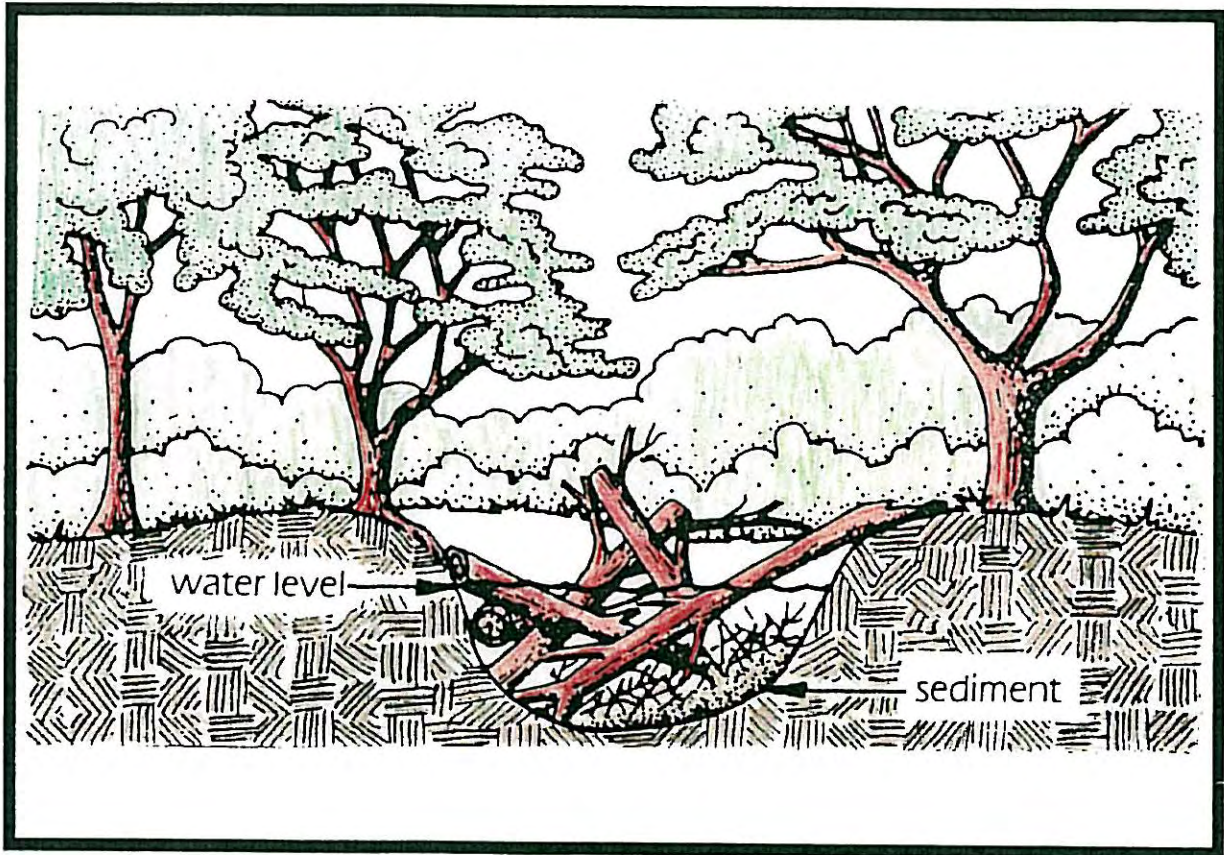




# MAUMEE RIVER BASIN FLOOD CONTROL MASTER PLAN (IMPLEMENTATION PHASE)

## STREAM OBSTRUCTION REMOVAL ASSISTANCE PROGRAM



For

**MAUMEE RIVER BASIN COMMISSION  
ROOM B80 CITY-COUNTY BUILDING  
FORT WAYNE, INDIANA 46802**

JANUARY 1996

CBBEL PROJECT NO. 95-150



**CHRISTOPHER B. BURKE ENGINEERING, LTD.**

MAUMEE RIVER BASIN FLOOD CONTROL MASTER PLAN

# STREAM OBSTRUCTION REMOVAL ASSISTANCE PROGRAM

*prepared for*

The Maumee River Basin Commission

*by*



Christopher B. Burke Engineering, Ltd.

January 1996

# MAUMEE RIVER BASIN FLOOD CONTROL MASTER PLAN STREAM OBSTRUCTION REMOVAL ASSISTANCE PROGRAM

## Introduction

Annual Stream Maintenance, including removal of stream obstructions such as logjams, is one of the recommended components of the Maumee River Basin Flood Control Master Plan. Although, as stated in the Master Plan Main Report, this recommended component does not have a significant impact in reducing existing flood damages in the Basin, removal of major stream obstructions such as logjams was recommended as a Master Plan component to help prevent existing flood damages from increasing in the future. The Master Plan was approved and adopted by the Maumee River Basin Commission (MRBC) in May, 1995.

Ongoing maintenance of the streams in the area by the respective local government entities, or by the landowners themselves, on an annual basis is an effective way of preventing logjams and other obstructions to flood flows. Such obstructions often cause higher flood stages (especially during smaller floods), result in increased sedimentation, and also promote additional streambank erosion. By removing the logjams, fallen trees, and general garbage (tires or other debris) from the streams periodically, the need for extensive river restoration work can be significantly reduced.

The extent of work being proposed as part of this plan component is intended to be limited and localized in nature. The annual maintenance will be limited to removal of logjams, fallen trees, and general garbage from the stream on a case-by-case basis as opposed to an extensive stream-long clearing and snagging project. In many instances, the fallen trees and logs removed from the stream may be secured to streambanks to help reduce the bank erosion while providing some habitat. General garbage and debris as well as those logs which are not appropriate for use as bank erosion control materials, should be disposed of or deposited outside the floodplain area to eliminate the possibility of these materials being washed back into the stream during major flood events.

In those man-made ditches that are classified as a "legal drain", the county drainage boards already have access easements, a funding mechanism, and right to perform the suggested maintenance activities. However, presently no acceptable program or procedure is in place to obtain funds and/or required easements to perform ongoing maintenance in natural streams.

With proper guidance on safe and environmentally sound removal of obstructions, local government entities, landowners, and volunteers may be able to perform most debris removal either themselves or through hiring qualified contractors. Through a proper early coordination and notification process, the local governments and Basin landowners may find that many of maintenance activities of this magnitude may not even require certain permits, if done with appropriate and acceptable tools and methods.

The annual stream clean-up and maintenance activities reduce the potential impacts from existing and future logjams. Logjams can aggravate bank erosion and also induce higher future flood stages than the unobstructed waterway. According to results of a recent hydraulic analysis performed by Christopher B. Burke Engineering, Ltd. (CBBEL) for a pilot stream reach in Adams County, removal of larger logjams from the channel can often be just as effective as a large-scale river restoration project in reducing future increases in potential flood damages (see the discussion of Plan Component "m" in the MRBC Master Plan Main Report for more details). Such maintenance activities cost much less than a large-scale river restoration project, are environmentally acceptable, and usually do not involve a prolonged permit process.

Pursuant to the Master Plan recommendations, this document is prepared in order to establish the details of the MRBC Stream Obstruction Removal Assistance program, guidelines, and instructions on how to apply for such an assistance. The actual obstruction removal work is to be performed/contracted out by the counties, cities, and towns within the Basin with MRBC's technical and financial assistance. Counties, cities, and towns can apply for the MRBC assistance according to the procedures established in this document. Terms of this financial and technical assistance includes following the MRBC Obstruction Removal Guidelines (copy attached) which have been accepted and pre-approved by permitting agencies.

Pre-approved procedures outlined in the MRBC Obstruction Removal Guidelines are established so that the counties, cities, and towns may be able to fulfil one of the recommended components of the Maumee River Basin Flood Control Master Plan in a timely manner without excessive delays due to financial or permit-related constraints. However, it is not the intention of this program or the guidelines to prohibit various jurisdictions within the Maumee watershed to pursue stream-wide clearing and snagging projects so long as the financial and permit-related constraints associated with this type of work can be overcome.

### **Eligibility**

To be eligible for the program, the following criteria must be met:

1. The subject stream and obstruction(s) to be removed must be within the Maumee River Watershed in Indiana.
2. The subject stream must not be considered a Legal Drain under IC 36-9-27. (MRBC Obstruction Removal Assistance Program is not a substitute for other established funding mechanisms which are available for Legal Drains).
3. The subject stream must not be considered a scenic river. Section 36-7-6.1-23 of the MRBC's enabling legislation restricts, with few exceptions, the MRBC's powers upon scenic or recreational rivers and nature preserves.

4. County, town, and city within which the stream is located must have already adopted Flood Hazard Areas and Storm Drainage Ordinances acceptable to the MRBC.
5. The scope of work and obstruction removal procedure must be according to the MRBC Obstruction Removal Guidelines (Appendix 2).

### **Project Review and Selection**

The applications will be initially reviewed by the MRBC staff for completeness and to verify that they meet the established criteria. After the initial review process is completed, recommendations are made based on the severity of obstruction, potential flood damages, easement considerations, adherence to established guidelines, local commitments, requirement for permits, and available budget. The recommended projects will be presented to the full MRBC Board for selection and authorization.

### **Application Requirements**

Applicants should provide enough information to enable proper review by the MRBC. Information such as obstruction location, type, degree of severity, estimated cost of removal, easements, local commitments, scope of work, access points, types of equipments to be used, expected start time, and duration of work need to be provided along with pertinent photographs/videotapes and maps. An application form specifying the minimum required information has been developed for this purpose (Appendix 1).

### **Funding**

Funding for qualified projects shall be 100% MRBC and will be paid directly to the contractor upon satisfactory completion of work and after invoice is received by the MRBC. Local entity is responsible for notifying agencies and obtaining all applicable permits (if any), is expected to do all the bidding, and will manage the contract and the work to be done.

### **Questions**

If you have any questions, please write to: Maumee River Basin Commission, Room B80, City-County Building, Fort Wayne, IN 46802 or call (219) 449-7226.

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**APPENDIX 1**  
**APPLICATION FORM**

**MAUMEE RIVER BASIN FLOOD CONTROL MASTER PLAN  
STREAM OBSTRUCTION REMOVAL ASSISTANCE PROGRAM  
APPLICATION FORM**

**Applicant's Information**

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Affiliation: \_\_\_\_\_ Title: \_\_\_\_\_  
Address: \_\_\_\_\_ City: \_\_\_\_\_, State: \_\_, Zip Code: \_\_\_\_\_  
Tel. No.: \_\_\_\_\_

**Project Location**

Stream: \_\_\_\_\_ Stream Mile (if known): \_\_\_\_\_ Legal Drain?  yes  No  
USGS Quad Map Name (attach copy with location marked): \_\_\_\_\_ T: \_\_, R: \_\_, S: \_\_  
 The obstruction is located in the corporate limits of \_\_\_\_\_ (City/town) within \_\_\_\_\_ County,  
Indiana  
 The obstruction is located within the unincorporated portion of the \_\_\_\_\_ County, Indiana

**Description of Obstruction (attach photos)**

Obstruction Type (check one) (refer to the MRBC guidelines):  I  II  III  IV  V  
Approximate Dimensions of the Obstruction:  
Approximate length along the stream: \_\_\_\_\_ ft.  
Approximate width perpendicular to stream: \_\_\_\_\_ ft.  
Approximate Height above the bed: \_\_\_\_\_ ft.  
How long has the obstruction been in its current location? \_\_\_\_\_

**Adjacent Landowner(s)**

Right bank landowner (looking downstream):  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_, State: \_\_, Zip Code: \_\_\_\_\_ Tel. No.: \_\_\_\_\_

Left bank landowner (looking downstream):  
Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_, State: \_\_, Zip Code: \_\_\_\_\_ Tel. No.: \_\_\_\_\_

**Description of Proposed Work**

Estimated Removal Cost: \$ \_\_\_\_\_  
Basis for the Estimate: \_\_\_\_\_  
Are local easements readily available? (check one)  Yes  No (Explain why)  
\_\_\_\_\_  
Expected start date: \_\_\_\_\_ Expected Duration of Work: \_\_\_\_\_  
Detailed Scope and Description of the Proposed Work (attach a narrative outlining the work to be done, equipment to be used, access points, and disposal methods/locations.)

**Affirmation**

I affirm that the above information are, to the best of my knowledge, accurate.  
Applicant's Signature: \_\_\_\_\_, Date Signed: \_\_\_\_\_

Return completed application and support documentation to: Maumee River Basin Commission: Room B80, City-County Building, Fort Wayne, IN 46802.

**APPENDIX 2**

**MRBC OBSTRUCTION REMOVAL GUIDELINES**



# MAUMEE RIVER BASIN FLOOD CONTROL MASTER PLAN STREAM OBSTRUCTION REMOVAL GUIDELINES

## Introduction

Annual Stream Maintenance, including removal of stream obstructions such as logjams, is one of the recommended components of the Maumee River Basin Flood Control Master Plan. Although, as stated in the Master Plan Main Report, this recommended component does not have a significant impact in reducing existing flood damages in the Basin, removal of major stream obstructions such as logjams was recommended as a Master Plan component to help prevent existing flood damages to increase in the future. The Master Plan was approved and adopted by the Maumee River Basin Commission (MRBC) in May, 1995.

The intent of these guidelines is to set a standard procedure for removal of obstructions from natural (non-maintained) streams within the Maumee River Basin. To be successful, the procedure must be effective in preventing future increase in flood damages in the Basin and at the same time be acceptable to the permitting agencies.

By following these guidelines, entities wishing to perform stream obstruction removal works may find that, in most cases, they probably would not need to obtain an Indiana Department of Natural Resources (IDNR) permit or an individual U.S. Army Corps of Engineers (COE) permit although a general permit, such as a nationwide permit, may still be required by COE. However, a notification procedure as outlined later in this document will still be required **prior to start of any work**. The decision as to whether or not an individual permit will be required will be made, on a case by case basis, based on documents supplied to agencies by the applicant through the notification process.

## Definition of Stream Obstruction Conditions

The following classification has been taken from a publication entitled: "Stream Obstruction Removal Guidelines" prepared by Stream Renovation Guidelines Committee, the Wildlife Society, and American Fisheries Society in cooperation with the International Association of Fish and Wildlife Agencies, dated 1983. The referenced publication has widely been used throughout the country, including Indiana. Exhibit 1, taken from the same publication, illustrates this classification system by showing cross sectional and planimetric views of the most common obstruction conditions. A summary of stream segment characteristics for each obstruction condition and appropriate actions towards removal of these obstructions is provided in the following paragraphs. Obstruction Removal Guidelines published by the International Association of Fish and Wildlife Agencies, referenced earlier, has also been incorporated in the text below.

## I. Condition One

### Characteristics

- Stream segment may contain various amounts of instream debris and fine sediments that do not span the entire width of the stream.
- Minor flow impedance may be present but it is acceptable due to adjacent land-use.
- These obstructions are normally washed downstream or are naturally relocated during moderate flooding events.

### Assessment

- Obstructions do not pose a significant risk in increasing potential flood damages in the future.
- Overall, stream segment has acceptable flow capacity and is expected to stay this way.

### Recommendations

- Isolated, Condition One obstructions are recommended to be left in the stream unless they are associated with or are in close proximity (i.e., within eye-sight) of larger obstructions, in which case they may also be removed.

## II. Condition Two

### Characteristics

- Stream segment contains small accumulations of logs and/or other debris that may be inter-locked and occasionally span the entire stream width.
- Accumulations are isolated and do not presently cause upstream ponding damages.
- Adjacent land-use is such that a major flow obstruction at this location may result in unacceptable increases in flood damage potentials.

### Assessment

- Stream segment currently has acceptable flow but existing conditions are such that obstructions are likely to form in the near future.
- Obstructions may pose an unacceptable risk in increasing potential flood damages in the future.

### Recommendations

- It is recommended that the obstructions are removed by hand-operated equipment such as axes, chain saws, and portable winches unless they are associated with or are in close proximity of larger obstructions that are being removed by heavy equipment.
- The extent of work should be limited to cutting, relocating, removing, or, if appropriate, securing (parallel to the channel banks) any free logs or affixed logs that are crossways in the channel. Isolated or single logs that are embedded, lodged, or rooted in the channel but do not span the channel or cause any flow

problems shall not be removed unless they are associated with or are in close proximity of larger obstructions, in which case they may also be removed.

- Severely damaged, leaning, or other trees which are judged, by the applicant, to be in immediate danger of falling may be removed if they are associated with or are in close proximity of obstructions. The root system and stumps are to be left in place.
- Unless they are associated with or are in close proximity of larger obstructions, the extent of the problem and available solutions for Condition Two obstructions may make them appropriate candidates for work to be done by local landowners or volunteers. However, any such effort must be coordinated in advance with the permitting agencies.
- Due to their potential contribution to future increases in flood damages, Condition Two stream obstructions are recommended to be removed. Funding assistance is available subject to terms and conditions outlined in the MRBC Obstruction Removal Assistance Program.

### III. Condition Three

#### Characteristics

- Stream segment contains large accumulations of lodged trees, root wads, and/or other debris that are inter-locked and frequently span the entire stream width.
- Large amounts of fine sediments have not yet covered or become lodged in the obstruction.
- Although impeded, some flow can still move through the obstruction.
- Accumulations are somewhat extensive and may presently cause limited bank erosion or upstream ponding damages.

#### Assessment

- Stream segment currently has unacceptable flow problems that are likely to become worse in the near future.
- Obstructions are likely to pose an unacceptable risk in increasing potential flood damages in the future.

#### Recommendations

- It is recommended that the obstructions are removed preferably by hand-operated equipment such as axes, chain saws, and portable winches. When the use of hand-operated equipments are not feasible, heavier equipment such as small tractors, backhoes, bulldozers, log skidders, or other low ground pressure equipment may be used so long as they are not equipped for excavation.
- The extent of work should be limited to cutting, relocating, removing, or, if appropriate, securing (parallel to the channel banks) any free logs or affixed logs that are crossways in the channel. Isolated or single logs that are embedded, lodged, or rooted in the channel but do not span the channel or cause any flow problems shall not be removed unless they are associated with or are in close proximity of larger obstructions, in which case they may also be removed.

- Work shall be accomplished within the channel or from one side of the channel only.
- Selective tree clearing shall be limited to the minimum clearing necessary for equipment access and efficient operation of equipment on the worked side of the channel. Severely damaged, leaning or other trees which are judged, by the applicant, to be in immediate danger of falling may be removed if they are associated with or are in close proximity of obstructions. The root system and stumps are to be left in place.
- The extent of the problem and likely necessity for utilizing heavy equipment, makes the work appropriate to be performed only by qualified contractors.
- No excavation or discharge of material should take place within the floodway or in wetlands. If excavation or discharge is proposed, permit from both COE and IDNR is required. In addition, any work in a Section 10 navigable waterway (Maumee River) requires prior authorization from COE.
- Disposal of material may be accomplished by removing it from floodplain and any wetlands, or by piling and cabling the logs at secured areas, as appropriate, with the minimum amount of disturbance to vegetation.
- No permits are likely to be required so long as the procedure outlined in this guide are strictly followed and the work is coordinated with IDNR and COE according to procedure set forth later in this guideline.
- Due to their potential contribution to future increases in flood damages, Condition Three stream obstructions are recommended to be removed. Funding assistance is available subject to terms and conditions outlined in the MRBC Obstruction Removal Assistance Program.

#### **IV. Condition Four**

##### Characteristics

- Stream segment contains major blockages causing severe and unacceptable flow problems.
- Obstructions consist of compacted debris and/or sediment that severely restricts flow.
- Accumulations are extensive and presently cause unacceptable bank erosion or upstream ponding damages.

##### Assessment

- Stream segment currently has unacceptable flow conveyance problems that have already resulted in bank erosion and other unacceptable conditions.
- Obstructions are likely to increase existing levels of potential flood damages in the Basin.

##### Recommendations

- Due to the extent of the blockage, heavy equipment is likely to be the only effective means available for removal of obstructions. Blockage removal may employ equipment necessary to accomplish the work in the least damaging manner.

- Other aspects of the obstruction removal work, including the extent of work, access, and methods of disposal shall be accomplished in accordance with guidelines presented above for Condition Three obstructions. General garbage, sediment, and/or debris associated with the blockage removed from the site shall be disposed of outside the floodway to restrict their reentry into the channel.
- Due to the extent of the project, such extensive blockage removal work may need an individual permit from the IDNR and COE. Also, note that temporary or permanent road discharge through wetlands is not authorized by COE.
- Due to their potential contribution to future increases in flood damages, Condition Four stream obstructions are recommended to be removed. Funding assistance is available subject to terms and conditions outlined in the MRBC Obstruction Removal Assistance Program.

## V. Condition Five

### Characteristics

- Stream segment possesses unique, sensitive, or specially valuable biological resources. Examples include, but are not limited to, areas harboring rare or endangered species, shellfish beds, fish spawning and rearing areas, and rookeries. These include scenic or recreational rivers such as Fish Creek in Steuben County and the entire length of Cedar Creek in Allen County as well as one mile into DeKalb County.
- The extent of obstructions may be similar to one of the four conditions above.

### Assessment

- Due to extreme sensitivity of the stream and its habitat, these obstructions should be dealt with on a case-by-case basis.

### Recommendations

- These obstructions may be left undisturbed unless the adjacent land-use is such that a major flow obstruction at this location may result in unacceptable increases in flood damage potentials.
- The removal of obstructions from Condition Five stream segments must be pre-approved by the IDNR regardless of removal methodology used. However, employment of methods using hand-operated equipment, such as those recommended for Condition Two obstructions, are likely to be more readily acceptable to the IDNR and other permitting agencies and are, therefore, recommended.
- Section 36-7-6.1-23 of the MRBC's enabling legislation restricts, with few exceptions, the MRBC's powers upon scenic or recreational rivers and nature preserves. Therefore, no MRBC assistance is being proposed for removal of Condition Five obstructions.

## Other Considerations

No stream work, including bank clearing, repositioning, or removal of material, should take place except at specific locations where unacceptable flow conveyance problems occur or is likely to occur in the near future. Where stream work is needed, access routes for equipment should be selected to minimize disturbance to wetlands, the floodplain, and the riparian area. Exhibit 2 illustrates this point. All disturbed areas shall be restored or replanted with plant species which will stabilize soils and benefit fish and wildlife.

To avoid the future need for a costly removal of major logjams, the stream conditions should be monitored on a regular basis and maintenance work conducted in accordance with the guidelines contained in this document.

## Standard Procedure for Obtaining Agency Approvals for Removal of Logjams

The following standard procedure has been agreed upon by the IDNR and the Detroit District of Corps of Engineers (COE). IDNR and COE have agreed to waive their respective requirements for obtaining individual permits for obstruction removals associated with Conditions I through III stream segments provided that the following procedure is strictly adhered to:

A letter outlining how the obstruction removal will be performed should be sent to the following two agencies:

Division of Water  
Indiana Department of Natural Resources  
Permit Administration Section  
402 W. Washington Street, Room W264  
Indianapolis, Indiana 46204-2212  
Telephone: (317) 232-4060

Detroit District Office  
U.S. Army Corps of Engineers  
Chief, Regulatory Branch  
P.O. Box 1027  
Detroit, Michigan 48231  
Telephone: (313) 226-6812

The letter should outline the project as follows:

1. All work will be done on and from one side of the river (i.e., the \_\_\_\_\_ bank). If possible, all work should be completed from the non-wetland side of the stream.
2. No excavation of existing grades, including and not limited to the stream bed, streambanks, or levees, will be included in this work. If any areas are disturbed by this work, they will be hand-seeded with rye grass before project completion. Wetland areas should not be disturbed (i.e., excavated or discharged into).
3. Equipment used for obstruction removal or repositioning will preferably be portable winches, saws, and other hand equipment. Any heavy excavation equipment used on site will not be equipped for excavation. Backhoes, drag lines, and other heavy

excavation equipment will be equipped only with brush hooks, snags, or hydraulic thumbs for removal of trees and brush. Equipments likely to be utilized on this particular site would include \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_ , etc.

4. Tree roots and stumps will not be removed.
5. All logs, brush, and other loose debris removed from the floodway will either be disposed of in areas outside of floodplain and wetlands or secured with #9 wire to stand trees or stumps outside of the floodway, if practical.
6. All existing piles of logs, brush, and other loose debris within the project limits may be secured with #9 wire to stand trees or stumps as a bank erosion control measure, if practical.
7. Two weeks before the project starts, the \_\_\_\_\_ and/or the contractor will contact and provide the expected project start and finish dates to:

IDNR Fish and Wildlife Biologist  
R.R. 6, Box 334  
Peru, IN 46970  
Tel: (317) 472-7981

In addition to the outline, a set of color photographs from the obstruction and its surrounding area, including proposed access routes, as well as a project map with an adequate scale should be prepared and should accompany the request. The project map should outline the project limits, access routes, areas of tree removal, disposal sites, and where the logs will be secured.

Upon successful review of the letter, photographs, and the project map, the IDNR is expected to issue a letter agreeing to the work as proposed without the need for a Construction in a Floodway permit on the grounds that the project does not involve any excavation or fill within the floodway.

Since the obstruction removal work noted above does not involve any excavation, incidental discharge, filling in wetlands, and/or any significant disturbance to the stream bottom or side slopes geometry, Corps of Engineers permit under Section 404 of the Clean Water Act is not expected to be required. However, the early notification procedure as outlined above is required for COE to make such a determination.

For Conditions IV and V stream obstructions, a procedure similar to the above should be followed. However, due to unique situations associated with these two types of obstructions, the review process may vary on a case-by-case basis.

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# Definition of Stream Obstruction Conditions

## Condition One

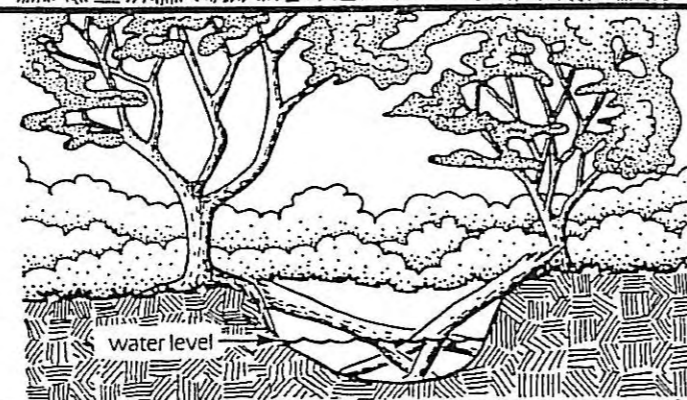
These stream segments have acceptable flow and no work would be required. They may contain various amounts of instream debris and fine sediment, such as silt, sand, gravel, rubble, boulders, logs and brush. In certain situations flow may be impeded, but due to stream and land classification or adjacent land-use, this is not a problem.



boulder  
riffle  
affixed log  
point bar

## Condition Two

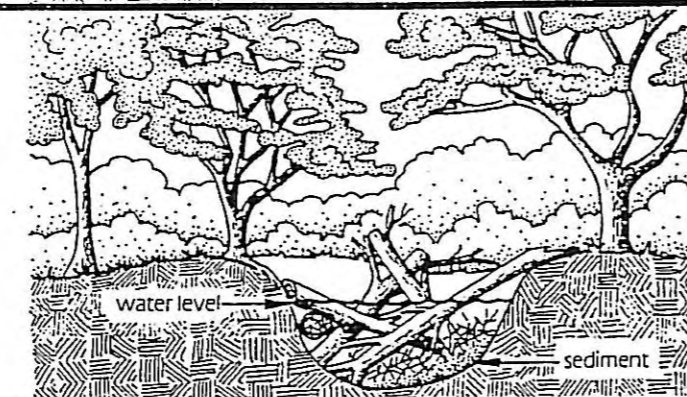
These stream segments currently have no major flow impediments, but existing conditions are such that obstructions are likely to form in the near future, causing unacceptable problems. This condition is generally characterized by small accumulations of logs and/or other debris which occasionally span the entire stream width. Accumulations are isolated, not massive and do not presently cause upstream ponding damages.



free log

## Condition Three

These stream segments have unacceptable flow problems. Obstructions are generally characterized by large accumulations of lodged trees, root wads, and/or other debris that frequently span the entire stream width. Although impeded, some flow moves through the obstruction. Large amounts of fine sediment have not covered or lodged in the obstruction.

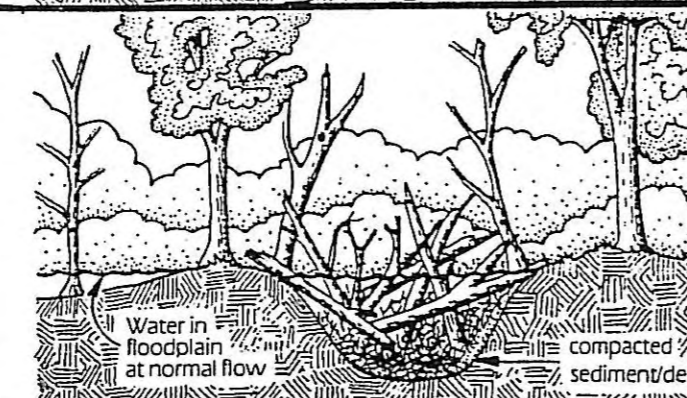


Some ponding usually evident

obstruction (debris blockage)

## Condition Four

These stream segments are characterized by major blockages causing unacceptable flow problems. Obstructions consist of compacted debris and/or sediment that severely restricts flow.

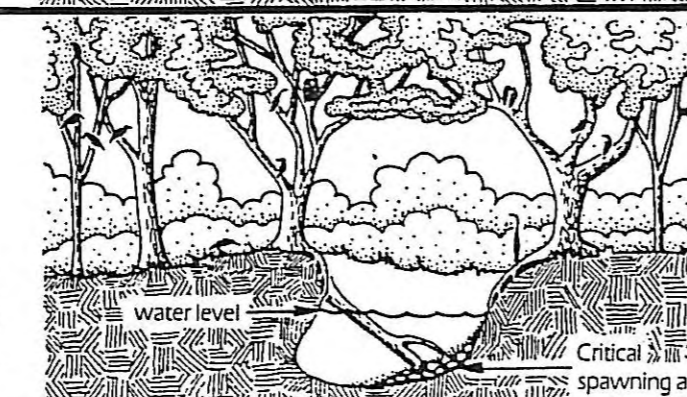


fine sediment and gravel

Normal flow often diverted to floodplain

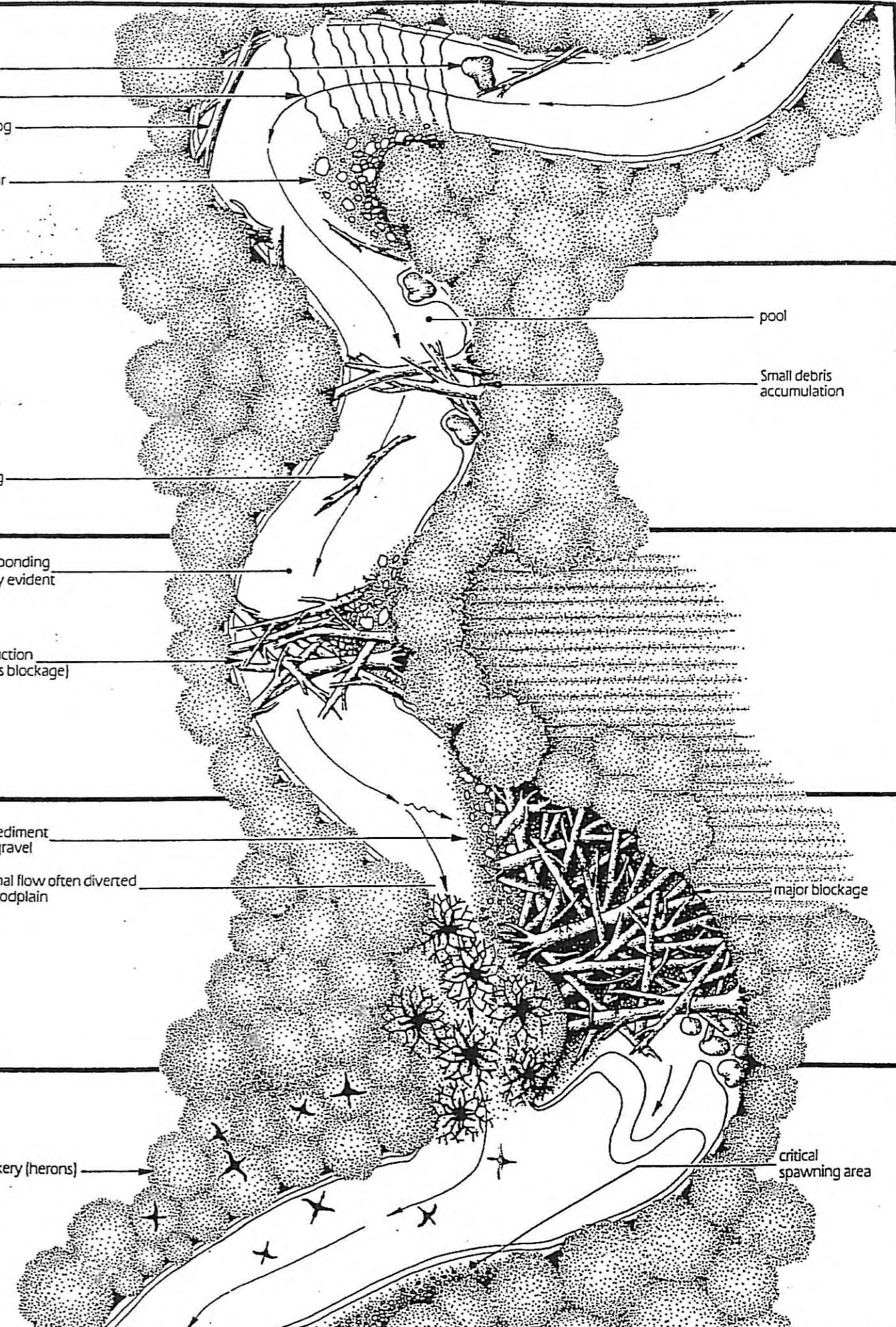
## Condition Five

These stream segments possess unique, sensitive, or especially valuable biotic resources and should be dealt with on a case-by-case basis. Examples include, but are not limited to: Areas harboring rare or endangered species, shellfish beds, fish spawning and rearing areas, and rookeries.



rookery (herons)

Critical spawning areas



pool

Small debris accumulation

major blockage

critical spawning area

PROJECT NO.: 98-150C

MRBC STREAM OBSTRUCTION REMOVAL GUIDELINES

MRBC STREAM OBSTRUCTION CLASSIFICATION GUIDE

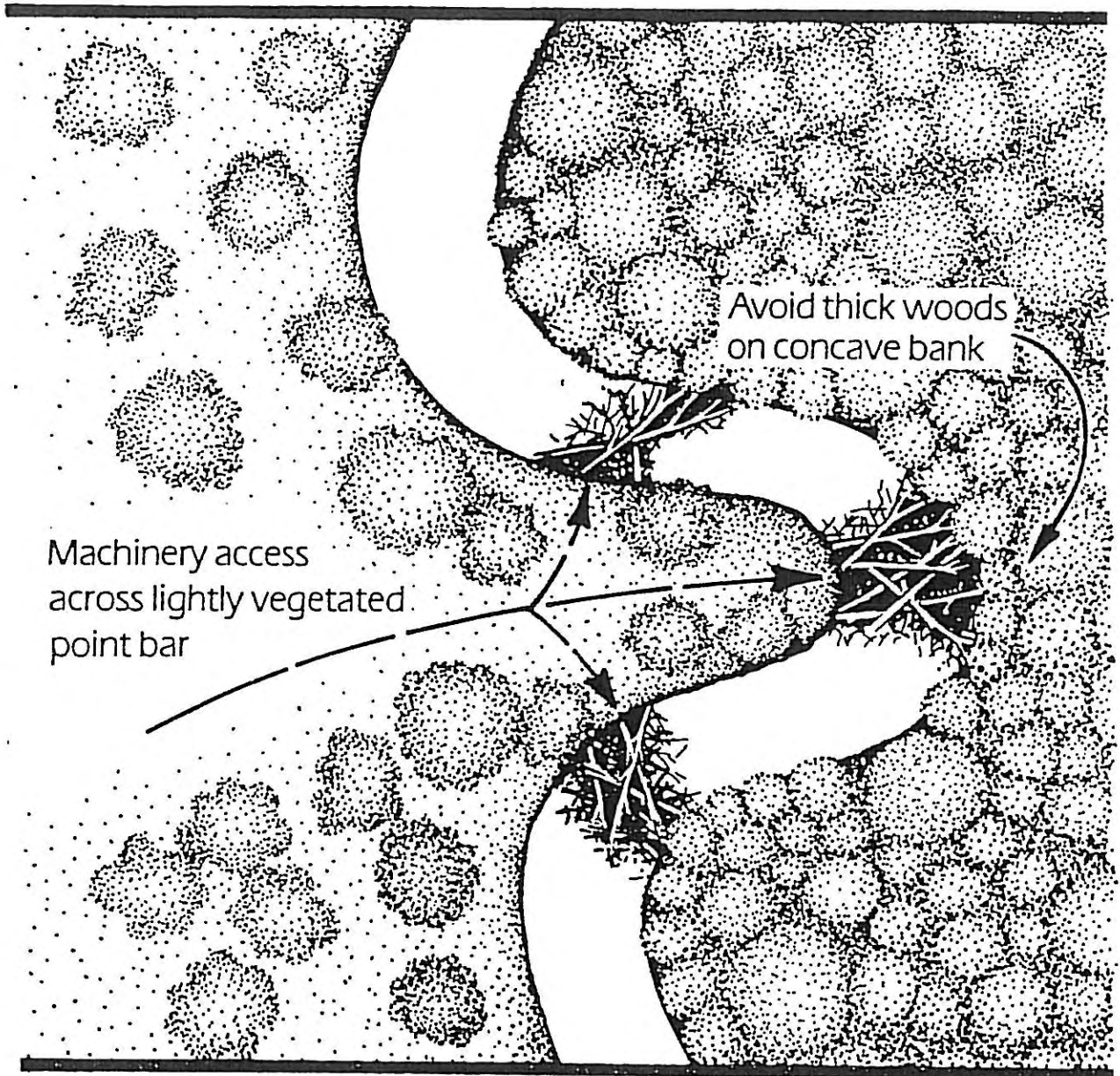
(Source: International Society of Fish and Wildlife Agencies, 1983)

CHRISTOPHER B. BURKE ENGINEERING, LTD.  
National City Center, Suite 1368 South  
115 W. Washington St.  
Indianapolis, IN 46204  
TEL: (317) 268-8000



DATE: 9/95  
EXHIBIT 1





**CBB**  
 CHRISTOPHER B. BURKE ENGINEERING, LTD.  
 National City Center, Suite 1368 South  
 115 W. Washington St.  
 Indianapolis, IN 46204  
 TEL (317) 266-8000 FAX (317) 832-3308

MRBC STREAM OBSTRUCTION REMOVAL GUIDELINES	PROJECT No. 95-150C	APPROX. SCALE: N/A
Schematic Plan for Machinery Access to Selected Stream Obstructions (Source: International Society of Fish and wildlife Agencies, 1983)		DATE: 9/95
		EXHIBIT 2