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Appendix A: How the Guidelines Were Developed

Establishing Technical Teams To Develop Guidelines

To develop guidelines as required by the Sustainable Forest Resources Act (SRFA), the Minnesota Forest Resources Council (MFRC) appointed four technical teams for the following topics: riparian management, site-level forest wildlife habitat, forest soil productivity, and cultural resources.

Two additional topics—visual quality, and water quality and wetlands—had already been addressed in previously published guidebooks.

Team members exhibited the following qualifications:

- ❒ A basic, if not technical, understanding of the topics to be addressed by the team
- ❒ A willingness to devote the time and energy required to contribute in a constructive manner to the team
- ❒ A commitment to develop the guidelines in the timeframe established by the MFRC
- ❒ A willingness to use a consensus-based process

The technical teams reflected the breadth of interests represented on the MFRC and included representatives from state and federal agencies, county land departments, colleges and universities, forest industry, American Indian tribes, logging interests, recreation interests, conservation groups, landowner groups, private consultants, utility companies and environmental organizations.

Developing Technical Guidelines

The guideline development process focused on three areas:

- ❒ Identification of issues
- ❒ Development of options to mitigate issues
- ❒ Recommendation of a range of practical and sound practices based on the best available scientific information

While the 1994 Generic Environmental Impact Statement Study on Timber Harvesting and Forest Management in Minnesota (GEIS) (Jaakko Pöyry 1994) served as the foundation document for identification of issues and guideline development, the technical teams were not limited to the issues and mitigations identified in the GEIS.

After identifying the scope of the guidelines to be developed for each of the four technical teams, the teams developed proposed guidelines for their assigned topics. This scoping and guideline development process took nearly two years to complete.

The proposed guidelines were submitted for review and evaluation by selected outside peers. Guided by this peer review, each technical team finalized its guidelines and submitted them to the MFRC.

Developing Integrated Guidelines and Determining Economic Effects

Upon completion of the technical guidelines, representatives of each technical team came together to form an integration team. The MFRC forwarded the individual technical team products, along with existing best management practices for visual quality, water quality and wetlands, to the integration team. The purpose of this team was to identify linkages between topics, address conflicting recommendations, and develop finalized, fully integrated guidelines.

The final integrated guidelines are organized by groups of practices commonly associated with timber harvesting and other forest management activities.

The MFRC directed a formal analysis of financial costs and economic effects associated with the application of the guidelines. The goal of the analysis was to identify instances where the application of the guidelines would result in adverse financial costs and economic effects, and then to explore opportunities to offset those adverse effects.

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Appendix B: Cultural Resource Inventory Sources in Minnesota[1]

Source/Contact information	Resource types included/ Geographic coverage
Minnesota State Historic Preservation Office Cultural Resource Database State Historic Preservation Office Minnesota History Center 345 Kellogg Blvd. W. St. Paul, MN 55102-1906 Phone: (651) 296-5434 Fax: (651) 282-2374	Archaeological sites, cemeteries, standing structures, traditional cultural properties, cultural landscapes *Geographic coverage*: Statewide
State Archaeological Site File Office of the State Archaeologist Fort Snelling History Center St. Paul, MN 55111-4061 Phone: (612) 725-2411 Fax: (612) 725-2427	Archaeological sites, cemeteries, traditional cultural properties *Geographic coverage:* Statewide
Chippewa National Forest Heritage Sites Database Chippewa National Forest Route 3, Box 244 Cass Lake, MN 56633 Phone: (218) 335-8671 Fax: (218) 335-8637	Archaeological sites, cemeteries, standing structures, traditional cultural properties, cultural landscapes *Geographic coverage:* Chippewa National Forest

Source / Contact information	Resource types included / Geographic coverage
Superior National Forest Heritage Sites Database Forest Archaeologist Superior National Forest 8901 Grand Ave. Place Duluth, MN 55801-1102 Phone: (218) 626-4320 Fax: (218) 626-4398	Archaeological sites, cemeteries, standing structures, traditional cultural properties, cultural landscapes *Geographic coverage:* Superior National Forest
Leech Lake Tribal Cultural Resource Database Preservation Officer Leech Lake Tribal Government Route 3, Box 100 Cass Lake, MN 56633 Phone: (218) 335-8095	American Indian archaeological sites, cemeteries, traditional cultural properties *Geographic coverage:* Leech Lake Reservation
Mille Lacs Tribal Cultural Resource Database Preservation Officer Mille Lacs Tribal Government HCR 67, Box 194 Onamia, MN 56359 Phone: (320) 532-4181	Archaeological sites, cemeteries, traditional cultural properties *Geographic coverage:* Mille Lacs Tribal Lands (under development)
Minnesota DNR Forestry Heritage Resources Database DNR Forestry Archaeologist Resource Assessment Office 413 SE 13th Street Grand Rapids, MN 55744 Phone: (218) 327-4449 x 243 Fax: (218) 327-4517	Archaeological sites, cemeteries *Geographic coverage:* Non-federal lands statewide

Source / Contact information	Resource types included / Geographic coverage
Minnesota DNR State Parks Heritage Resources Database	Archaeological sites, cemeteries, structures
DNR Parks Archaeologist Division of Parks & Recreation Dept. of Natural Resources 500 Lafayette Road St. Paul, MN 55102 Phone: (651) 297-1153	*Geographic coverage:* State parks

[1]Note: This list is not exhaustive, but it identifies locations that actively maintain cultural resource databases and have staff available for assistance. Distribution of data may be restricted under state or federal law. Reliability of information varies.

Appendix C: National Register Criteria for Evaluation of Cultural Resources[1]

Criteria for Evaluation

The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

- ❒ That are associated with events that have made a significant contribution to the broad patterns of our history; or
- ❒ That are associated with the lives of persons significant in our past; or
- ❒ That embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- ❒ That have yielded, or may be likely to yield, information important in prehistory or history.

Criteria Considerations

Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties

will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

❒ A religious property deriving primary significance from architectural or artistic distinction or historical importance; or

❒ A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

❒ A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or

❒ A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

❒ A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

❒ A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

❒ A property achieving significance within the past 50 years if it is of exceptional importance.

How To Evaluate a Property Within Its Historic Context

Understanding Historic Contexts

To qualify for the National Register, a property must be significant; that is, it must represent a significant part of the history, architecture, archaeology, engineering or culture of an area, and it must have the characteristics that make it a good representative of properties associated with that aspect of the past. This section explains how to evaluate a property within its historic context.

The significance of a historic property can be judged and explained only when it is evaluated within its historic context. Historic contexts are those patterns, themes or trends in history by which a specific occurrence, property or site is understood and its meaning (and ultimately its significance) within prehistory or history is made clear.

Historians, architectural historians, folklorists, archaeologists and anthropologists use different words to describe this phenomenon, such as trend, pattern, theme, or cultural affiliation, but ultimately the concept is the same.

The concept of historic context is not a new one; it has been fundamental to the study of history since the 18th century and, arguably, earlier than that. Its core premise is that resources, properties or happenings in history do not occur in a vacuum but rather are part of larger trends or patterns.

In order to decide whether a property is significant within its historic context, the following five things must be determined:

- ❒ The facet of prehistory or history of the local area, state, or the nation that the property represents;
- ❒ Whether that facet of prehistory or history is significant;
- ❒ Whether it is a type of property that has relevance and importance in illustrating the historic context;
- ❒ How the property illustrates that history; and finally
- ❒ Whether the property possesses the physical features necessary to convey the aspect of prehistory or history with which it is associated.

These five steps are discussed in detail below. If the property being evaluated does represent an important aspect of the area's history or prehistory and possesses the requisite quality of integrity, then it qualifies for the National Register.

Evaluating a Property Within Its Historic Context

Identify what the property represents: the theme(s), geographical limits, and chronological period, that provide a perspective from which to evaluate the property's significance.

Historic contexts are historical patterns that can be identified through consideration of the history of the property and the history of the surrounding area. Historic contexts may have already been defined in your area by the State Historic Preservation Office, federal agencies, or local governments. In accordance with the National Register Criteria, the historic context may relate to one of the following:

- ❒ An event, a series of events or activities, or patterns of an area's development (Criterion A).
- ❒ Association with the life of an important person (Criterion B).
- ❒ A building form, architectural style, engineering technique, or artistic values, based on a stage of physical development, or the use of a material or method of construction that shaped the historic identity of an area (Criterion C).
- ❒ A research topic (Criterion D).

Determine how the theme of the context is significant in the history of the local area, the state or the nation.

A theme is a means of organizing properties into coherent patterns based on elements such as environment, social/ethnic groups, transportation networks, technology, or political developments that have influenced the development of an area during one or more periods of prehistory or history. A theme is considered significant if it can be demonstrated, through scholarly research, to be important in American history.

Many significant themes can be found in the following list of Areas of Significance used by the National Register:

- Agriculture
- Architecture
- Archeology:
  - Prehistoric
  - Historic: Aboriginal
  - Historic: Non-Aboriginal
- Art
- Commerce
- Communications
- Community Planning and Development
- Conservation
- Economics
- Education
- Engineering
- Entertainment/Recreation
- Ethnic Heritage
  - Asian
  - Black
  - European
  - Hispanic
  - Native American
  - Pacific Islander
  - Other
- Explorations/Settlement
- Health/Medicine
- Industry
- Invention
- Landscape Architecture
- Law
- Literature
- Maritime History
- Military
- Performing Arts
- Philosophy
- Politics/Government
- Religion
- Science
- Social History
- Transportation
- Other

Determine what the property type is and whether it is important in illustrating the historic context.

A context may be represented by a variety of important property types. For example, the context of "Civil War Military Activity in Northern Virginia" might be represented by such properties as: a group of mid-19th century fortification structures; an open field where a battle occurred; a knoll from which a general directed troop movements; a sunken transport ship; the residences or public buildings that served as company headquarters; a railroad bridge that served as a focal point for a battle; and earthworks exhibiting particular construction techniques.

Because a historic context for a community can be based on a distinct period of development, it might include numerous property types. For example, the context "Era of Industrialization

in Grand Bay, Michigan, 1875–1900" could be represented by important property types as diverse as sawmills, paper mill sites, salt refining plants, flour mills, grain elevators, furniture factories, workers' housing, commercial buildings, social halls, schools, churches and transportation facilities.

A historic context can also be based on a single important type of property. The context "Development of County Government in Georgia, 1777–1861" might be represented solely by courthouses. Similarly, "Bridge Construction in Pittsburgh, 1870–1920" would probably only have one property type.

Determine how the property represents the context through specific historic associations, architectural or engineering values, or information potential (the Criteria for Evaluation).

For example, the context of county government expansion is represented under Criterion A by historic districts or buildings that reflect population growth, development patterns, the role of government in that society, and political events in the history of the state, as well as the impact of county government on the physical development of county seats.

Under Criterion C, the context is represented by properties such as districts or buildings whose architectural treatments reflect their governmental functions, both practically and symbolically.

Determine what physical features the property must possess in order for it to reflect the significance of the historic context. These physical features can be determined after identifying the following:

- ❒ Which types of properties are associated with the historic context,
- ❒ The ways in which properties can represent the theme, and
- ❒ The applicable aspects of integrity.

Properties that have the defined characteristics are eligible for listing.

[1]Excerpted from "How To Apply the National Register Criteria for Evaluation." *National Register Bulletin 15*, U.S. Department of the Interior, National Park Service, Interagency Resources Division, Washington, D.C.

Appendix D: Qualifications Standards for Cultural Resource Professionals[1]

In the following definitions, a year of full-time professional experience need not consist of a continuous year of full-time work but may be made up of discontinuous periods of full-time or part-time work adding up to the equivalent of a year of full-time experience.

(a) History. The minimum professional qualifications in history are a graduate degree in history or closely related field; or a bachelor's degree in history or closely related field plus one of the following:

(1) At least two years of full-time experience in research, writing, teaching, interpretation or other demonstrable professional activity with an academic institution, historical organization or agency, museum or other professional institution; or

(2) Substantial contribution through research and publication to the body of scholarly knowledge in the field of history.

(b) Archaeology. The minimum professional qualifications in archaeology are a graduate degree in archaeology, anthropology, or closely related field plus:

(1) At least one year of full-time professional experience or equivalent specialized training in archeological research, administration or management;

(2) At least four months of supervised field and analytic experience in general North American archaeology; and

(3) Demonstrated ability to carry research to completion.

In addition to these minimum qualifications, a professional in prehistoric archaeology shall have at least one year of full-time professional experience at a supervisory level in the study of archaeological resources of the prehistoric period. A professional

in historic archaeology shall have at least one year of full-time professional experience at a supervisory level in the study of archaeological resources of the historic period.

(c) Architectural history. The minimum professional qualifications in architectural history are a graduate degree in architectural history, art history, historic preservation, or closely related field, with coursework in American architectural history; or a bachelor's degree in architectural history, art history, historic preservation, or closely related field plus one of the following:

(1) At least two years of full-time experience in research, writing, or teaching in American architectural history or restoration architecture with an academic institution, historical organization or agency, museum, or other professional institution; or

(2) Substantial contribution through research and publication to the body of scholarly knowledge in the field of American architectural history.

(d) Architecture. The minimum professional qualifications in architecture are a professional degree in architecture plus at least two years of full-time professional experience in architecture; or a state license to practice architecture.

(e) Historic architecture. The minimum professional qualifications in historic architecture are a professional degree in architecture or state license to practice architecture, plus one of the following:

(1) At least one year of graduate study in architectural preservation, American architectural history, preservation planning or closely related field; or

(2) At least one year of full-time professional experience on historic preservation projects. Such graduate study or experience shall include detailed investigations of historic structures, preparation of historic structures research reports, and preparation of plans and specification for preservation projects.

[1]*Secretary of the Interior's Professional Qualifications Standards.* Code of Federal Regulations. Title 36, Part 61, Appendix A. September 29, 1983.

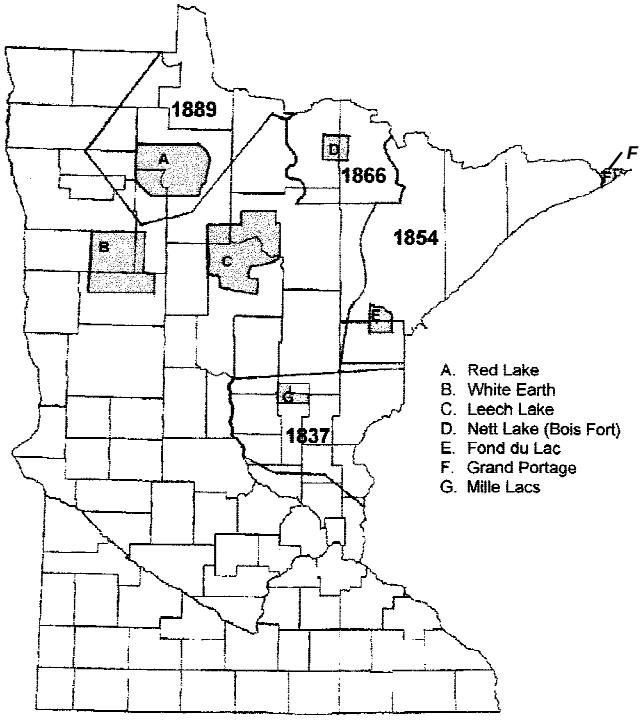
Appendix E: Ceded Lands and Reservation Boundaries

As used within these guidelines, the term "ceded lands" refers to territories ceded to the United States Government by the Ojibwe under treaties of 1837, 1854, 1866 and 1889.

On public lands within these areas, members of the following bands retain the right to pursue traditional practices:

Mille Lacs Band (Treaty of 1837)
Fond du Lac and Grand Portage Bands (Treaty of 1854)
Bois Fort Band (Treaty of 1866)
Red Lake Band (Treaty of 1889)

When planning forest management activities in these areas, it is advisable to check with tribal representatives to determine whether there are traditional use areas in the vicinity. For sources of information and assistance, see the *Resource Directory*.



Appendix F: Determining Basal Area

Basal area is useful for a variety of applications, including determining whether enough trees remain within the RMZ (riparian management zone) to maintain and enhance riparian functions and values.

As one example of determining basal area, assume that an acre of RMZ contains 635 trees, varying in size from 1 to 15 inches in diameter as measured at 4.5 feet (DBH). See Table F-1.

For each diameter class, the basal area per acre is determined by multiplying the number of trees per acre by the basal area per tree. For example:

> A tree with a 1-inch diameter provides 0.005 ft^2 of basal area. 168 trees with a 1-inch diameter provide 0.84 ft^2 of basal area per acre (168 x 0.005 = 0.84).

Similar calculations are made for each tree diameter class found within the RMZ (in this example, from 1 inch to 15 inches).

The total basal area per acre for the RMZ is the sum of the basal area per acre for each diameter class. In this example, the 635 trees on this acre of RMZ represent a total basal area of approximately 80 ft^2/acre, which is the recommended basal area within the RMZ for uneven-age management for all water bodies. See Table F-1 next page,

Table F-1

Example of Basal Area Calculations for an RMZ Containing 80 ft^2 per Acre of Basal Area

DBH (inches)	Number of trees/acre	BASAL AREA ft^2/tree	BASAL AREA ft^2/acre
1	168	0.005	0.840
2	107	0.022	2.354
3	93	0.049	4.557
4	77	0.087	6.699
5	52	0.136	7.072
6	33	0.196	6.468
7	26	0.267	6.942
8	21	0.349	7.329
9	17	0.442	7.514
10	13	0.545	7.085
11	10	0.660	6.600
12	8	0.785	6.280
13	5	0.922	4.610
14	3	1.069	3.207
15	2	1.227	2.454
Totals	**635 trees**		**80.011 ft^2/acre**

Using Crown Closure To Approximate Basal Area

While basal area is frequently determined using specialized tools, crown closure can also provide an approximation of the extent to which an area is occupied by trees. (See Table F-2.) Crown closure represents the degree to which the forest floor is shaded by tree crowns when the sun is immediately overhead.

Complete (100%) crown closure occurs when the crowns of trees touch and effectively block sunlight from reaching the forest floor while foliage is on the tree. Table F-2 shows the approximate relationship between crown closure and basal area across a range of species and tree diameters (Verry 1969). Since the relationship between basal area and crown closure varies by both tree species and diameter, crown closure may be different in two areas that have the same residual basal area.

A landowner could approximate basal area by estimating the percentage of crown closure at a particular location. An estimated crown closure of 70%, for example, would mean that about 70% of all sunlight is effectively blocked from reaching the forest floor, which approximates a basal area of 80 ft^2 per acre.

Table F-2

Approximate Relationship Between Crown Closure and Basal Area

Crown closure	Basal area (per acre)
30%	20 ft^2
35%	25 ft^2
50%	50 ft^2
70%	80 ft^2
75%	100 ft^2
75%	120 ft^2
80%	140 ft^2
95%	190 ft^2

Source: Verry 1969

Appendix G: Baseline Standards for Development of Best Management Practices To Provide Wetland Protection

Land use activities in wetlands, which are operating under an exemption in the Minnesota Wetland Conservation Act, should be guided by the following principles to ensure that the activities do not contribute to the loss or diminishment of wetland values and functions. Impacts to wetlands should be avoided if practical alternatives exist.

When impacts cannot be avoided, landowners, managers and operators should implement all practical measures to minimize impacts. Best Management Practices designed to meet these baseline standards will provide the necessary protection while operating in or adjacent to wetland areas and reduce the risk of being in violation of the Minnesota Wetland Conservation Act.

BMPs developed through this process do not supersede federal regulations (33 CFR, Section 323.4 and 7 CFR, Part 12).

1. The activities should minimize impacts to the hydrologic regime of wetlands.

2. The activities should not take or jeopardize the continued existence of state (Minn. Statute, Chapter 84.0895; Minn. Rule, Chapter 6134) and federal (16, Sections 1531-1544; 50 CFR, Section 17) threatened or endangered species, or adversely modify or destroy the critical habitat of such species.

3. Activities in breeding and nesting areas for migratory waterfowl and spawning areas in wetlands should be avoided if practical alternatives exist.

4. The activities should minimize impacts to species of special concern under Minn. Statute, Chapter 84.0895 and Minn. Rule, Chapter 6134 where their existence is known within the activity area.

5. In designing, constructing and maintaining roads, vegetative disturbance in wetlands should be kept to a minimum.

6. Permanent roads, temporary access roads and trails in wetlands should be held to the minimum feasible number, width and total length consistent with the management objectives, and local topographic and climatic conditions.

7. All roads, temporary or permanent, should be located sufficiently far from streams or other water bodies (except for portions of such roads which must cross water bodies) and designed to minimize impacts to wetland functions and values.

8. Discharges of dredged or fill material into wetlands to construct a road fill should be made in a manner that minimizes the encroachment of trucks, tractors, bulldozers or other heavy equipment within wetlands that lie outside the lateral boundaries of the fill itself.

9. The design, construction and maintenance of the road crossing should allow the migration or other movement of those species utilizing the wetland.

10. Road fill should be bridged, culverted or otherwise designed to prevent the restriction of everyday surface and subsurface water flows and expected floodwater flows.

11. Fill should be properly stabilized and maintained during and following construction to prevent erosion.

12. Borrow material should be taken from upland sources whenever feasible.

13. All temporary fills should be removed in their entirety and the area restored to its original elevation unless removal will have a greater impact on water quality than leaving in place.

14. Material placed or discharged in wetlands should of suitable material free from toxic pollutants in toxic amounts.

Appendix H: Work Activities That Do Not Require A DNR Protected Waters Permit

Low-water ford crossings (on streams only)

No permit is required as long as *all* of the following conditions are met:

- No special site preparation is necessary.
- Normal summer flow does not exceed 2 feet in depth.
- Normal low flow is not restricted or reduced.
- Crossing conforms to the shape of the natural stream channel.
- Original streambank is no higher than 4 feet.
- Construction is only gravel, natural rock, concrete, steel matting or other durable, inorganic material not more than 1 foot thick.
- Graded finished slope is no steeper than 5:1 (horizontal to vertical).
- Graded banks are seeded or mulched.
- Site is not an officially designated trout stream; trout stream tributary designated by rule; wild, scenic or recreational river; or officially designated canoe and boating route.

Temporary bridges (on streams only)

No permit is required as long as
all of the following conditions are met:

• Streambank can support bridge without pilings, foundations, culverts, excavation or other special site preparations.

• Nothing is placed in the bed of the stream.

• Bridge is capable of removal for maintenance and flood damage prevention.

• Bridge is firmly anchored at one end and can swing away during flooding.

• A minimum 3 feet of clearance exists between lowest portion of bridge and normal summer stream flow.

• [illegible]

Water level control structures (on streams only)

No permit is required as long as
all of the following conditions are met:

• The contributing watershed above the structure is 300 acres or less.

• The structure is not considered a “dam” under State Dam Safety rules.

• The structure is not on an officially designated trout stream or trout stream tributary designated by rule.

For streams with a watershed less than 5 square miles (3,200 acres)

No permit is required to construct a bridge or culvert, or to fill or excavate the bed of a protected watercourse having a total drainage area, at its mouth, of 5 square miles or less, provided that *all* of the following conditions are met:

- County zoning officials and local Soil and Water Conservation District staff are given at least 7 days' prior notice and determine the project will not result in downstream erosion or sedimentation.
- The project will not divert the water to a different watershed.
- The project will not impound water by damming the watercourse.
- The watercourse is not an officially designated trout stream (or designated trout stream tributary).

Removal of existing structures

No permit is required as long as *all* of the following conditions are met.

- The original lake, marsh or streambed is restored.
- All parts of the structure, including footings or pilings, are removed.
- The structure is not a water level control device and is not on an officially designated trout stream (or designated trout stream tributary).

Removal of debris

No permit is required to remove debris, such as trees, logs, stumps and trash, as long as the original alignment, slope or cross-section of the lake, marsh or streambed is not altered.

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