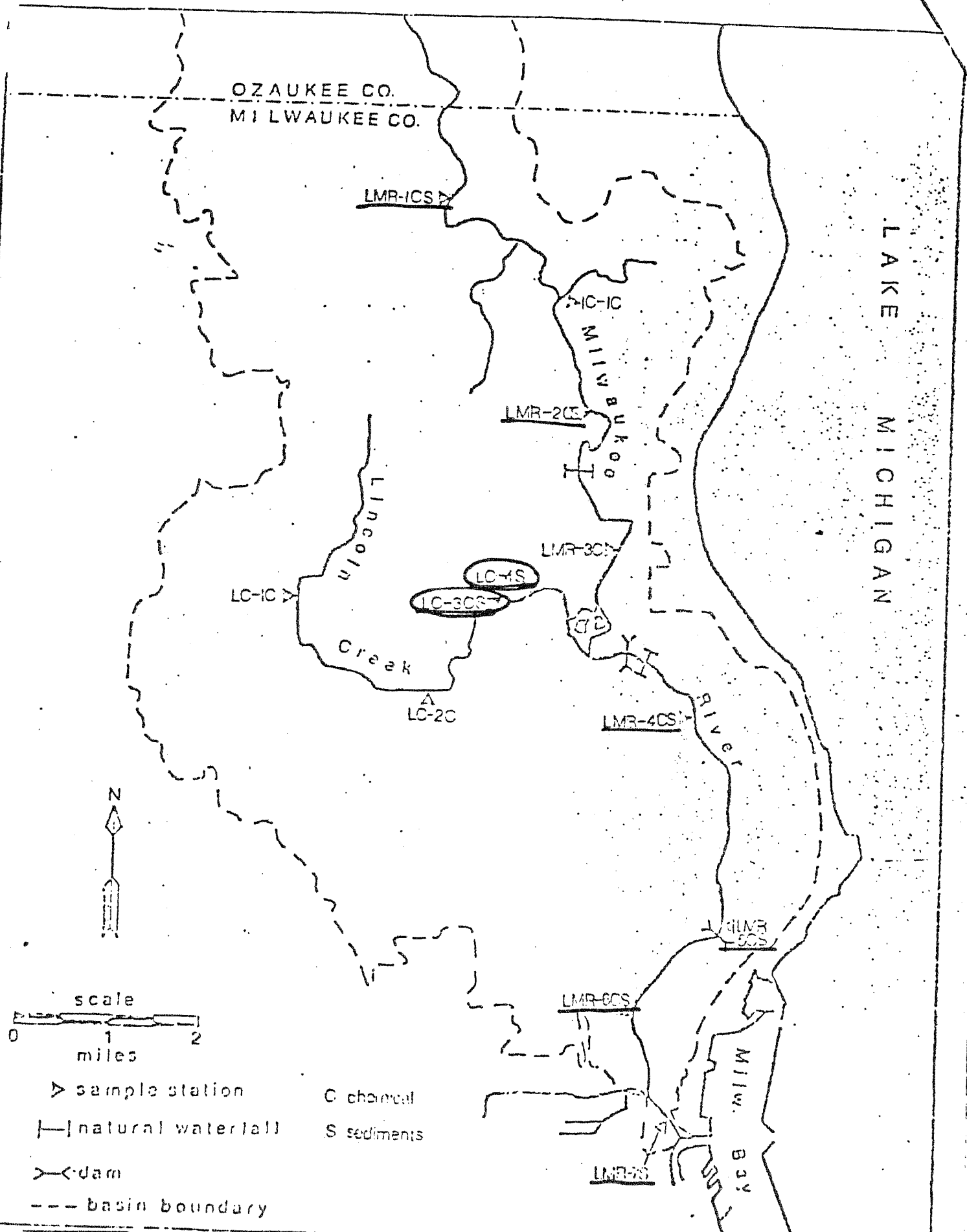
Wisconsin Department of Natural Resources. 1984. Section 24 Water Quality Standards Review for the Milwaukee Metropolitan Area. Bureau of Water Resource Management, Madison. May 16 correspondence to USEPA.

Wisconsin Department of Natural Resources. 1984. Solid Waste and Water Resource Management file reports. Southeast District.

4653P

Appendix 1

WATER QUALITY AND SEDIMENT SAMPLING STATIONS IN THE LOWER MILWAUKEE RIVER BASIN



Appendix (CONT.)

Lincoln Creek @ Cameron Ave. River M. 1.5

5691-01		INDEX SITE WATER QUALITY DATA--1976-1977										2/16/78		PAGE					
STAT	DATE	TIME	FLOW	TEMP	DO	SC	NO2	NO3	NH3	ON	TN	PO4	SRP	TP	BOD	FEC	CL	PH	TSS
ML-B	11/03/76	1105	15.9	57.0	11.7	562	.010	.11	*.03	.06	.18	.032	.017	.19	5.7	130	70		
	11/03/76	1645	15.9	54.0	8.8	479	.005	.09	*.05	.22	.39	.145	.144	.19	5.4	80	44		
	11/03/76	2145	15.9	39.0	6.2	432	.005	.05	*.03	.22	.39	.032	.027	.05	7.0	1200	36		
	11/04/76	0355	15.9	36.0	6.1	453	.008	.06	*.03	.20	.57	.137	.185	.17	4.0	1200	41		
	11/05/76	1410	17.04	52.0	8.8	397	.040	.11	*.03	.45	.57	.075	.049	.08	6.8	1500	30		
	11/06/76	0215	26.5	45.0	5.4	438	.008	.42	*.03	1.00	1.44	.126	.115	.18	3.8	3300	39		
	11/08/76	0915	16.38	41.5	13.7	459	.019	.12	*.03	.33	.51	.109	.109	.17	3.6	540	50		
	11/09/76	1040	15.9	49.5	14.5	507	.024	.10	*.05	.33	.51	.121	.116	.17	0.0	20	50		
	11/10/76	1100	17.04	47.5	14.7	475	.006	.03	*.03	.26	.41	.078	.085	.15	3.8	130	43		
	11/11/76	1155	14.76	47.0	12.7	459	.015	.18	*.03	.27	.39	.145	.097	.23	3.6	400	35		
	11/12/76	1330	17.42	47.0	13.0	448	.023	.08	*.03	.24	.29	.086	.083	.09	3.6	450	34		
	11/13/76	0510	16.28	40.0	7.2	442	.015	.07	*.03	.24	.47	.137	.090	.12	2.8	5000	44		
	11/14/76	1635	12.68	42.8	10.6	621	.021	.14	*.03	.31	.20	.118	.067	.12	4.8	9200	63		
	11/15/76	0840	15.14	39.0	12.5	507	.004	.81	*.13	.85	1.80	.114	.128	.19	5.2	640	71		
	11/16/76	0825	17.42	43.0	12.2	477	.009	.14	*.15	.77	1.09	.096	.097	.12	3.2	590	26		
	11/17/76	0810	17.04	44.0	12.4	477	.028	.14	*.03	.32	.41	.090	.074	.11	6.6	2500	69		
	11/18/76	0915	17.04	41.0	12.4	525	.015	.06	*.03	.22	.35	.123	.100		4.2	2500	66		
	11/19/76	0745	17.42	41.0	7.0	517	.019	.07	*.05	1.57	1.96	.018		.48	3.8	14000	16	7.1	173.33
	2/10/77	1445	41.0	6.7	6.8	517	.177	.17	*.05	2.16	2.57	.070		.86	5.5	22000	2216	7.7	346.67
	2/12/77	1115	15.52	38.0	11.4	688	.016	.12	*.26	.84	1.55	.223			10.0	170	542	7.6	65.33
3/27/77	0600	32.60	44.6	8.3	114	.064	.47	*.17	.84	1.55	.223		.16	4.6	14100	246	7.3	50.67	
3/27/77	1430	56.45	49.0	9.2	163	.112	.76	*.32	1.15	1.91	.108		.22	6.2	22000	119	7.4	133.34	
3/28/77	1730			8.6	24	.047	.68	*.04	1.15	1.91	.105		.34	4.0	6400	129	7.4	98.00	
3/28/77	2020	59.00	46.0	12.3	55	.051	1.13	*.07	1.15	2.53	.094		.24	3.0	18000	74	7.6	232.66	
3/29/77	0450	37.00	47.0	9.9	501	.045	1.22	*.10	1.15	2.53	.102		.34	3.2	18000	221	7.8	15.20	
3/29/77	1250	32.05	47.0	12.0	119	.052	1.73	*.12	1.09	2.99	.061		.14	4.4	400	124	7.6	7.33	
3/30/77	1240	41.41	46.0	13.1	681	.079	1.38	*.06	1.26	2.78			.23	4.6	400	238	7.8	30.40	
3/31/77	1315	27.50	47.0	11.6	126	.046	1.24	*.04	.50	1.81	.035		.12	5.4	600	236	7.8	8.00	
4/06/77	0920	24.70	43.0	12.1	128	.033	2.36	*.04	.28	2.66	.029		.04	2.0	90				

30 RECORDS

River Mile 2.85

X 00 00 000070
S 0007.53 0003.16
METER

0007.53 0003.16		RMK		NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	REG DATE	END LINE
0	WATER	TEMP	CENT	12	13.6750	77.0220	8.77622	.641771	2.53348	26.0000	1.60000	75/05/29	76/04/13
1	STREAM	FLOW	INST-CFS	12	5.44499	173.780	13.1826	1.55731	3.80548	48.4400	1.00000	75/05/29	76/04/13
5	STREAM	STAGE	FEET	11	6.46454	.033008	.181880	.028104	.054779	4.98000	6.34000	75/05/29	76/04/13
5	CONDUCTVY	AT 25C	MICROMHO	1	678.000					678.000	678.000	75/07/09	75/07/09
0	DO		MG/L	12	12.4250	9.88392	3.14397	.253029	.007557	17.9000	7.60000	75/05/29	76/04/13
0	BOD	5 DAY	MG/L	11	3.99090	1.98495	1.41313	.354089	.426076	6.50000	2.40000	75/05/29	76/04/13
2	BOD	6 DAY	MG/L	1	4.90000					4.90000	4.90000	76/03/22	76/03/22
0	PH		SU	12	8.27499	.129395	.359714	.043470	.103841	8.90000	7.80000	75/05/29	76/04/13
3	LAB	PH	SU	1	8.20000					8.20000	8.20000	75/05/29	75/05/29
0	RESIDUE	TOTAL	MG/L	12	567.166	47440.6	260.078	.462635	75.0781	879.000	214.000	75/05/29	76/04/13
5	RESIDUE	TOT VOL	MG/L	12	116.667	2484.70	51.8624	.444535	14.9714	204.000	42.0000	75/05/29	76/04/13
0	RESIDUE	TOT NFLT	MG/L	12	17.4167	302.629	17.3962	.998928	5.02196	54.0000	1.00000	75/05/29	76/04/13
5	RESIDUE	VOL NFLT	MG/L	12	4.66667	14.7406	3.74975	.803519	1.08246	12.9000	1.00000	75/05/29	76/04/13
5	ORG N	N	MG/L	12	.435000	.030246	.173913	.399400	.050204	.740000	.210000	75/05/29	76/04/13
8	NH3+NH4-	N-OISS	MG/L	12	.119166	.005736	.075734	.635532	.021863	.270000	.030000	75/05/29	76/04/13
9	UN-IONZD	NH3-NH3	MG/L	12	.005883	.000030	.005457	.927407	.001575	.017500	.000900	75/05/29	76/04/13
1	N02&N03	N-OISS	MG/L	12	.674166	.338441	.681791	.862974	.167949	1.87000	.010000	75/05/29	76/04/13
5	PHOS-TOT		MG/L P	12	.170833	.006536	.080843	.473230	.023337	.330000	.060000	75/05/29	76/04/13
1	PHOS-DIS	ORTHO	MG/L P	12	.104333	.003060	.055316	.530188	.015948	.210000	.036000	75/05/29	76/04/13
0	CHLORIDE	TOTAL	MG/L	2	215.000	36450.0	190.919	.887995	135.000	350.000	80.0000	75/07/09	76/02/17
7	CADMIUM	CD-TOT	UG/L	2	.400000	.020000	.141421	.353533	.100000	.500000	.300000	76/01/28	76/02/17
				10	.200000	.397E-07	.000194	.000997	.000063	.200000	.200000	75/05/29	76/04/13
			K	12	.233333	.007879	.088763	.380413	.025624	.500000	.200000	75/05/29	76/04/13
4	CHROMIUM	CR-TOT	UG/L	2	6.25000	10.1250	3.18198	.509117	2.25000	4.50000	4.00000	75/06/18	75/10/15
			K	10	3.00000	.000000	.000000	.000000	.000000	3.00000	3.00000	75/05/29	76/04/13
			TOT	12	3.54167	2.52084	1.58771	.448296	.458334	8.50000	3.00000	75/05/29	76/04/13
2	COPPER	CU-TOT	UG/L	12	6.83333	6.51518	2.41808	.427036	.842377	14.8000	4.00000	75/05/29	76/04/13
1	LEAD	PB-TOT	UG/L	11	15.9182	714.764	26.8284	1.69605	8.09907	96.0000	4.00000	75/05/29	76/04/13
			K	1	3.00000					3.00000	3.00000	75/09/17	75/09/17
			TOT	12	14.7500	648.023	25.8461	1.75228	7.44113	96.0000	3.00000	75/05/29	76/04/13
7	NICKEL	NI-TOTAL	UG/L	12	20.0000	.000000	.000000	.000000	.000000	20.0000	20.0000	75/05/29	76/04/13
2	ZINC	ZN-TOT	UG/L	7	34.2857	628.572	25.0713	.731244	9.47408	90.0000	20.0000	75/05/29	76/04/13
			K	5	22.0000	20.0000	4.47214	.203774	2.00000	30.0000	20.0000	75/05/29	76/04/13
			TOT	12	29.1667	390.153	19.7523	.677221	5.70199	90.0000	20.0000	75/05/29	76/04/13
9	INVALID	PAR	NUMBER	1	.006300					.006300	.006300	75/06/18	75/06/18
3	FEC COLI	M-FECAGR	/100ML	11	1382.73	2298523	1516.04	1.09645	457.118	4900.00	400.000	75/05/29	76/04/13
			K	1	10.0000					10.0000	10.0000	75/07/09	75/07/09
			TOT	12	1268.33	2746597	1496.87	1.14176	432.685	4900.00	10.0000	75/05/29	76/04/13
5	ALDRIN		TOT UG/L	2	.003500	.000005	.002121	.606092	.001500	.005000	.002000	75/05/29	75/10/15
3	DDT	WHL SMPL	UG/L	2	.007500	.000013	.003536	.471405	.002500	.010000	.005000	75/05/29	75/10/15
5	DOE	WHL SMPL	UG/L	2	.007500	.000013	.003536	.471405	.002500	.010000	.005000	75/05/29	75/10/15
0	DOT	WHL SMPL	UG/L	2	.015000	.000050	.007071	.471404	.005000	.020000	.010000	75/05/29	75/10/15
0	DIELDRIN	TOTUG/L	K	2	.007500	.000013	.003536	.471405	.002500	.010000	.005000	75/05/29	75/10/15
0	HEPTACHL	TOTUG/L	K	2	.003500	.000005	.002121	.606092	.001500	.005000	.002000	75/05/29	75/10/15
0	HPCHLREP	TOTUG/L	K	2	.003500	.000005	.002121	.606092	.001500	.005000	.002000	75/05/29	75/10/15
0	MTXCYCLR	WHL SMPL	UG/L	2	.030000	.000200	.014142	.471405	.010000	.040000	.020000	75/05/29	75/10/15
6	PCA-12&2	TOTUG/L	K	1	13.8000					13.8000	13.8000	76/03/22	76/03/22
6	PCBS	WHL SMPL	UG/L	2	.075000	.001250	.035355	.471407	.025000	.100000	.050000	75/05/29	75/10/15
2	LINDANE	WHL SMPL	UG/L	1	.030000					.030000	.030000	75/05/29	75/10/15
			K	1	.002000					.002000	.002000	75/05/29	75/10/15
			TOT	2	.016000	.000392	.019799	1.23744	.014000	.030000	.002000	75/05/29	75/10/15
0	MERCURY	HG-TOTAL	UG/L	2	.300000	.020000	.141421	.471405	.100000	.400000	.200000	75/05/29	75/10/15
			K	10	.200000	.397E-07	.000194	.000997	.000063	.200000	.200000	75/07/09	76/04/13
			TOT	12	.216666	.003333	.057735	.264471	.016667	.400000	.200000	75/05/29	76/04/13

Appendix 2 (cont.)

Monthly Geometric Mean

STATION	DATE	No. Obs.	No./100 ml	% > 400	% > 2,000	RANGE
LC-4B Mile 3.25 (42nd and Congress)	STANDARD		1,000/100 ml	N/A	10%	
	June, 1974	4	1,489	100	25	700- 6,100
	July, 1974	9	3,155	100	56	1,000-15,000
	Aug., 1974	8	2,254	100	38	620-20,000
	June, 1975	4	948	50	50	360-12,000
	July, 1975	8	597	50	13	100-12,000
	Aug., 1975	9	1,506	67	56	120-13,000
	June, 1976	5	380	60	0	140- 1,300
	July, 1976	9	660	78	11	20- 7,100
	Aug., 1976	9	391	56	11	80- 2,100
	June, 1977	4	1,490	75	50	< 20- 1,600
	July, 1977	9	2,414	100	56	800- 8,400
	Aug., 1977	8	2,858	100	38	1,100- 8,400

Monthly Geometric Mean

STATION	DATE	No. Obs.	No./100 ml	% > 400	% > 2,000	RANGE
LC-6B Mile 2.65 (35th and Ruby Avenue)	STANDARD		1,000/100 ml	N/A	10%	
	June, 1974	4	1,483	75	50	260- 4,700
	July, 1974	9	2,045	89	44	320- 5,400
	Aug., 1974	8	2,375	100	38	440-24,000
	June, 1975	4	2,748	100	75	500- 7,200
	July, 1975	8	563	50	25	40-16,000
	Aug., 1975	9	690	56	56	< 20-19,000
	June, 1976	5	246	40	0	60- 860
	July, 1976	9	497	56	11	80- 2,500
	Aug., 1976	9	323	33	11	100- 2,200
	June, 1977	4	17,927	100	100	14,000-31,000
	July, 1977	8	4,946	100	88	2,600-15,000
	Aug., 1977	8	2,489	100	63	520-21,000

Appendix 2 (cont.)

Monthly Geometric Mean

STATION	DATE	No. Obs.	No./100 ml	% > 400	% > 2,000	RANGE
LC-7B Mile 1.62 (N. Teutonia Avenue)	STANDARD		1,000/100 ml	N/A	10%	
	June, 1974	4	559	50	25	200- 76,000
	July, 1974	9	1,577	89	44	220-210,000
	Aug., 1974	8	1,808	75	38	100-110,000
	June, 1975	4	1,340	75	50	50- 21,000
	July, 1975	8	741	75	13	120- 11,000
	Aug., 1975	9	686	56	56	20- 12,000
	June, 1976	5	216	20	0	100- 10,000
	July, 1976	9	309	33	22	< 20- 10,000
	Aug., 1976	9	282	33	11	20- 2,500
	June, 1977	4	7,636	100	100	2,300- 52,000
	July, 1977	9	3,002	100	78	940- 7,100
	Aug., 1977	8	2,850	88	63	220- 28,000

Monthly Geometric Mean

STATION	DATE	No. Obs.	No./100 ml	% > 400	% > 2,000	RANGE
LC-8B Mile 0.78 (Green Bay & West Lawn Avenue)	STANDARD		1,000/100 ml	N/A	10%	
	June, 1974	4	598	50	0	140- 3,800
	July, 1974	9	1,116	89	22	360-190,000
	Aug., 1974	8	6,643	88	63	180-690,000
	June, 1975	4	1,308	50	50	100- 19,000
	July, 1975	8	227	25	13	20- 5,400
	Aug., 1975	9	1,679	67	44	40- 54,000
	June, 1976	5	470	60	20	20- 21,000
	July, 1976	9	140	22	11	< 20- 5,300
	Aug., 1976	9	403	33	22	40- 15,000
	June, 1977	4	6,103	100	75	660- 39,000
	July, 1977	9	958	89	33	< 20- 8,000
	Aug., 1977	8	2,779	75	63	200- 54,000

TABLE 1

LINCOLN CREEK
SEDIMENTSEDIMENT RESULTS (mg/kg) FOR THE LOWER MILWAUKEE RIVER BASIN

Site	Land Use	Date	PCB	Cd	Cr	Cu	Pb	Ni	Zn	Hg	EPA Pollutional Classification
1CS	Agricultural Low Density Residential Base Line Data	Feb. 10, 1976	0.150	0.5	6.3	8.5	35	5	MP 95	.07	Moderately
2C	Low Density Residential	May 8, 1975	1.1								Insufficient Data
4S	Residential	May 8, 1975	3.2								Insufficient Data
3CS	Residential Some Industry and Transportation	Feb. 10, 1976	7.5	2.0	MP 38	MP 45	HP 250	MP 20	MP 275	0.21	Heavily Polluted
4CS	Residential Industrial	May 8, 1975	3.5								Insufficient Data
	Residential Industrial	Feb. 10, 1976	P 345	HP 7.25	HP 172	HP 272	HP 625	HP 62	HP 775	0.69	Heavily Polluted
5CS	Residential Industrial	May 8, 1975	P 21.3								Polluted (PCB)
	Residential Industrial	Feb. 10, 1976	P 13.6	HP 6.75	HP 93	HP 100	HP 550	MP 28	HP 525	0.11	Heavily Polluted
6CS	Commercial Transportation	Feb. 10, 1976	9.6	HP 6.25	16.5	HP 125	HP 775	MP 30	HP 600	P 1.06	Heavily Polluted
7S	Commercial Transportation	May 8, 1975	P 26								Polluted (PCB)

Table 1

1. taken in impounded area
2. listed

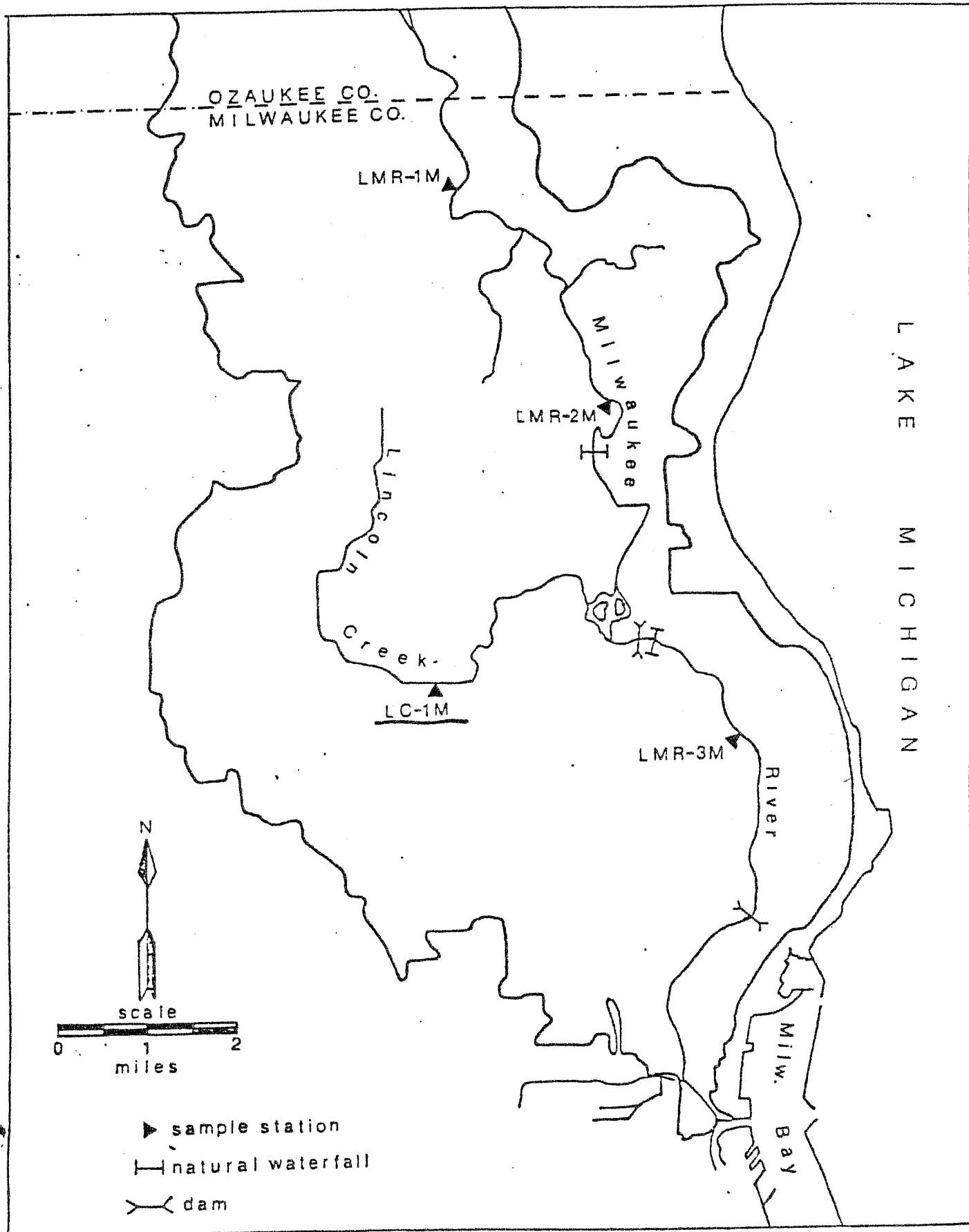
Table 2

Fish Distribution Data for Lincoln Creek

Date	Location	Species	Number	Tolerance
X 9/9/75	Villard Ave. @ mile 0.8	N. Pike	1	S
		Log Perch	4	IT
		Common Shiner	1	T
		Spottail Shiner	2	T
		Sand Shiner	4	T
		Bluntnose Minnow	>99	T
		Fathead Minnow	1	VT
		White Sucker	51	T
		Green Sunfish	5	S
		Pumpkinseed	2	S
		Common Carp	1	VT
9/9/75	Hampton Ave. @ mile 4.3	Goldfish	1	VT
		Fathead Minnow	8	VT
		Green Sunfish	48	S
8/13/83	Havenwoods park @ mile 6.3	Fathead Minnow	2	VT
X 7/27/84	Across from St. Michels Hosp. & 27th St. @ mile 1.1	Rock Bass	4	S
		Smallmouth Bass	10	S
		Largemouth Bass	2	S
		N. Pike	2	S
		Pumpkinseed X	1	S
		Green Sunfish		
		White Sucker	4	T
		Green Sunfish	25	S
		Black Bullhead	15	S
		Goldfish	2	VT
		Black Crappie	2	S
		Yellow Bullhead	1	S
		Common Carp	1	VT
		Horneyhead Chub	1	T
		Shorthead Redhorse	1	IT
		Golden Redhorse	2	IT
		Redhorse unsp.	3	IT
		Sand Shiner	2	T
7/27/84 & 8/84	Between 38th & 42nd St. @ mile 2.7-2.9 and @ 47th St. @ mile 3.3	Green Sunfish	15	S
		Largemouth Bass	3	S
		Pumpkinseed	*	S
		Bluegill	*	S
		White Sucker	*	T
		Common Shiner	*	T
		Bluntnose Minnow	1	T
		Common Carp	1	VT
		Fathead Minnow	4	VT

* Noted as being present.

- Location of macroinvertebrate sample stations
in the Lower Milwaukee River Basin



Appendix (cont)

- Station descriptions for macroinvertebrate sample stations in the Lower Milwaukee River Basin

<u>Station</u>	<u>Stream Miles</u>	<u>Station Location</u>	<u>Collection Date</u>	<u>Current</u>	<u>Substrate</u>	<u>Comments</u>
<u>Lower Milwaukee River</u>						
LMR-1M	14.85	200 yards downstream of Brown Deer Road bridge	October 30, 1975	Riffle	0.5 rock, 0.2 gravel, 0.2 sand, 0.1 sandy loam	<u>Myriophyllum</u> upstream of station.
LMR-2M	11.15	200 yards downstream of Greentree Road bridge	October 30, 1975	Riffle	0.9 rock, 0.1 gravel	<u>Myriophyllum</u> present throughout site. Filamentous blue-green algae on 90% of substrate.
LMR-3M	5.39	75 yards downstream of Capitol Drive bridge	October 31, 1975	Riffle	0.05 boulder, 0.6 rock, 0.25 gravel, 0.1 sand	<u>Myriophyllum</u> present upstream of site. Downstream of combined sewer outflow.
<u>Lincoln Creek</u>						
LC-1M	3.14	20 yards downstream of 40th Street walk bridge	October 27, 1975	Riffle	0.5 rock, 0.2 gravel, 0.2 sand, 0.1 detritus	Filamentous algae and <u>Elodea</u> present. Oil film on water surface. Debris abundant (broken glass, shopping cart, etc.).

Appendix (CONT.)

15.

Macroinvertebrate Taxa (Mean No./Sq. Ft.) Collected in the Lower Milwaukee River Basin
and Their Corresponding Tolerance Classifications

	Tolerancy ¹	Biotic Index	Hypotheses ²		LMR-1M			LMR-2M			LMR-3M			LC-1M		
			Ho'	Ha''	X	SO	Qual. 3	X	SO	Qual.	X	SO	Qual.	X	SO	Qual.
<i>Caenis</i>	T	4	A	A	0.8	2.5		-	-		-	-		-	-	
<i>Heptagenidae</i> (instar)	*	*	A	A	14.4	18.8		-	-		-	-		-	-	
<i>Pseudocloeon</i>	I	2	A	A	4.8	10.8		4.0	7.4	R	2.0	5.6		-	-	
<i>Stenacron</i>	I	3	R	R	20.0	26.7	R, P	187.0	152.0	R, P	30.5	34.8	R, P, V	-	-	
<i>Stenonema</i>	I	3	R	R	22.4	29.2		17.0	17.3		-	-		-	-	
<i>Tricorythodes</i>	I	2	A	R	15.2	20.1	R	36.0	32.3	P	9.0	6.3		-	-	
<i>Cheumatopsyche</i>	T	4	R	R	260.0	459.2	R, P B, V	1724.0	1173.7	R, P	258.5	454.2		-	-	
<i>Chimara</i>	I	2	-	-	-	-	R	-	-		-	-		-	-	
<i>Hydropsyche</i>	T	3	R	R	97.6	203.8	R, V	209.0	178.3	R	83.0	41.8	R	-	-	
<i>Hydroptila</i>	I	3	A	A	1.6	5.6		2.0	5.7		-	-		-	-	
<i>Stactobiella</i>	I	*	A	R	14.4	20.9		18.0	10.2		-	-		-	-	
<i>Argia</i>	I	2	A	A	-	-		12.0	11.3	P	-	-	R	-	-	
<i>Enallagma</i>	I	4	-	-	-	-	B	-	-	R	-	-	V	-	-	V
<i>Nehalennia</i>	I	*	R	R	1.6	5.1		-	-		-	-		0.4	1.3	

* 50

APPENDIX (CONT.)

16.

	Tolerancy ¹	Biotic Index	Hypotheses ²		LMR-1M			LMR-2M			LMR-3M			LC-1M		
			Ho'	Ha''	X	SO	Qual. ³	X	SO	Qual.	X	SO	Qual.	X	SO	Qual.
<i>Empididae</i>	T	*	A	A	5.6	5.6		18.7	18.7		0.5	1.4		-	-	
<i>Simulium</i>	V	4	A	A	656.0	803.6	R, V	1133.0	621.5	R, P, B	135.0	266.1		-	-	
<i>Ablabesmyia</i>	T	*	A	A	5.9	18.8		51.4	103.3		2.0	5.6		-	-	
<i>Cardiocladius</i>	T	4	A	A	-	-		-	-		3.2	9.0		-	-	
<i>Chironomus</i>	V	5	A	A	68.8	121.7		-	-	R	-	-	R, V	0.4	1.3	
<i>Clinotanytus</i>	T	*	-	-	-	-	R	-	-		-	-		-	-	
<i>Conchapelopia</i>	T	4	A	A	43.8	64.8	R	146.1	199.0		16.4	12.4	R	21.0	19.0	R
<i>Cricotopus</i>	T	4			80.7	152.1		242.3	218.6	P	25.3	19.1	R	62.0	49.6	R
<i>Dicrotendipes</i>	T	3	A	A	27.7	62.3		19.1	54.1		4.2	7.8		-	-	
<i>Glyptotendipes</i>	T	5	A	A	104.1	144.9		341.8	403.6		-	-		-	-	
<i>Microtendipes</i>	T	2	R	R	96.8	118.6		249.3	221.2		-	-		-	-	
<i>Orthocladius</i>	T	4	A	A	18.0	57.2		29.2	45.4		2.1	6.0		-	-	
<i>Phaenospetra</i>	T	1	A	A	1.8	5.6		-	-		-	-		-	-	
<i>Procladius</i>	T	*	-	-	-	-		-	-	R	-	-	P	-	-	
<i>Polypedilum</i>	T	3	A	A	2.2	7.0	R	87.8	97.7		4.0	11.3		-	-	
<i>Psectrotanytus</i>	T	2	A	A	-	-		-	-		4.0	11.3		-	-	
<i>Pseudochironomus</i>	T	*	A	A	-	-		5.7	16.2		-	-		-	-	
<i>Rheotanytarsus</i>	T	0	R	R	932.6	1132.7		1435.1	1452.5		17.6	32.8		0.6	1.9	

January 4, 1983

3200

File

Joe Kurz

Lincoln Creek Stream Classification -- Havenwoods Preserve

Lincoln Creek originates from a series of small ponds in T8N, R21E, Section 15, SE in Milwaukee County and is part of the Milwaukee River drainage basin. A stream classification of the segment of Lincoln Creek contained within the Havenwoods Preserve (See map) was conducted on August 13, 1982.

Lincoln Creek drains into the Milwaukee River in Lincoln Park. Land use in the Lincoln Creek watershed is primarily urban area. The majority of the stream channel has been straightened for flood control measures and acts primarily as a drainageway for urban runoff. Approximately five storm sewers drain into Lincoln Creek above the Havenwoods area. The estimated discharge of the stream during low flow is <0.1 cfs. The slope of the stream ranges from 17.2 feet per mile from the headwater ponds to Good Hope Road to 11.0 feet per mile through the Havenwoods area. The major substrate in the stream is clay. The reach of stream in the northernmost portion of the Havenwoods area has a rubble - gravel - clay substrate, is much shallower, and has a much faster flow than the downstream portion of the stream. The cool water temperature appears to reflect a strong influence of groundwater flow to the stream. Streambank erosion is significant along many areas of the stream and debris accumulation along the streambanks indicates past water levels three to four feet higher than levels observed during the field investigation. Deposition of fine materials is significant on the stream bottom.

A biological investigation of Lincoln Creek was conducted in the Havenwoods area. An attempt was made to electrofish the entire stream segment. However, this failed due to equipment malfunction. The area which was shocked gave indications of a very poor fish population in this segment of the stream. Only two fathead minnows were collected in approximately 200 feet of stream. This segment has suitable habitat for larger fish populations. However, food may have been the limiting factor. The most abundant invertebrates found in the stream in the Havenwoods area were sowbugs (Asellus), crayfish, and snails (Ferrissia). Other less abundant invertebrates found in the slow current area included mayflies (family Heptageniidae), midges (Chironomus), scuds

(Hyallolela azteca), snails (Physa), damselflies, and dragonflies. In the riffle areas caddisflies (family Hydropsychidae) were present in low numbers. Invertebrates found in the investigation are all tolerant to very tolerant organisms.

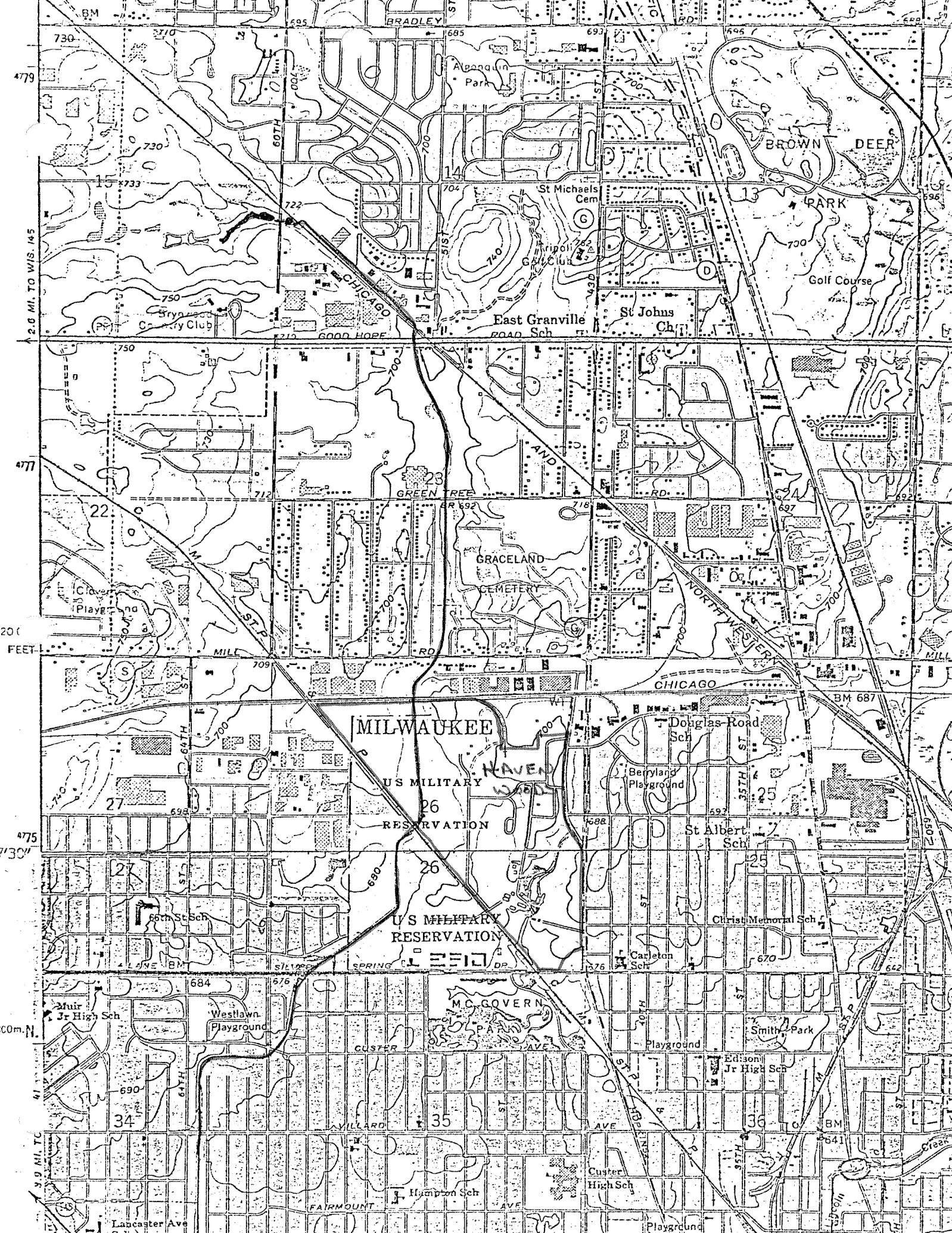
Primary productivity in the stream is very limited, especially in the downstream section. In the upstream section filamentous algae is present along with a small amount of Elodea. This section has a more open canopy along with a more stable substrate and faster current.

Based on the observed physical and biological characteristics of the stream and its watershed, it is recommended that the portion of Lincoln Creek which flows through the Havenwoods area be classified as capable of supporting tolerant or very tolerant forage or rough fish, or tolerant macroinvertebrates (Use Class D or intermediate fish and aquatic life.).

JK:jf

Encl.

cc: Al Stenstrup
 ➤ Dan Moran - WRM/2



Rick Johnson

Lincoln Creek, Milwaukee County
Milwaukee River Drainage Basin

Lincoln Creek is a small intermittent tributary of the Milwaukee River which provides drainage for 20 square miles of Milwaukee County. The stream flows approximately seven miles through an urbanized area before joining with the Milwaukee River in Lincoln Park. The channel has been altered for most of the stream and has been concrete lined in many sections. Approximately four stream miles are bordered by park land.

The substrate ranges from muck to gravel. Stream bank erosion is a problem along much of the stream. A benthic macroinvertebrate sampling survey conducted by Department of Natural Resources personnel in October 1975 found only invertebrates tolerant and very tolerant of decomposable organic wastes.

The creek has great recreational potential resulting from extensive areas of public access through surrounding parks.

Recommendations

Lincoln Creek shall be classified as a noncontinuous urban stream. The Milwaukee River shall be classified as a continuous fish and aquatic life stream.

