

Cold Water Use Designation Assessment Protocol

December 15, 2004

Iowa Department of Natural Resources

I. Summary

This document specifies an approach to be followed in assessing the cold water uses of water bodies. The current cold water designation is split into two designations, Class B(CW1) and Class B(CW2). The purpose of the split is to reflect the type or extent of uses by cold water types of aquatic species.

Initially, the use assessment protocol will be applied to waters where existing data are available to complete the assessment for cold water use designations. Future staff efforts will be to apply the protocol on smaller springs and tributaries currently undesignated where little data is available. It is anticipated that most of the macroinvertebrate collection and identification will be completed by contract personnel or other sources and used in conjunction with field data to complete the assessment form and worksheet.

II. Cold Water Use Designation Assessment Protocol

To assess Iowa waters for the appropriate cold water use designation, the following guidelines are followed. Formal rule making is required to adopt any stream into one of the use designations.

A. Type I Cold Water Streams – B(CW1): Stream segments that meet the requirements of 1 or 2 below will be recommended as Class B(CW1). These waters exhibit flow and temperature characteristics needed to support a coldwater fish population.

1. Class B(CW1) Designation – Stream reaches meeting any **one** of following characteristics:

- Documented self-sustaining population of brown, brook or rainbow trout,
- Documented self-sustaining population of slimy or mottled sculpin,
- Documented evidence of periodic natural reproduction of brown, brook or rainbow trout where the natural year class(es) has(have) survived through a minimum of three summer (mid-May through August) seasons,
- Documented evidence of the survival of stocked trout species through three summer (mid-May through August) seasons.

2. Additional Justification for Class B(CW1) Designation - Streams not meeting any of the above criteria shall be designated Class B(CW1) if they meet both the following two criteria:

- **Water Temperature:** The maximum stream water temperature during mid-May through mid-September does not exceed 75 degrees Fahrenheit under normal stream conditions, as documented by continuous monitoring during this period for three, not necessarily consecutive, years. However, the presence of watercress (*Rorippa nasturtium-aquaticum*) at various locations along the stream **or** the presence of key macroinvertebrate assemblages (see Section III.F) that are indicative of coldwater habitat, will automatically fulfill this criterion, **and**
- **Flow:** The minimum stream flow is at least 0.3 cubic feet per second during years with normal precipitation.

B. Type II Coldwater Streams – B(CW2): This use designation is for small, channeled streams, headwaters, and spring runs that fulfill the water temperature criterion identified above, but do not normally exhibit flow volume needed to sustain a coldwater fish population. For water bodies to be recommended for Class B(CW2) designation, meeting 1 or 2 below is required.

1. Class B(CW2) classification: Stream reaches that meet either of following criteria:

- Presence of watercress (*Rorippa nasturtium-aquaticum*) at various locations along the stream/spring run through the summer period, **or**
- Presence of key macroinvertebrate assemblages indicative of cold water habitat (see Section III.F).

2. Additional Justification for Class B(CW2) Designation - Streams not meeting either of the above criteria shall be designated Class B(CW2) if they meet either of the following criteria:

- Water Temperature and Flow: a) The maximum water temperature during mid-May through mid-September does not exceed 75 degrees Fahrenheit under normal stream conditions, as measured instantaneously between 2 and 6 pm on the second consecutive day of greater than 85 degrees Fahrenheit air temperature, along the stream. and b) Continuous flow during years with normal precipitation, **or**
- A stream segment found not to be conducive to natural reproduction of trout or found to have an absence of the early life stages of trout, but has the evidence of non-aberrational populations of adult trout as determined by a qualified fisheries biologist.

III. Field Evaluations for Use Designations – Basic Processes and Guidelines

A. Basic Process: It is projected that the Department’s Fisheries Bureau staff and Water Resources Section staff would perform the field use assessment, assemble file documentation and assist in needed justification of the recommended use designations. The Water Resources Section staff would carry out the basic rule-making efforts to incorporate the recommended uses into the Water Quality Standards rule-referenced Surface Water Classification document. Any type of data could be provided to DNR Fisheries or Water Resources staff from a number of sources, but it is recognized that DNR Fisheries and Water Resources staff will make the decision on the credibility of the data provided. The Cold Water Use Designation Assessment Form is used to document these recommendations.

As part of the initial phase work efforts, the Department will be applying this use assessment protocol to waters where adequate data exists to perform a use assessment. Future efforts will be to obtain field data and apply the use assessment protocol on smaller spring runs and tributaries.

The evaluation of a stream for cold water use designation will include a short documentation of its cold water attributes from both field and file information. A field assessment form (see Appendix C) has been developed to assist in assembling the file documentation. The form includes the physical, biological and flow information needed to determine achieving the criteria above, the recommended use designation, and its beginning and endpoint (including UTM coordinates). This file documentation will serve the needs of the staff and will also be the source of information for public requests and for submittal to EPA for approval of any change to the Standards.

It should be noted that in the event that early stream evaluations (year one or two) show evidence of the survival of trout, the Department will place the stream reach on the highest priority to obtain field documentation in the next year. (See Section G. Administrative Action)

B. Watercress Guidelines: Stream segments that are supportive of watercress through the summer period, either indigenous or even transplanted, can be a good indicator for the designation of a cold water stream if the transplanted watercress survives. A stream reach can be recommended to be designated as a cold water stream because in part the water conditions in that reach are adequate for the survival of watercress.

Currently, it is anticipated that Fisheries or Water Resources staff will perform all watercress identification and/or samples could be collected and sent to the University of Iowa's Hygienic Laboratory for identification.

Watercress (*Rorippa Nasturtium-aquaticum*) absolutely requires cold water and will not survive long in water warmer than 65 degrees. The stream should support the watercress at different locations within the stream reach and through the summer period to properly designate the stream as cold water. When assessing a stream reach, watercress that is found only at or near a spring should not be considered as the main indicator of watercress present in a stream reach. One of the characteristics of a spring is the presence of cold water at the outflow, which would not necessarily characterize the entire stream channel. A stream assessment finding watercress should not designate a stream as cold water simply based on watercress found only at or near spring locations.

C. Stream Flow: All field use assessment should be performed under normal stream flow conditions. No field flow assessments shall be performed during abnormally high or low flow conditions or during periods of runoff.

D. Stream Temperature: One of the requirements for designating a cold water stream is the maximum stream water temperature during mid May through mid September shall not exceed 75 degrees Fahrenheit under normal stream conditions, as documented by continuous monitoring during a period for three, not necessarily consecutive, years.

Areas within the first riffle-pool segment downstream of a spring input shall be avoided for temperature monitoring. It is expected that a stream should have fairly uniform temperatures throughout the segment even if the sample is collected under a bridge, in a shaded area, near the stream bottom or near the surface.

E. Fish Survival: The basic purpose of assessing a stream reach for cold water designation is to determine its ability to support non-aberrational occurrences of cold water aquatic species. The survival of trout will be assessed by looking at a stream reach's ability to support survival. Thus, for the purposes of this protocol, if even a few trout were found to survive and carry over through a summer (mid-May through August) season, it is demonstrating the objective of the cold water use designation.

It is not the objective of the protocol to require consecutive year survival, but rather survival for any three summer seasons. As with temperature measurements, many factors may influence the ability to gather data on trout survivability. Thus, the DNR staff will consider many factors when evaluating the ability of trout to survive in an assessed reach.

F. Macroinvertebrate Sampling: Key macroinvertebrate assemblages to include at least two of the species noted in Appendix B and one of the species being in abundance with more than 20 organisms collected within the standard 90 people-minute multi-habitat sampling period. Additional macroinvertebrate sampling details can be found using the following document:

IDNR 2001b. Biological sampling procedures for wadeable streams and rivers in Iowa. June 30, 1994 revised May 3, 2001. Iowa Department of Natural Resources, Environmental Protection Division, Water Resources Section. Des Moines, Iowa.

G. Administrative Action: In the event that early stream evaluations (year one or two) show evidence of the survival of non-aberrational populations of adult trout as determined by a qualified fisheries biologist, the Department will apply the following actions for the scenarios described below.

1) Existing NPDES permittees – If an existing wastewater treatment facility (WWTF) discharges to a general use or warm water designated use stream that shows evidence of the survival of non-aberrational populations of adult trout, the facility will be advised of the potential new cold water use designations (B(CW1) or B(CW2)) and the respective water quality based effluent limits.

2) New NPDES permittees - If a new WWTF is proposed to be built on a stream that shows evidence of the survival of non-aberrational populations of adult trout, the future owners of the WWTF will be advised of the potential new cold water use designations and the respective water quality based effluent limits. The new WWTF will be expected to meet the WQ-based effluent limits to protect the impending cold water use designation when it begins discharging to the receiving stream.

The Standard Conditions present in all NPDES permits allow for a permit to be modified or reopened for a variety of reasons. Standard Condition #11.b states a “permit may be modified due to conditions or information on which a permit is based, including any new standard the department may adopt that would change the required effluent limits”. If an NPDES permittee falls into either situation described above, the permit will be reopened and updated accordingly to assure protection of the use.

Appendix A: Example Stream Assessment

1. Example Creek

Appendix B: Macroinvertebrate Assemblages

Appendix C: Field Assessment Form and Worksheet

Appendix D: Definitions

Appendix E: Field Assessment Flow Chart

- EXAMPLE ONLY -
Appendix A

Cold Water Use Designation Assessment Form

I. Stream/Water Body Name: Example Creek

II. Location or Reach Assessed: Mouth to Spring Source

Starting at: Section 1, Township 100N, Range 3W, Allamakee Co.
Ending at: Section 7, Township 100N, Range 3W, Allamakee Co.
Basin: X (NE), _____ (I/C), and _____ (other).
UTMs: _____,

III. Assessed By: R. Turtle, Date: 10/13/03

IV. Characteristics:

A. Class B(CW1)

1. Meet *one* of following:

- Documented self sustaining population of (√):
Brown _____, Brook _____, or Rainbow _____ trout.
- Documented self sustaining population of (√):
Slimy _____, or Mottled _____ sculpin
- Documented *three-year summer survival* of periodic natural reproduction of (√):
Brown _____, Brook _____, or Rainbow _____ trout.
- Documented *three-year summer survival* of stocked (√):
Brown _____, Brook _____, or Rainbow _____ trout.

OR

2. Meet *both* of following:

- Documented Water Temperature: three-year summer maximum ≤ 75 °F Yes (Y/N), or Presence of Water Cress Yes (Y/N), or Presence of two or more Macroinvertebrate species (Y/N) YES, and one species with more than 20 specimens (Y/N) YES : (Use Attached Worksheet)
- Minimum Stream Flow > 0.3 cfs (during years with normal precipitation) Yes (Y/N) (estimated flow 3.0 cfs)

B. Class B(CW2)

1. Meet *one* of following:

- Water Cress present at various locations _____(Y/N).
- Presence of two or more Macroinvertebrate species (Y/N)_____, and one species with more than 20 specimens (Y/N) _____: (Use Attached Worksheet)

OR

2. Meet the following two conditions:

- Documented Water Temperature: summer maximum water temperature ≤ 75 °F under normal stream conditions, as measured instantaneously between 2 and 6 P.M. on the second consecutive day of greater than 85°F air temperature _____(Y/N),
- Continuous Flow (years with normal precipitation) _____(Y/N),

OR

3. Meet the following:

- Evidence of non-aberrational population(s) of adult trout as determined by qualified fisheries biologist _____(Y/N)

V. Recommend Use Designation: YES (Y/N), if Yes, complete the following:

Class B(CW1) from mouth (Section 1, Township 100N, Range 3W, Allamakee Co. to spring source, SE1/4, Section 7, Township 100N, Range 3W, Allamakee Co.)

UTM coordinates: lower extent:_____

Upper extent:_____

Additional Comments: _____

WORKSHEET
Macroinvertebrate Assemblages

Family (Common Name**)	Taxa (Genus/Species)	Number Specimen Found
Baetidae (Small Minnow Mayflies)	<i>Acerpenna macdunnoughi</i>	
Ephemerelellidae (Spiny Crawler Mayflies)	<i>Ephemerelella inermis</i>	60
	<i>Ephemerelella subvaria</i>	
	Eurylophella*	
	<i>Timpanoga lita</i>	
Leptophlebiidae (Pronggilled Mayflies)	<i>Paraleptophlebia debilis</i> *	
Leuctridae (Rolledwinged Stoneflies)	<i>Leuctra tenuis</i> *	30
Nemouridae (Nemourid Stoneflies)	<i>Amphinemura linda</i> *	
	<i>Nemoura trispinosa</i>	
Brachycentridae (Humpless Case Maker Caddisflies)	<i>Brachycentrus americanus</i>	
	<i>Brachycentrus lateralis</i>	
Glossosomatidae (Saddlecase Maker Caddisflies)	Glossosoma*	
Hydropsychidae (Common Netspinner Caddisflies)	<i>Diplectrona modesta</i>	100
	<i>Parapsyche apicalis</i>	
Limnephilidae (Northern Case Maker Caddisflies)	<i>Hesperophylax designatus</i>	
	<i>Frenesia missa</i>	
Philopotamidae (Fingernet Caddisflies)	<i>Chimarra aterrima</i>	5
Rhyacophilidae (Freeliving Caddisflies)	<i>Rhyacophila vibox</i>	300

* Identification to genus will be sufficient for these specimens.

** Names from *A Guide to Common Freshwater Invertebrates of North America*, J. Reese Voshell, Jr. Ph.D., 2002.

Appendix B

Macroinvertebrate Assemblages

Order	Family (Common Name**)	Taxa (Genus/Species)
Ephemeroptera (Mayflies)	Baetidae (Small Minnow Mayflies)	<i>Acerpenna macdunnoughi</i>
	Ephemerellidae (Spiny Crawler Mayflies)	<i>Ephemerella inermis</i>
		<i>Ephemerella subvaria</i>
		<i>Eurylophella*</i>
	<i>Timpanoga lita</i>	
Leptophlebiidae (Pronggilled Mayflies)	<i>Paraleptophlebia debilis*</i>	
Plecoptera (Stoneflies)	Leuctridae (Rolledwinged Stoneflies)	<i>Leuctra tenuis*</i>
	Nemouridae (Nemourid Stoneflies)	<i>Amphinemura linda*</i>
		<i>Nemoura trispinosa</i>
Trichoptera (Caddisflies)	Brachycentridae (Humpless Case Maker Caddisflies)	<i>Brachycentrus americanus</i>
		<i>Brachycentrus lateralis</i>
	Glossosomatidae (Saddlecase Maker Caddisflies)	<i>Glossosoma*</i>
	Hydropsychidae (Common Netspinner Caddisflies)	<i>Diplectrona modesta</i>
		<i>Parapsyche apicalis</i>
	Limnephilidae (Northern Case Maker Caddisflies)	<i>Hesperophylax designatus</i>
		<i>Frenesia missa</i>
	Philopotamidae (Fingernet Caddisflies)	<i>Chimarra aterrima</i>
Rhyacophilidae (Freeliving Caddisflies)	<i>Rhyacophila vibox</i>	

* Identification to genus will be sufficient for these specimens.

** Names from *A Guide to Common Freshwater Invertebrates of North America*, J. Reese Voshell, Jr. Ph.D., 2002.

Appendix C
**Cold Water Use Designation
Field Assessment Form & Worksheet**

VI. **Stream/Water Body Name:**

VII. **Location or Reach
Assessed:** _____

Starting at: Sec _____, Township _____N, Range _____, _____ Co.
Ending at: Sec _____, Township _____N, Range _____, _____ Co.
Basin: _____(NE), _____(I/C), and _____ (other).
UTMs: _____,

VIII. **Assessed By:** _____, **Date:** _____

IX. **Characteristics:**

A. Class B(CW1)

1. Meet *one* of following:

- Documented self sustaining population of (√):
Brown _____, Brook _____, or Rainbow _____ trout.
- Documented self sustaining population of(√):
Slimy _____, or Mottled _____ sculpin
- Documented *three-year summer survival* of periodic natural reproduction of(√):
Brown _____, Brook _____, or Rainbow _____ trout.
- Documented *three-year summer survival* of stocked(√):
Brown _____, Brook _____, or Rainbow _____ trout.

OR

2. Meet *both* of following:

- Documented Water Temperature: three-year summer maximum ≤ 75 °F _____(Y/N), or Presence of Water Cress _____(Y/N), or Presence of two or more Macroinvertebrate species (Y/N) _____, and one species with more than 20 specimens (Y/N) _____: (Use Attached Worksheet)

Minimum Stream Flow > 0.3 cfs (during years with normal precipitation) _____(Y/N) (estimated flow ____ cfs)

B. Class B(CW2)

1. Meet *one* of following:

- Water Cress present at various locations _____(Y/N).
- Presence of two or more Macroinvertebrate species (Y/N)_____, and one species with more than 20 specimens (Y/N) _____: (Use Attached Worksheet)

OR

2. Meet the following two conditions:

- Documented Water Temperature: summer maximum water temperature ≤ 75 °F under normal stream conditions, as measured instantaneously between 2 and 6 P.M. on the second consecutive day of greater than 85°F air temperature _____(Y/N),
- Continuous Flow (years with normal precipitation) _____(Y/N),

OR

3. Meet the following:

- Evidence of non-aberrational population(s) of adult trout as determined by qualified fisheries biologist _____(Y/N)

X. Recommend Use Designation: _____(Y/N), if Yes, complete the following:

Class B(CW____) from _____

Section _____, Township _____N, Range _____, _____ Co.

to _____

Section _____, Township _____N, Range _____, _____ Co.

UTM coordinates: lower extent:_____

Upper extent:_____

Additional Comments: _____

WORKSHEET
Macroinvertebrate Assemblages

Family	Genus/Species	Number Specimen Found
Baetidae	<i>Acerpenna macdunnoughi</i>	
Brachycentridae	<i>Brachycentrus americanus</i>	
Brachycentridae	<i>Brachycentrus lateralis</i>	
Ephemerellidae	<i>Ephemerella inermis</i>	
Ephemerellidae	<i>Ephemerella subvaria</i>	
Ephemerellidae	Eurylophella*	
Ephemerellidae	<i>Timpanoga lita</i>	
Glossosomatidae	Glossosoma*	
Hydropsychidae	<i>Diplectrona modesta</i>	
Hydropsychidae	<i>Parapsyche apicalis</i>	
Leptophlebiidae	<i>Paraleptophlebia debilis</i> *	
Leuctridae	<i>Leuctra tenuis</i> *	
Limnephilidae	<i>Hesperophylax designatus</i>	
Limnephilidae	<i>Frenesia missa</i>	
Nemouridae	<i>Amphinemura linda</i> *	
Nemouridae	<i>Nemoura trispinosa</i>	
Philopotamidae	<i>Chimarra aterrima</i>	
Rhyacophilidae	<i>Rhyacophila vibox</i>	

* Identification to genus will be sufficient for these specimens.

Appendix D – Definitions

Year-class of fish - A year-class is all the individual fish of one species in a particular waterbody, either naturally reproduced or stocked, that were hatched in a single spawning season.

Self-sustaining population - A self-sustaining population is one that is resultant from natural reproduction and is made up of three or more, not necessarily consecutive, year-classes of fish.

Natural year-class - A natural year class is collectively all the individual fish of one species that were produced by natural reproduction in a single spawning season in a particular waterbody.

Adult trout - Trout that are Age 1 or older. All fish reach Age 1 on the first day of January following the date they were hatched.

Non-aberrational Population – A viable trout population as determined by a qualified fisheries biologist.

Appendix E – Cold Water Protocol Field Flow Chart

