

CORRESPONDENCE/MEMORANDUM

DATE: December 3, 2003

FILE REF:

TO: Laura Bub - WT/2
Pat Oldenburg – Eau Claire
Paul LaLiberte – Eau Claire
Eric Donaldson – Wausau
Tom Jerow – Wisconsin Rapids

FROM: Mark Hazuga - Wausau

SUBJECT: Stream Classification Surveys on Elm Brook Creek for Abbotsford WWTP for Phase II

The Village of Abbotsford treats domestic and industrial wastewater by primary settling followed by trickling filters and rotating biological contactors. The annual average design flow is 0.815 million gallons per day (mgd). Phosphorus removal is accomplished by ferric chloride added to the final clarifiers. The discharge is to Elm Brook Creek near its headwaters located in Abbotsford. Effluent flows during the survey period averaged 0.317 mgd.

Elm Brook Creek is a five mile long warm water tributary to Dill Creek which flows into the Big Eau Pleine River. The stream and discharge is located in Marathon County in the Upper Big Eau Pleine Watershed (UW18). According to the USGS 7.5 minute QUAD map, Elm Brook has perennial flow in the lower reaches and becomes intermittent in mid through upper reaches. The Q710 flow of Elm Brook Creek near Abbotsford is <0.01 cfs. Observations by Department staff indicate that the stream generally has no flow above the treatment plant except during runoff events.

Elm Brook Creek is currently classified in NR 104 as Limited Aquatic Life upstream from Lincoln Road and Limited Forage Fish from Lincoln Road to the confluence with Dill Creek. Dill Creek is classified as Limited Forage Fish from the confluence with Elm Brook downstream to Blackberry Road. At this point, Dill Creek receives the Fish and Aquatic Life Classification. Effluent limits of the WWTP are based on the Limited Aquatic Life classification of Elm Brook Creek.

Elm Brook Creek 2003 Survey Results

Surveys were completed on Elm Brook Creek at bridge crossings of CTH N, Lincoln Road and Washington Road on August 5th, 2003 using baseline monitoring protocols (Figure 1).

Site 1

An electro-fishing survey at CTH N (Site 1) began ~120 meters below the bridge and continued upstream 100 meters to the bridge pool. This site was located approximately 3.3 miles downstream of the outfall. Fishery survey results found a total of 247 individuals represented by 11 species. The percent of fish tolerant to low dissolved oxygen was 13% (Table 1). The dominant fish species included blacknose dace, creek chub, johnny darter and brook stickleback. Redside dace, a special concern species, was also found during the survey. Streamflow measured at the site was 0.52 cfs, which was similar to the treatment plant's discharge rate.

Table 1. Elm Brook Creek Fishery Survey Results

Sample Location	# of Fish per 100 m	# of fish species	% of fish tolerant to low D.O.	% fish tolerant to disturbed habitat	# of low D.O. tolerant species	# of fish species tolerant to disturbed habitat
Elm Brook at CTH N	247	11	13	64	2	3
Elm Brook at Lincoln Rd.	512	12	24	53	3	4
Elm Brook at Washington Rd.	220	11	42	51	3	4

The stream channel was naturally meandering with well developed small riffles, runs and shallow pools. Stream gradient measured at the site was 20 feet per mile. Portions of the channel were overgrown with reed canary grass. Substrate consisted of cobble and gravel in riffles while pools contained coarse substrate embedded by sand and some silt. Average width and depth of the channel was four feet and seven inches, respectively. Forage fish cover consisted of shallow pools and some woody debris.

Site 2

An electro-fishing survey at Lincoln Road (Site 2) began approximately 30 meters upstream from the bridge crossing to avoid influence of the bridge pool. This site was located approximately 2 miles downstream of the outfall. Fishery survey results found 512 individuals represented by 12 species in a 100 meter station. The percent of fish tolerant to low dissolved oxygen was 24%. The dominant fish species collected include black nose dace, brook stickleback, creek chub and johnny darter. Redside dace, a special concern species, was also found at the site. Shocking efficiency within the first 30 meters upstream of the road was poor due to the pool created by the bridge and high conductivity. Above this point the stream became narrower and shocking efficiency improved to allow capture of fish, however numerous fish were observed and not captured.

The stream channel was meandering with a diverse habitat of riffles, runs and shallow pools. Substrate composition consisted mostly of gravel and cobble with some sand and silt. Stream gradient measured at the site was 20 feet per mile. Average width and depth of the stream channel was approximately 5 feet and 6 inches, respectively. Forage fish cover consisted of shallow pools and some woody debris.

Site 3

The survey at Washington Road (Site 3) started approximately 5 meters upstream from the culvert and continued upstream for 100 meters. The site was located approximately 0.7 miles downstream from the WWTP outfall. Fishery survey results found 220 individuals represented by 11 species. The percent of fish tolerant to low dissolved oxygen was 42%. The dominant fish species collected include black nose dace, brook stickleback, creek chub and central mudminnow. Redside dace, a special concern species, was also found at the site. Numerous fish were observed within the station but were not captured due to poor shocking efficiency created by high conductivity. The stream channel was naturally meandering with well developed riffles, runs and some shallow pools. Average width and depth of the channel was approximately 4 feet and 4 inches, respectively. Stream gradient measured at the site was 25 feet per mile. Forage fish cover was provided by shallow pools and some woody debris and overhanging vegetation.

Approximately 0.4 miles upstream from this station the entire stream has been channelized including the reach below and above the WWTP.

Site 4

An additional survey was completed approximately 0.2 miles upstream the outfall, just above Old Highway 29. Department staff indicates the stream generally has no flow except during and after runoff events. On the survey date, very small visible flow was observed likely due to rainfall a few days prior to the survey. A 70 meter shocking survey was completed and no fish or other aquatic life were captured or observed. This reach was likely dry or contained minimal water prior to recent rainfall and aquatic life did not have time to migrate to this reach. The lack of continuous stable streamflow above the treatment plant limits the potential for fish and aquatic life movement into this area. Fish may seasonally migrate into this area during spring runoff or longer duration flow events but the lack of continuous flow likely prevents fish from completing a successful life cycle. If another discharge was to occur in this reach or baseflow conditions improved to provide a more continuous flow, fish and other aquatic life could potentially complete a life cycle in this reach.

The stream channel has been channelized and is mostly run habitat. Substrate is mostly gravel with some cobble, silt and sand. Water depth was shallow and averaged 3 to 4 inches. Filamentous algae was growing in portions of the stream. This section of the stream receives urban runoff from Abbotsford.

Discussion

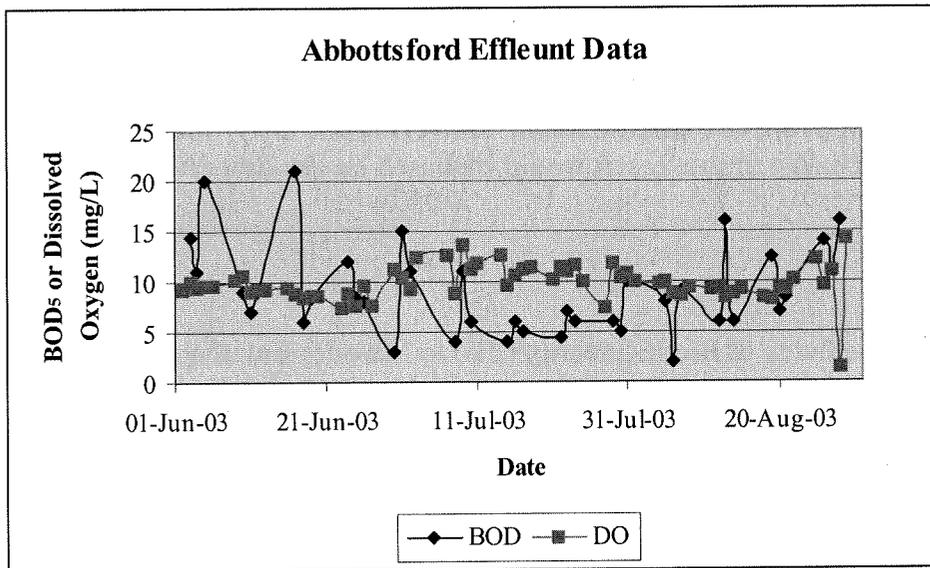
Currently, Elm Brook Creek receives two classifications in NR 104. The stream is classified as Limited Aquatic Life upstream from Lincoln Road and Limited Forage Fish from Lincoln Road downstream to the confluence with Dill Creek (Figure 2). Based on surveys completed in August 2003, Elm Brook Creek from the Abbotsford outfall downstream to the mouth should be

classified as Full Fish and Aquatic Life (FFAL). According to the Use Designation document, a Full Fish and Aquatic Life stream is one that has the potential to contain a fishery represented by several species and fewer than 75% of the individuals are tolerant of low dissolved oxygen. The percent of low dissolved oxygen tolerant fish in Elm Brook Creek ranged from 13 to 42%, which is well below the 95-75% threshold listed in guidance. The number of species collected was 11 or 12 indicating a relatively diverse community. The presence of Redside Dace at two sites also warrants the Full Fish and Aquatic Life classification according to guidance. Habitat conditions at the sites surveyed were relatively diverse which in turn supports a more diverse fishery. The stream channel naturally meandered and contained riffles, runs and shallow pools. Substrate consisted of gravel, cobble, sand and silt with coarse substrate being the most dominant type. Forage fish cover consisted of shallow pools and some woody debris. The natural habitat conditions at sites surveyed in Elm Brook Creek supports a FFAL fishery.

Surveys in 2003 were completed during drought conditions and most if not all of the streamflow in Elm Brook Creek was effluent discharged by the treatment plant. Current effluent quality from the treatment plant appears adequate for the development of a FFAL community downstream from the plant, especially below the channelized portion (Figure 3). The channelized portion below the outfall is approximately 0.1 mile long with a natural channel below this point. A survey in the channelized portion immediately below the outfall was not completed because the downstream classification would determine effluent limits.

Elm Brook above the outfall is intermittent and Department staff have previously observed no streamflow in this reach. The existing use of this reach is likely limited aquatic life. Fish may seasonally migrate to this area during spring runoff or longer duration runoff events but it is unlikely they complete their life cycle under current flow conditions. Surveys completed below the treatment plant indicate that good effluent quality from the treatment plant supports a FFAL community in a natural stream environment. If effluent of similar quality and volume were added above the existing outfall the continuous flow would likely support a higher classification than limited aquatic life. Therefore, any future discharges above the current Abbotsford outfall should be evaluated to determine if they raise the potential classification of the stream.

Figure 3. Effluent data from Abbotsford WWTP



*Obtained from SWAMP

Abbotsford currently does not have an ammonia limit since the current classification of Elm Brook Creek is Limited Aquatic Life. Ammonia concentrations during the summer months when the fishery surveys were conducted are not expected to be high due to warmer temperatures, corresponding improved treatment plant performance and natural in-stream bacteria activity. During the colder water periods in winter, natural bacterial activity is expected to greatly decline preventing the breakdown of ammonia into less toxic forms. During January of 2003, ammonia samples were collected from the treatment plant and Elm Brook Creek. Two rounds of samples were collected to evaluate ammonia concentrations in effluent prior to and just after sludge pressing. All sample results indicate that ammonia concentrations fell below criteria for chronic effects on aquatic life (Appendix 4). The current operation of the plant appears to be providing sufficient nitrification to protect the FFAL community present in the stream.

Recommended Stream Classification

Existing Classification in NR 104

Elm Brook Creek Limited Aquatic Life upstream from Lincoln Road and from Lincoln Road downstream to Dill Creek Limited Forage Fish

Proposed Classification

Elm Brook Creek Full Fish and Aquatic Life from the Abbotsford Outfall in T28N R2E Sec 6 NE NW downstream to the confluence with Dill Creek in T28N R2E Sec 19 SW SW

(Figure 4). The existing classifications in NR 104 in this reach should be removed from code allowing the default classification of FFAL to become effective.

Elm Brook from the Abbotsford Outfall upstream supports an existing use of Limited Aquatic Life based on surveys completed in 2003. This is the existing use without a discharge. If a discharge were to occur in this reach the potential classification could be higher depending on effluent flow. Therefore any discharge to this reach would need to be evaluated to determine the appropriate classification. However, it is likely that effluent limits of any substantial discharge to this reach would be based on the downstream classification.

Literature Review

Lyons, John. 1992. Using the Index of Biotic Integrity (IBI) to Measure Environmental Quality in Warm Water Streams of Wisconsin. U.S. Forest Service General Technical Report NC-149.

Oldenburg, Pat. 2003. Draft Memo. Wisconsin Department of Natural Resources. Eau Claire, WI.

WDNR. 2003 Draft. Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters.

Appendix 2. Elm Brook Fishery Survey Results at Lincoln Road

IBI Calculator for Central and Southern WI

(REV. 3/11/2003)

Sample Date 37838

SITE Elm Brook upstream Lincoln Road

PERSONNEL Hazuga, Schreiber, Oldenburg, Donaldson

MATRIX VALUE SCORE

total # of fish	512	n/a
total # of native spp.	12	10
total # of darter spp.	2	10
total # of sucker spp.	1	10
total # of sunfish spp. < 8km from	0	0
total # of sunfish spp. >8km from l	0	0
total # of intolerant spp.	1	7
total # of tolerant fish	282	0
total # of omnivores	25	10
total # of insectivores	239	5
total # of top carnivores	0	0
total # of simple lithophils	209	5
subtotal		57
Correction Factors		57
total # of DELT fish	0	57
Total after correction factors =		57

Equipment Type = Back Pack
 Stream width (m) = 1.5
 Ln stream width (m) = 0.41
 Distance shocked (m): 100
 Is your sample site greater than 8 km from a ln

% of tolerant spp.	55
% of omnivorous spp.	5
% of insectivores	47
% of carnivores	0
% of simple lithophilous	41
Correction Factors	
# of nontolerant fish per 300m	690
% DELT	0

IBI SCORE = 57

Sand Shiner ID uncertain could be Bigmouth Shiner

Biotic Integrity Rating GOOD

Notes

of fish Fish species

** STREAM WIDTH BELOW IBI MODEL CALIBRATION (<2.5m or 8.2 ft.)

150 Blacknose Dace	Stream Class Guidance (7/2002) Tolerance Summary Data
110 Brook Stickleback	Total # of game-fish species with more than 2 individuals 0
98 Creek Chub	Total # of DO tolerant fish 123
60 Johnny Darter	Total # of DO tolerant fish per 100 meter stream length 123
36 Common Shiner	% forage fish belonging to spp. that are tolerant to low DO 24 %
16 Sand Shiner	Total # of fish tolerant to disturbed habitat 269

Appendix 1. Elm Brook Creek Fishery Survey Results at CTH N

IBI Calculator for Central and Southern WI

(REV. 3/11/2003)

Sample Date 37838

SITE Elm Brook ~115 meters downstream CTH N - Shocked 100 meters

PERSONNEL Hazuga, Schreiber, Oldenburg, Donaldson

MATRIX	VALUE	SCORE	Equipment Type =	Back Pack
total # of fish	247	n/a	Stream width (m) =	1.23
total # of native spp.	11	10	Ln stream width (m) =	0.21
total # of darter spp.	2	10	Distance shocked (m):	100
total # of sucker spp.	1	10	Is your sample site greater than 8 km from a l	
total # of sunfish spp. < 8km from l	0	2		
total # of sunfish spp. >8km from l	0	0		
total # of intolerant spp.	1	10		
total # of tolerant fish	159	0		
total # of omnivores	7	10		
total # of insectivores	89	5	% of tolerant spp.	64
total # of top carnivores	0	0	% of omnivorous spp.	3
total # of simple lithophils	101	5	% of insectivores	36
	subtotal	62	% of carnivores	0
			% of simple lithophilous	41
Correction Factors		62	Correction Factors	
total # of DELT fish	0	62	# of nontolerant fish per 300m	264
Total after correction factors =		62	% DELT	0
IBI SCORE =		62		

Sand Shiner ID uncertain could be Big Mouth shiner

Biotic Integrity Rating

GOOD

Notes

of fish Fish species

** STREAM WIDTH BELOW IBI MODEL CALIBRATION (<2.5m or 8.2 ft.)

 79 Blacknose Dace
 72 Creek Chub
 40 Johnny Darter
 30 Brook Stickleback
 8 Common Shiner
 7 White Sucker

Stream Class Guidance (7/2002) Tolerance Summary Data

Total # of game-fish species with more than 2 individuals	0
Total # of DO tolerant fish	31
Total # of DO tolerant fish per 100 meter stream length	31
% forage fish belonging to spp. that are tolerant to low DO	13 %
Total # of fish tolerant to disturbed habitat	158

15 White Sucker	Total # of fish tolerant to disturbed habitat per 100m. stre	269
9 Central Mudminnow	% of fish species that are tolerant to disturbed habitats	53 %
7 Redside Dace	% of DO fish AND tolerant to disturbed habitat fish spp.	77 %
6 Bluntnose Minnow	Total # of DO tolerant species =	3
4 Fathead Minnow	Total # of Disturbed habitat species =	4
1 Blackside Darter	Total # of fish species collected =	12
	Total # of fish collected =	512
	Steam length shocked (m) =	100
	Macroinvertebrates collected (mm/dd/yyyy)	
	Overall sample HBI score and rating	
	Toal # of macroinvcrtbrates with HBI tolerance values <=5.00 =	
	Toal # of macroinvcrtbrates with HBI tolerance values >5.00 =	
	% of macroinvertebrates with HBI Tol. Values >5.00 =	#DIV/0! %

Fish and Aquatic Life Minimum Expectations Evaluation

% forage fish belonging to spp. that are tolerant to low D(DFAL
 % of macroinvertebrates with HBI Tol. Values >5.00 =

Coolwater Fish Species

Total # of coolwater fish species	2
Total # of coolwater fish	117

Appendix 3. Elm Brook Fishery Survey Results at Washington Road

IBI Calculator for Central and Southern WI

(REV. 3/11/2003)

Sample Date 37838

SITE Elm Brook upstream Washington Road just below STH 29 - Shocked 100 meters

PERSONNEL Hazuga, Schreiber, Oldenburg, Donaldson

MATRIX	VALUE	SCORE	Equipment Type =	Back Pack
total # of fish	220	n/a	Stream width (m) =	1.23
total # of native spp.	11	10	Ln stream width (m) =	0.21
total # of darter spp.	1	10	Distance shocked (m):	100
total # of sucker spp.	1	10	Is your sample site greater than 8 km from a l y	
total # of sunfish spp. < 8km from l	0	2		
total # of sunfish spp. >8km from l	0	0		
total # of intolerant spp.	1	10		
total # of tolerant fish	144	0		
total # of omnivores	19	10		
total # of insectivores	93	5	% of tolerant spp.	65
total # of top carnivores	0	0	% of omnivorous spp.	9
total # of simple lithophils	90	5	% of insectivores	42
subtotal		62	% of carnivores	0
			% of simple lithophilous	41
Correction Factors		62	Correction Factors	
total # of DELT fish	0	62	# of nontolerant fish per 300m	228
Total after correction factors =		62	% DELT	0
IBI SCORE =		62		

Biotic Integrity Rating

GOOD

Notes

of fish Fish species

** STREAM WIDTH BELOW IBI MODEL CALIBRATION (<2.5m or 8.2 ft.)

# of fish	Fish species	Stream Class Guidance (7/2002) Tolerance Summary Data
82	Blacknose Dace	Total # of game-fish species with more than 2 individuals
62	Brook Stickleback	0
22	Creek Chub	Total # of DO tolerant fish
21	Central Mudminnow	93
10	Fathead Minnow	Total # of DO tolerant fish per 100 meter stream length
6	Bluntnose Minnow	93
		% forage fish belonging to spp. that are tolerant to low DO
		42 %
		Total # of fish tolerant to disturbed habitat
		113

5 Johnny Darter	Total # of fish tolerant to disturbed habitat per 100m. stre	113
4 Northern Redbelly Dace	% of fish species that are tolerant to disturbed habitats	51 %
3 Common Shiner	% of DO fish AND tolerant to disturbed habitat fish spp.	93 %
3 White Sucker	Total # of DO tolerant species =	3
2 Redside Dace	Total # of Disturbed habitat species =	4
	Total # of fish species collected =	11
	Total # of fish collected =	220
	Steam length shocked (m) =	100
	Macroinvertebrates collected (mm/dd/yyyy)	
	Overall sample HBI score and rating	
	Toal # of macroinvcrtbrates with HBI tolerance values <=5.00 =	
	Toal # of macroinvcrtbrates with HBI tolerance values >5.00 =	
	% of macroinvertebrates with HBI Tol. Values >5.00 =	#DIV/0! %

Fish and Aquatic Life Minimum Expectations Evaluation

% forage fish belonging to spp. that are tolerant to low D(DFAL
 % of macroinvertebrates with HBI Tol. Values >5.00 =

Coolwater Fish Species

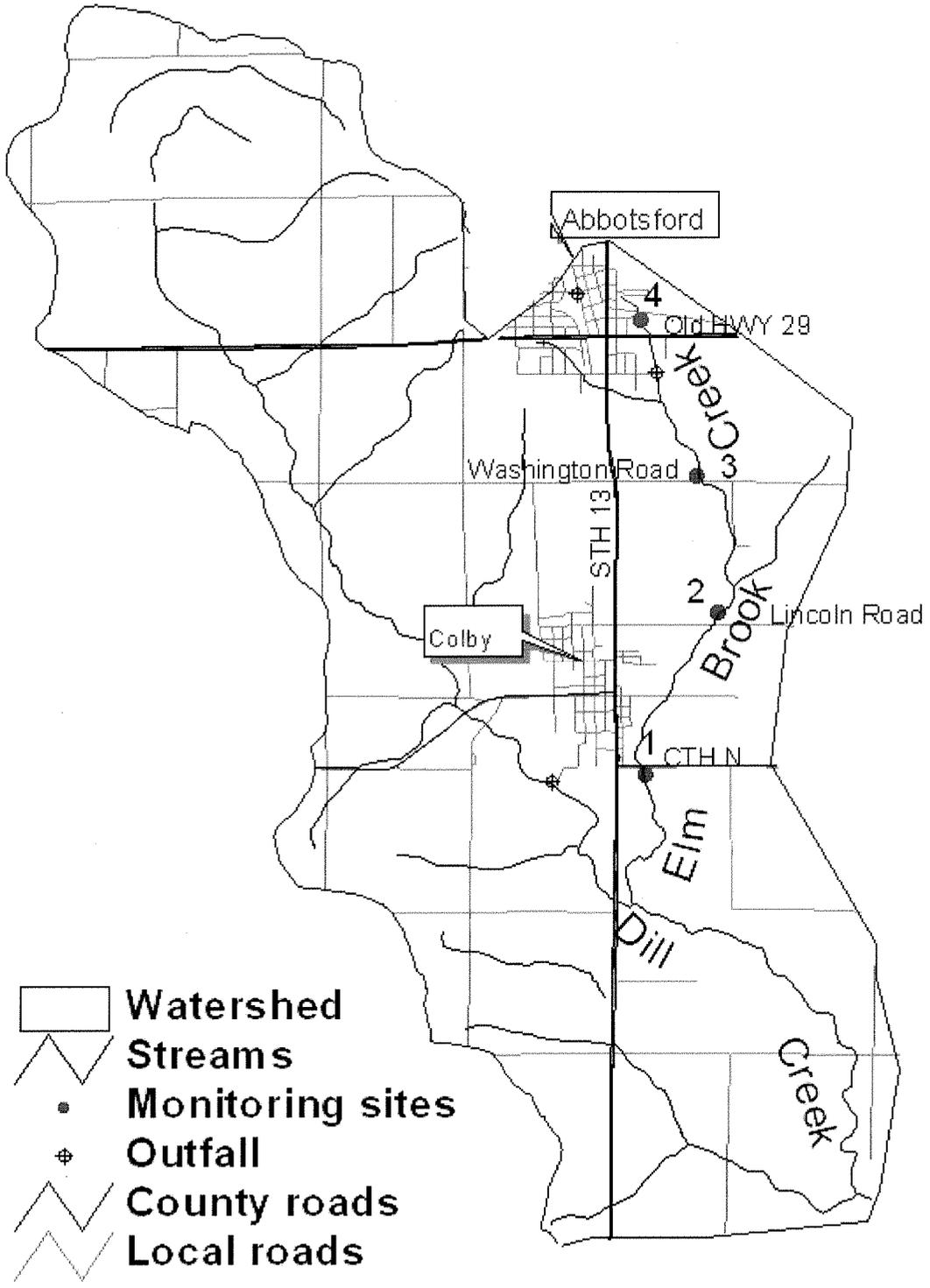
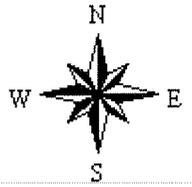
Total # of coolwater fish species	3
Total # of coolwater fish	68

Appendix 4. Abbotsford WWTP and Elm Brook Creek Winter Ammonia Monitoring

Pre-sludge pressing samples								
Site	Description	miles below outfall	Date 2003	Time	TEMP. (C)	D.O. (mg/l)	pH	Ammonia (mg/l)
AOF	24 hr composite effluent	0	1/15-1/16				6.51	0.7
EB2	Elm Brook at Washington Road	0.85	1/16	12:00	0.1	12.4	6.91	0.299
EB3	Elm Brook at Lincoln Road	2	1/16	11:35	0	12.8	5.39	0.16
EB4	Elm Brook at CTH N	3.2	1/16	11:15	0	10.5	5.71	0.187
DC1	Dill Creek at Blackberry Road	6.2	1/16	10:45	0.2	19	7.6	0.043
Post-sludge pressing samples								
OF4	24 hr composite effluent	0	1/30-1/31					1.41
OF1	Effluent grab sample	0	1/29	15:30				ND
OF2	Effluent grab sample	0	1/30	10:00				1.17
OF3	Effluent grab sample	0	1/30	15:00				0.53
AOF	Effluent grab sample	0	1/31	10:00	10.1	10.69	6.57	1.37
EB2	Elm Brook at Washington Road	0.85	1/31	11:00	0.1	10.57	5.89	0.519
EB3	Elm Brook at Lincoln Road	2	1/31	11:30	0.1	13.86	5.75	1.79
EB4	Elm Brook at CTH N	3.2	1/31	12:00	0	6.48	5.68	0.322

Sludge pressing began approximately in mid morning on January 29

Figure 1. Elm Brook Creek Monitoring Sites



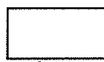
-  Watershed
-  Streams
-  Monitoring sites
-  Outfall
-  County roads
-  Local roads



Figure 2. Elm Brook Creek Current NR 104 Classifications

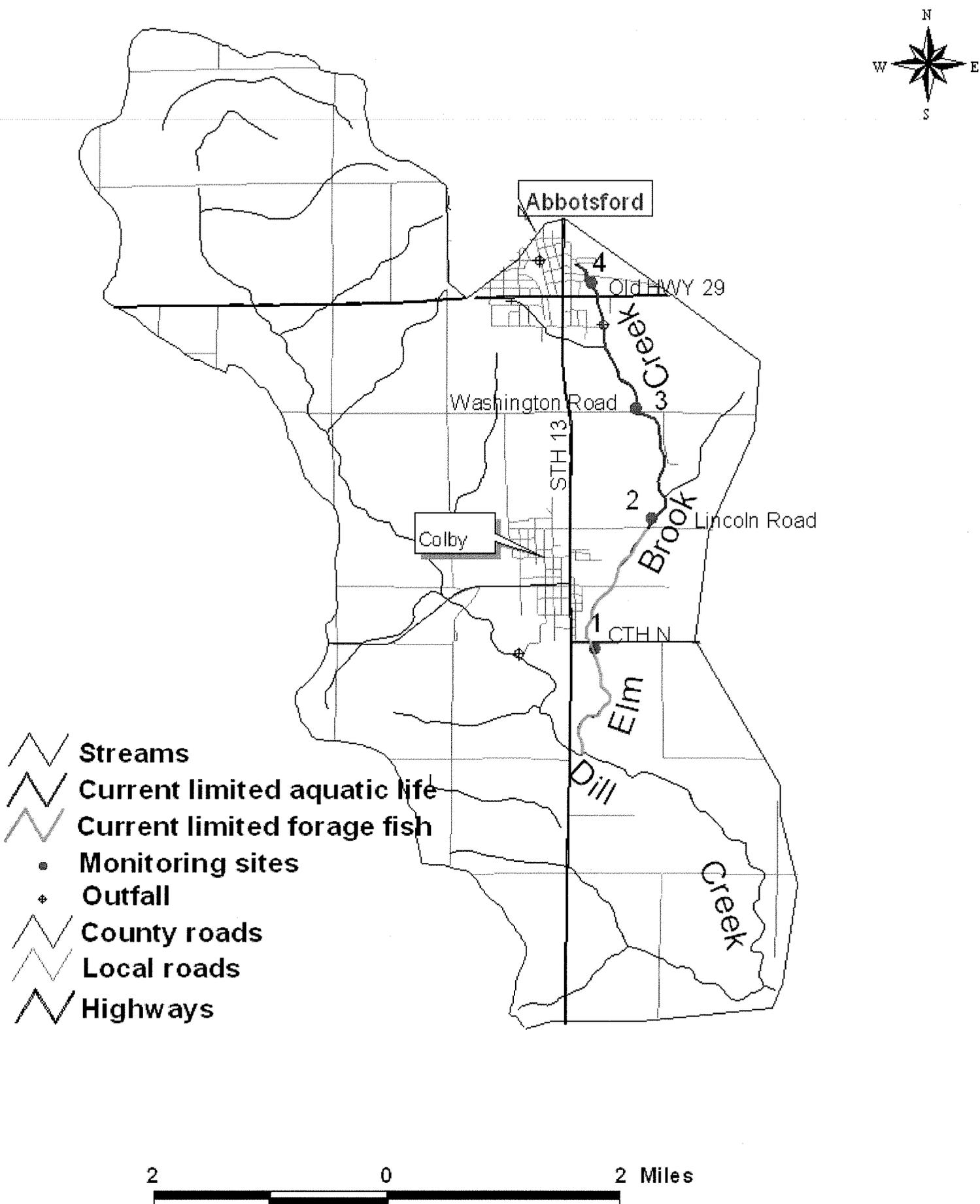
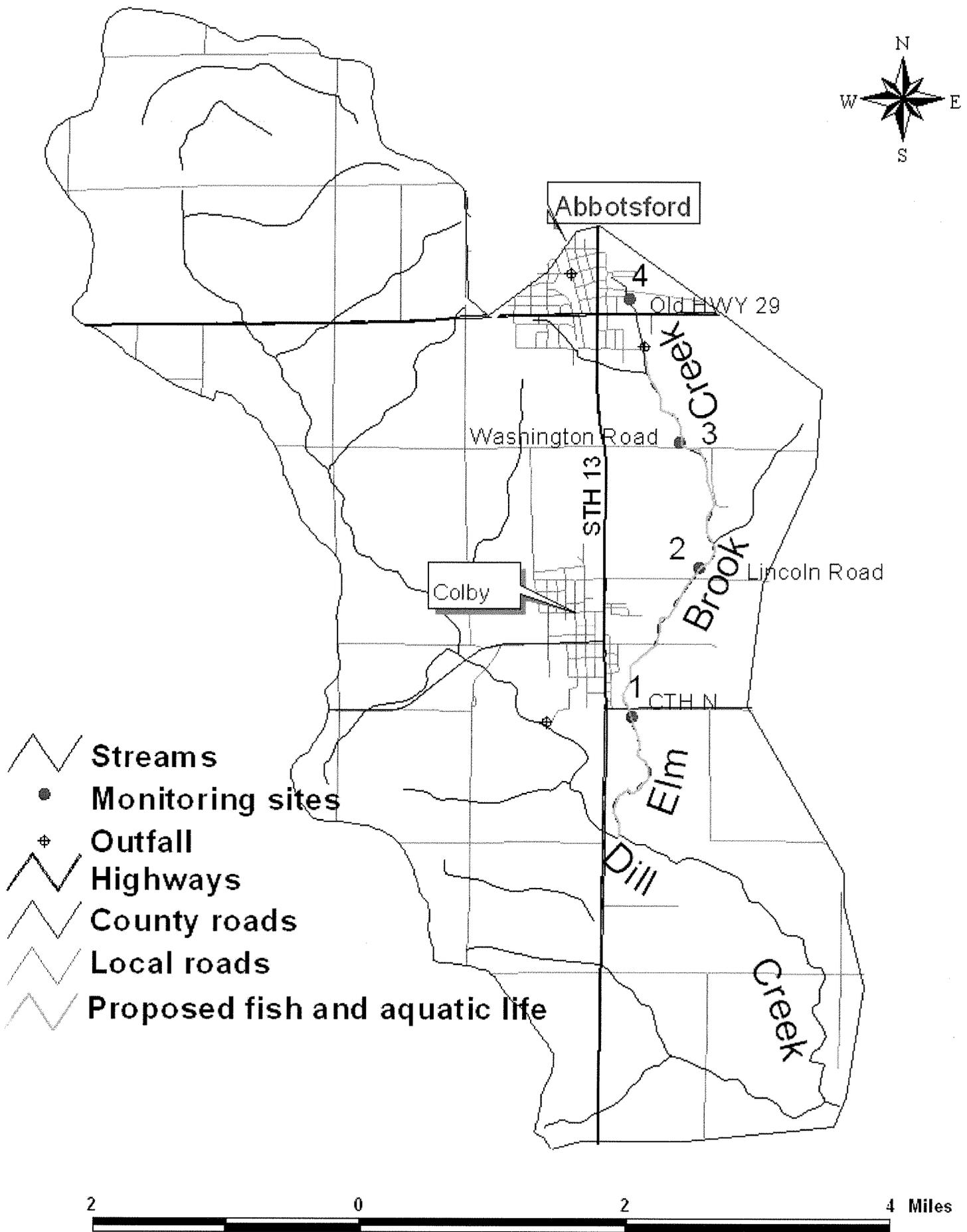


Figure 4. Elm Brook Creek Proposed Classifications



Region WCR County Marathon Report Date 12/1976 Classification LFF/LAL

Water Body: Elm Brook

Discharger: Abbotsford WWTP

If stream is classified as Limited Forage Fish (LFF) or Limited Aquatic Life (LAL), check any of the following Use Attainability Analysis factors that are identified in the classification report:

- Naturally occurring pollutant concentrations prevent the attainment of use
- Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met
- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place
- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or operate such modification in a way that would result in the attainment of the use
- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses
- Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact

Supporting Evidence in the report (include comments on how complete/thorough data is)

- Biological Data (fish/invert)
- Chemical Data (temp, D.O., etc.)
- Physical Data (flow, depth, etc.)
- Habitat Description
- Site Description/Map
- Other: photo

Historical Reports in file:

12/10/76 - Bill Jaeger

Additional Comments/How to improve report:

- no data to justify classification
- data is old
- check w/ region on this classin.

Abbotsford, Marathon County
(Elm Brook and Porky Creek)

Wastewater Receiving Stream Classification

The Abbotsford wastewater treatment plant is a trickling filter type that discharges to Elm Brook. An industrial discharge to nearby Porky Creek has been proposed so this classification covers both streams.

Elm Brook begins a short distance above the Abbotsford discharge and has a drainage area of about half of a square mile at that point. It has been ditched for several hundred feet below the discharge, but this is a continuation of a drainage ditch above the outfall. Elm Brook then follows a natural course through alders and marsh for a distance of about 1.5 miles at which point it flows through a cow pasture. The remaining part of the streambank is marsh and woodland. Elm Brook flows four miles below the treatment plant discharge before joining Dill Creek.

The aquatic community of Elm Brook is largely unknown. During the spring of 1976, fifty feet of stream was shocked near the first road crossing and only one stickleback was found. At the next town road, several creek chubs were found along with a few caddis fly larvae. During summer stream conditions were much worse, although some minnows were noted near the conjunction with Dill Creek.

Recommendations: The entire length of Elm Brook should have the noncontinuous hydrologic classification. From its source to ~~Adams Street East (town road between sections 7 and 8, T28N, R2E)~~ ^{Lincoln Rd}, it should have the "marginal" water quality classification and from that point to the joining of Dill Creek should be classified "not supporting a balanced aquatic community".

Porky Creek

The proposed discharge is in section 32, T29N, R2E. Above this area the drainage area is about four square miles. No low-flow measurements have been made at this site, but it is almost certainly zero and there was zero flow in the stream during summer and fall of 1976. The streambank of Porky Creek is mostly woodland and marsh, but some of it is pastured. During low-flow conditions, the remaining pools are algae choked which is probably a result of nutrient contributions from agricultural runoff.

During spring of 1976 fish shocking near the town road between sections 31 and 32 produced a variety of minnow species and they were also noted at sites further downstream. During the summer when there was no stream flow, minnows were noted only in a pool near the town road between sections 3 and 4.

Recommendations: Porky Creek should have the noncontinuous hydrologic classification for its entire length. From its source to the town road between sections 31 and 32 it should have the "marginal" water quality classification. The remainder of the stream should be classified "not supporting a balanced aquatic community".

12/10/76
Bill Jager

Bill Jager
Oct 24, 77



Abbotsford discharge to
Elm Brook.



Elm Brook 3/4 mile below
Abbotsford discharge.



Elm Brook at second town road
below discharge.



Elm Brook 400 yards above
conjunction with Dill Creek.



Porky Creek above proposed
discharge site.



Porky Creek at first town
road below discharge site.

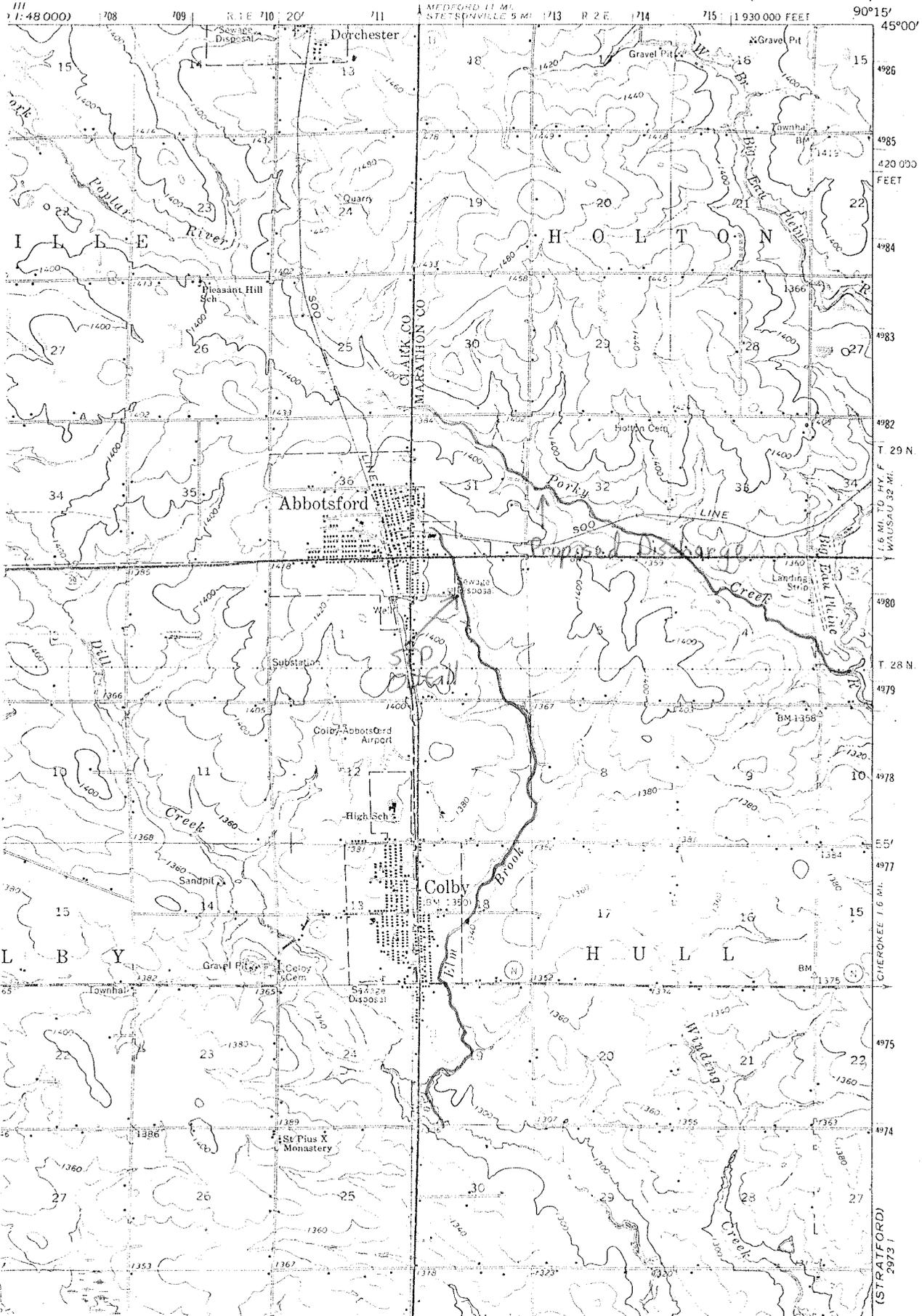


Porky Creek $\frac{1}{2}$ mile above
conjunction with Big Eau
Pleine River.

WISCONSIN

ABBOTSFORD QUADRANGLE
WISCONSIN
15 MINUTE SERIES (TOPOGRAPHIC)

2974 II
(ATHENS 1:48 000)



(STRATFORD)
2973 I

Field Survey Date: 5/3/76

Survey Crew: Al Hauber, Fish Management
Tom Bashaw, E. P. District Engineer
Bill Jaeger, E. P. Biologist