

**CHAPTER 3**

**HYDROLOGIC MODIFICATION  
NONPOINT SOURCE MANAGEMENT PROGRAM**

by  
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Water Quality Control Division

Prepared in Cooperation with the  
Colorado Nonpoint Source Council  
Hydrologic Modification Committee

January 10, 2000

# Hydrologic Modification Nonpoint Source Management Program

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## INTRODUCTION

The goal of this Management Program is to identify and develop programs for minimizing adverse nonpoint source water quality impacts associated with hydrologic modifications. The emphasis of the Water Quality Control Division and the Hydrologic Modification Committee will be on identifying and developing programs to employ physical, structural, or other solutions. The focus of concern is the interaction between sources of pollutants and hydrologic modifications that may cause adverse nonpoint source water quality impacts. These adverse water quality impacts which are best characterized as “pollution” and not the result of “pollutant” introduction are to be addressed through the voluntary implementation of economically reasonable best management practices.

Implementation of BMPs to correct nonpoint source water quality problems, where such BMPs are identified solely as a part of the state Section 319 program, is voluntary in Colorado. Thus, in the absence of independent statutory or regulatory authority, references in other state and federal enactments to Colorado’s Section 319 program, including BMPs developed thereunder, shall not establish an enforceable requirement that BMPs be implemented other than voluntarily. Any entity which attempts to impose BMPs must have independent regulatory authority.

**GOAL:** *Identification and correction of adverse nonpoint source water quality impacts associated with hydrologic modifications.*

**OBJECTIVE 1:** *Identification of adverse nonpoint source water quality impacts associated with hydrologic modifications.*

**OBJECTIVE 2:** *Identification of economically and technically reasonable alternative control measures, treatment measures, design concepts, operational procedures or other solutions which will result in a reduction of the identified adverse nonpoint source water quality impacts.*

**OBJECTIVE 3:** *Identification and recommendation of corrective measures which may be appropriate for implementation in a given situation on a voluntary basis.*

## **BEST MANAGEMENT PRACTICE**

The best management practice for this management program is a process to review identified adverse nonpoint source water quality impacts associated with hydrologic modifications and determine the most reasonable approach to achieve water quality improvement in a cost-effective manner. This process allows for two approaches:

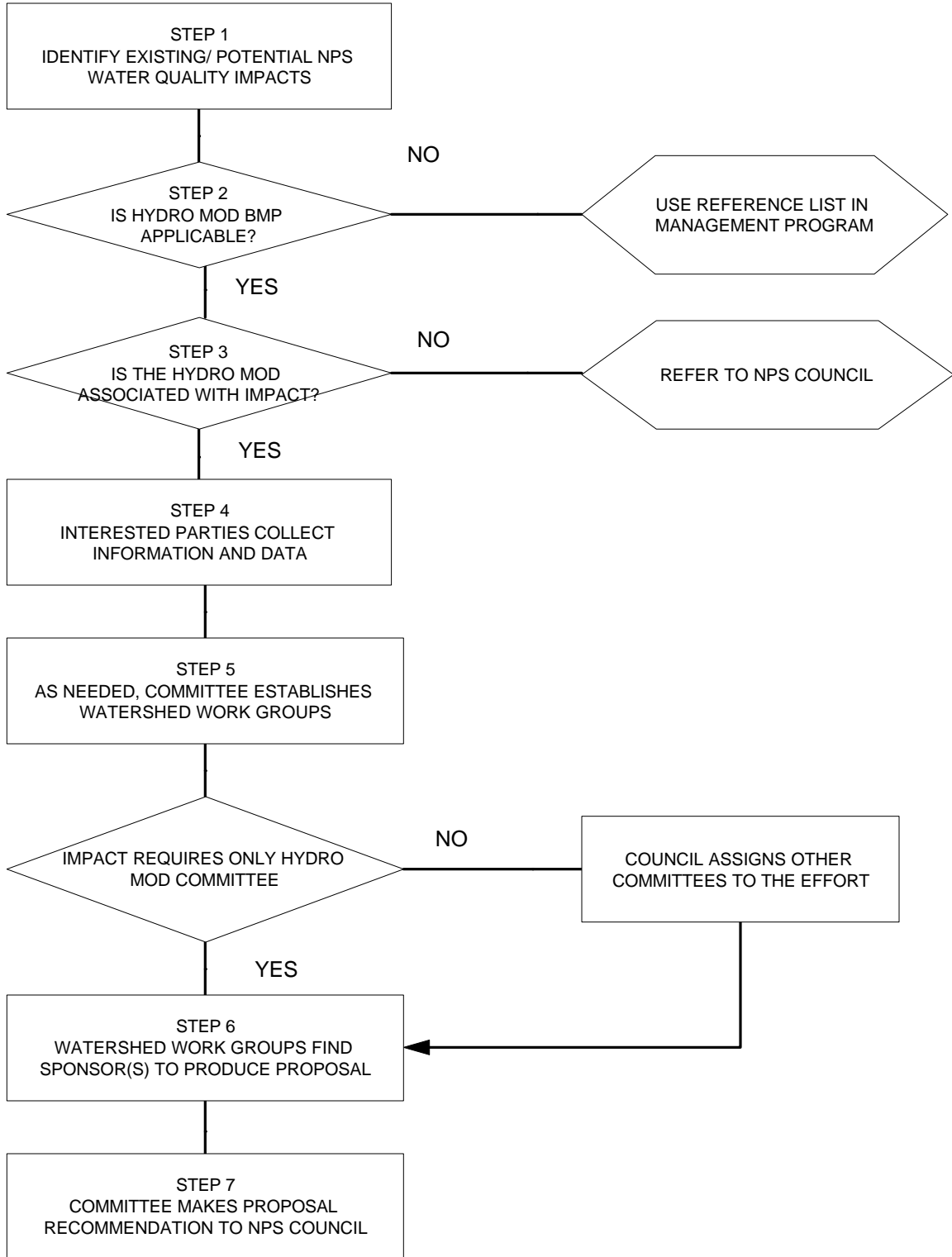
1. If an individual has an interest in correcting an identified impact, a list of references is attached.
2. If the identified impact is the result of the interaction from multiple pollution sources in a basin, the program develops a process by which the impacts can be reviewed, data can be collected, project sponsors can be identified and recommendations for correction can be made to the Colorado Nonpoint Source Council for action.

A watershed as a whole must be taken into consideration. The implementation of an action at one point may create or increase a nonpoint source water quality impact elsewhere in the watershed. Specific actions may need to be recommended or developed for each problem identified in a watershed.

This program shall not supercede, abrogate, impair or cause material injury to water rights in accordance with 25-8-104 C.R.S. or be inconsistent with U.S.C. 33-1251(g).

The following steps describe the BMP to be used in identifying and developing programs to minimize nonpoint source water quality impacts resulting from hydrologic modifications. Figure 1 shows the BMP in flowchart format. Participation by any interested party in the BMP process is voluntary and may be withdrawn at any time.

**FIGURE 1  
HYDROLOGIC MODIFICATION COMMITTEE'S  
NONPOINT SOURCE WATER QUALITY**



The BMP allows for consideration of the interaction between multiple pollution sources (point and nonpoint), determination of cost-effective control strategies, and provision for input from all affected or interested parties.

**Step 1: IDENTIFICATION OF EXISTING OR POTENTIAL NONPOINT SOURCE WATER QUALITY IMPACTS ASSOCIATED WITH A HYDROLOGIC MODIFICATION WHICH MAY CAUSE EXCEEDENCE OF APPLICABLE NUMERIC AND NARRATIVE STREAM STANDARDS OR SIGNIFICANT IMPAIRMENT TO CLASSIFIED USES.**

This step will be initiated by a party interested in a particular situation, including the Water Quality Control Commission's use of information received during the Water Quality Control Commission's Triennial Review of Stream Standards and Classifications.

**Step 2: THE INTERESTED PARTY THAT IDENTIFIED AN EXISTING OR POTENTIAL NONPOINT SOURCE WATER QUALITY IMPACT DETERMINES IF THE HYDROLOGIC MODIFICATION COMMITTEE'S NONPOINT SOURCE WATER QUALITY BMP SHOULD BE USED.**

If the interested party is looking for information related to the adverse nonpoint source water quality impacts associated with hydrologic modifications, they will be referred to the reference list contained in the Hydrologic Modification Nonpoint Source Management Program.

If the interested party decides that the Hydrologic Modification Committee's nonpoint source water quality BMP should be used, he/she will contact the Hydrologic Modification Committee.

**Step 3: THE HYDROLOGIC MODIFICATION COMMITTEE DETERMINES WHETHER HYDROLOGIC MODIFICATION IS PRIMARILY ASSOCIATED WITH THE POTENTIAL NONPOINT SOURCE WATER QUALITY IMPACT.**

If the Committee decides that the potential impact is primarily from a source other than hydrologic modification, it will be referred to the Nonpoint Source Council for reassignment to one of the other Committees.

**Step 4: EXISTING DATA AND INFORMATION REGARDING THE NATURE AND EXTENT OF THE POTENTIAL NONPOINT SOURCE WATER QUALITY IMPACT WILL BE COLLECTED.**

Data will be compiled and activities reviewed which may be relevant to the existence and/or solution of the problem. Collection of this pertinent information will most likely be done by interested parties. The Committee will determine if the impact has been identified in the Status of Water Quality Report. When the Committee determines that the Status of Water Quality Report should be updated to include the nonpoint source water quality impact, the proposed update will be forwarded to the Nonpoint Source Council for action.

**Step 5: AS NEEDED, THE HYDROLOGIC MODIFICATION COMMITTEE WILL ESTABLISH WATERSHED WORK GROUPS TO ASSESS THE POTENTIAL IMPACTS.**

The watershed work groups will work with the Hydrologic Modification Committee and will include representation from interested parties, representatives of activities which may be relevant to the problem and/or a solution, the Colorado Department of Public Health and the Environment, other appropriate federal/state agencies, and the responsible 208 agency.

The watershed work groups will be responsible for further characterizing the issue, identifying additional information regarding violations of standards, sources of pollution, and types of activities which may be relevant to the issue according to the reference list contained in this program. The Committee or watershed work groups will utilize all the information developed in the Council's other committees as needed. If the Hydrologic Modification Committee determines that the potential impact may require the expertise of other Council committees, the Hydrologic Modification Committee will make that recommendation to the Nonpoint Source Council for further action.

**Step 6: WATERSHED WORK GROUPS WILL ATTEMPT TO IDENTIFY A PROJECT SPONSOR OR SPONSORS TO DEVELOP A PROJECT PROPOSAL.**

The Proposal will be developed according to the guidelines in the Colorado Nonpoint Source Management Program and submitted to the Hydrologic Modification Committee for review. Other parties willing to undertake activities to minimize the water quality impacts will be identified by the project sponsor or sponsors and included in the analysis of the effectiveness of the proposed remedial efforts.

**Step 7: THE HYDROLOGIC MODIFICATION COMMITTEE WILL DECIDE IF THE PROPOSAL SHOULD BE RECOMMENDED TO THE COLORADO NONPOINT SOURCE COUNCIL FOR ACTION.**

If the Committee determines that the Proposal should be recommended to the Nonpoint Source Council, it will send the recommendations and all supporting information to the Nonpoint Source Council for consideration. A Proposal shall not include a recommendation for action by a particular



party not a member of the Committee, without that party's explicit agreement.

The Water Quality Control Division of the Colorado Department of Public Health and the Environment will be responsible for the maintenance and update of the statewide list of references provided at the end of this management program. Public education programs and involvement of the Division are necessary to ensure that the references and the BMP are understood by the public and other users. Data which may be available as a result of the implementation of the BMP may be used to determine the necessity for modification to or improvements in the reference list. The reference list is not all-inclusive. The Water Quality Control Commission may make deletions and/or additions as may be necessary based on an annual evaluation report, emerging technologies, innovative practices or requests for special practices. Implementation of the BMP to correct nonpoint source water quality problems, or where the BMP is identified solely as part of the state's Section 319 program is voluntary in Colorado.

## **DEFINITIONS AND POTENTIAL NONPOINT SOURCE WATER QUALITY IMPACTS ASSOCIATED WITH HYDROLOGIC MODIFICATIONS**

Hydrologic modification, for the purposes of this management program, is defined as reservoirs, releases from reservoirs, diversions, and other spatial and temporal changes in the movement and/or the circulation of flow of water. The following are the potential nonpoint source water quality impacts associated with hydrologic modifications.

- I. Reservoirs
  - A. Concentration of Nutrients
  - B. Changes in Dissolved Oxygen
  - C. Temperature
  - D. Chemical Concentration (Organic and Inorganic)
  - E. Chemical Changes (pH, Alkalinity Effects)
  - F. Turbidity

- II. Releases from Reservoirs
  - A. Release of water having a lower dissolved oxygen level than would have occurred without the reservoir.
  - B. Release of warmer or colder water to the downstream than would have occurred without the reservoir.
  - C. Due to the concentration effect or anaerobic condition in a reservoir, release of chemical concentrations (organic or inorganic) to the downstream channel at higher levels than would have occurred without the reservoir.
  - D. Due to the concentration effect of a reservoir, releases of nutrient rich water to the downstream channel at higher levels than would have occurred without the reservoir.
  - E. Increased streambank erosion or scour below the reservoir.
  - F. Excessive deposition of sediment in the downstream channel.
  - G. Degradation of aquatic habitat downstream of the reservoir.
- III. Diversions
  - A. Increase or decrease in chemical concentration (organic or inorganic) below the diversion.
  - B. Increase or decrease in nutrient concentration below the diversion.
  - C. Change in temperature below the diversion.
  - D. Change in dissolved oxygen below the diversion.
  - E. Increases or decreases in turbidity below the diversion.
  - F. Increased streambank erosion or scour below the diversion.
  - G. Increased deposition of sediment below the diversion.
  - H. Degradation of aquatic habitat below the diversion.
- IV. Spatial or Temporal Changes in the Flow or Circulation of Water
  - A. Downstream water quality impacts of activities not related to reservoirs or diversions including but not limited to channelization, levee construction or removal, and channel straightening.

## **PRIORITY WATERSHEDS AND PROJECTS**

Since very few watersheds or waterbodies in Colorado have been identified in the Nonpoint Source Assessment Report or the 305(b) Status of Water Quality Report as having adverse nonpoint source water quality impacts associated with hydrologic modification, it is difficult to determine the severity and resultant priority of these waters from a statewide perspective. One of the programmatic priorities of this management program reflects the need to further investigate and identify as appropriate additional watersheds or water bodies which may have adverse nonpoint source water quality impacts associated with hydrologic modifications. The result of this activity will be used to update this management program and the priority water bodies. The water bodies that have been identified may require additional study to determine the magnitude of the adverse nonpoint source water quality impacts associated with hydrologic modification and reasonable actions which may be effective in controlling these sources. Listed below are the acronyms of various funding sources or agencies which may assist in additional study or implementation of appropriate actions.

319 – Section 319 Nonpoint Source Funds

201(G) – Construction grant funds transferred to nonpoint source purposes

SRF – State Revolving Loan Fund, administered by Water Quality Control Division,  
Colorado Department of Public Health and the Environment

COE – Army Corps of Engineers

BOR – Bureau of Reclamation

UWA – Unified Watershed Assessment

CWAP – Clean Water Action Plan

COG's – Councils of Governments

DRCOG – Denver Regional Council of Governments

CDOT – Colorado Department of Transportation

DWB – Denver Water Board

WCD – Water Conservation Districts or Water Conservancy Districts

SJWCD – San Juan Water Conservancy District

SWCD – Southwest Water Conservation District  
 CWCB – Colorado Water Conservation Board  
 CDOW – Colorado Division of Wildlife  
 POA – Lower Blanco Property Owners Association

**Priority Watersheds/Water Bodies for Potential Projects**

<b><u>Water</u></b>	<b><u>County</u></b>	<b><u>Agencies Involved</u></b>	<b><u>Funding Source(s)</u></b>
Boulder Creek	Boulder	City of Boulder	201 (g), 319, SRF, Local
Bear Creek Res.	Jefferson	COE, DRCOG Jefferson County, City of Lakewood	201 (g), 319, CDOT, Local, COE
Fraser River	Grand	Grand County, DWB	319, Local
		<u>Funded Projects</u>	
Rio Blanco	Archuleta	SWCD, SJWCD, CWCB, CDOW, POA	319, Local

## PROGRAMMATIC PRIORITIES

1. Review existing program priorities and identify additional watersheds or water bodies through Triennial Review hearings, the 305(b) report, the 303(d) list, the Unified Watershed Assessment for Colorado, and through individual project submittals.
2. Continue to seek additional membership and broad participation in the Hydrologic Modification Committee with particular focus on agencies with technical expertise, watershed work groups, and government and private interests involved with hydrologic modifications.
3. Amend BMP to reflect project experience and additional information gathered.
4. Review additional references for inclusion into the reference list.
5. Actively pursue projects that address the nonpoint source water quality impacts identified in the current versions of the 305(b) report, the 303(d) list, and the Unified Watershed Assessment.
6. Actively pursue projects that preserve high quality water and protect water bodies from potential adverse nonpoint source water quality impacts associated with hydrologic modifications.
7. Seek out project proposals dealing with reservoir outlet structure design and operation, design and configuration of diversion structures, and the nonpoint source water quality impacts associated with channelization and channel modification.

## **MILESTONES FOR THE HYDROLOGIC MODIFICATION PROGRAM**

The Hydrologic Modification Management Program provides a framework for addressing nonpoint source water quality impacts associated with hydrologic modifications. The milestones listed below will assist in making the program successful.

### **Milestone**

### **Timeframes**

- |   |  |
|---|--|
| 1. Review existing program priorities, and identify additional watersheds through 305(b), 303(d), UWA, Triennial Reviews, and project submittals. | Begin 1/2000, annually thereafter.     |
| 2. Seek additional membership for the Hydrologic Modification Committee, including agencies and private interests with expertise in the subject.  | Begin 1/2000, annually thereafter.     |
| 3. Amend BMP flowchart and process steps to reflect field experience and information gained in the implementation of the BMP.                     | Begin 1/2001, annually thereafter.     |
| 4. Review existing and additional references for inclusion, deletion, or modification.  | Review by 1/2001; annually thereafter. |
| 5. Encourage projects for waters identified through the processes identified in #1 above.   | Begin 1/2000, annually thereafter.     |

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