

Mississippi Commission on Environmental Quality

**DAM SAFETY REGULATION
LW-4**

**Adopted by the Commission on Environmental Quality June 24, 2004
Revised by the Commission on Environmental Quality August 25, 2005**

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DAM SAFETY REGULATION (LW-4)

I. Definitions - The words and phrases used in this regulation shall have the meanings set forth in this section:

- A. Adverse Effects –Negative impacts that may occur at the site of the dam, upstream, downstream, or at locations remote from the site of the dam. The primary concerns are loss of human life, economic loss (including property damage), lifeline disruptions (such as damage to roads, bridges, or utilities), and adverse environmental impact.
- B. Abutment—That part of the undisturbed valley side or a constructed concrete wall against which the dam is constructed. Right and left abutments are identified from the perspective of an observer standing on the dam looking downstream.
- C. Alter or Repair— Any change in the surface or cross-section of existing dams and/or appurtenant works or any modification to appurtenant structures, other than minor grading and fill associated with routine slope and turf maintenance activities. Examples of alterations or repairs include such work as adding significant amounts of material to, or removing material from, the cross-section of a dam; changing the dimensions or elevations of an emergency or overflow spillway; replacing pipe or in any other way altering a principal spillway; making any repairs of erosion or undermining associated with seepage through the dam; building a roadway on or across any part of a dam; burying pipelines; or in any way altering the approved operational features of a dam.
- D. Appurtenant Works – This term includes, but is not limited to; spillways, either in the dam or separate therefrom; the reservoir and its rim or shoreline; low level outlet works; and water conduits such as tunnels, pipelines, or penstocks, either through the dam or its abutments.
- E. Breach—Partial removal of a dam by creating a channel through the dam to the original stream bed elevation, so that no water is impounded by the breached structure.
- F. Commission--- The Mississippi Commission on Environmental Quality, or its designee.
- G. Dam—Any artificial barrier, including appurtenant works, constructed to impound or divert water, waste-water, liquid borne materials, or solids that may flow if saturated. All structures necessary to maintain the water level in an impoundment or to divert a stream from its course will be considered one dam.

- H. Days—Calendar days including Saturdays, Sundays, and Holidays; unless specifically indicated otherwise in the body of this regulation.
- I. Department or MDEQ--- The Mississippi Department of Environmental Quality.
- J. Emergency Action Plan--- A formal written document identifying the area that would be inundated in the event of a dam failure and setting forth the plans and procedures for notifying the individuals, agencies, and public officials that would mobilize resources to respond to the emergency.
- K. Emergency—This term includes, but is not limited to, uncontrolled breach of a dam; or any conditions leading to, or causing, a breach, overtopping, or any other condition in the dam and/or its appurtenant works that may lead to failure of the dam or otherwise pose a threat to life or property.
- L. Enlarge—Any change in, or addition to, an existing dam or reservoir, which raises, or may raise the water storage elevation or storage volume of the water, waste-water, or liquid-borne material impounded by the dam.
- M. High Hazard—A class of dam in which failure may cause loss of life, serious damage to residential, industrial, or commercial buildings; or damage to, or disruption of, important public utilities or transportation facilities such as major highways or railroads. Dams which meet the statutory thresholds for regulation that are proposed for construction in established or proposed residential, commercial, or industrial areas will be assigned this classification, unless the applicant provides convincing evidence to the contrary.
- N. Impoundment or Reservoir — A man-made dammed, leveed, or diked area or basin designed to store water or other liquids above surface levels that would occur under natural conditions.
- O. Low Hazard—A class of dam in which failure would at the most result in damage to agricultural land, farm buildings (excluding residences), or minor roads.
- P. Permit Board or Board --- The Mississippi Environmental Quality Permit Board.
- Q. Person—The state or other agency or institution thereof, any municipality, political subdivision, public or private corporation, individual, partnership, association or other entity, and including any officer or governing or managing body of any municipality, political subdivision, or public or private corporation, or the United States or any officer or employee thereof.
- R. Probable Maximum Precipitation (PMP) —The rainfall event used for hydraulic design of dams and appurtenant spillways in Mississippi. The Probable Maximum Precipitation (PMP) varies by location within the state and the event used in design shall be as defined for the proposed construction location by Hydrometeorological Reports published by the Office of Hydrology, National Weather Service.

- S. Professional Engineer—An engineer with experience in the design of dams who is registered with the State of Mississippi Board of Registration for Professional Engineers and Land Surveyors.
- T. Professional Geologist---A geologist with experience in determining and analyzing geologic conditions affecting the siting of dams who is registered with the Mississippi State Board of Registered Professional Geologists.
- U. Removal—Complete elimination of the dam embankment or structure to restore the approximate original topographic contours of the area.
- V. Significant Hazard—A class of dam in which failure poses no threat to life, but may cause significant damage to main roads, minor railroads, or cause interruption of use or service of public utilities.
- W. Water Storage Elevation—The maximum surface elevation of water that can be maintained by a dam or reservoir.
- X. Written Authorization--- Official written correspondence or permit document from the Board, or its designee, authorizing construction, enlargement, repair, or alteration of a dam; including any specified conditions or limitations under which the work is to be performed by the person to whom the approval is granted.

II. Authorization

A. Applicability

1. Except as otherwise provided in this section, any person or entity proposing to construct, enlarge, repair, or alter a dam or reservoir in the state of Mississippi must obtain written authorization from the Permit Board, or its designee, prior to commencement of any site work related to the project. For high hazard and significant hazard dams, the written authorization will be in the form of a permit document. Application for such permits shall be made on a form prescribed by the Board and will be processed by the Board in accordance with Mississippi Code Annotated, Section 49-17-29.
2. The Board may require submittal of any information deemed necessary to evaluate a proposal to construct, enlarge, repair, or alter a dam or reservoir. Once the Board has authorized the project, the applicant shall not modify the approved design, plans, specifications, or construction methods, or act according to such modified documents, without the prior written authorization of the Permit Board.
3. Any person intending to acquire the right to store or use water from a reservoir formed by a dam, regardless of whether or not written construction authorization is required under this regulation, shall submit an application for

a surface water use permit to MDEQ in accordance with Mississippi Code Annotated, Sections 51-3-5 and 51-3-7, and the regulations of the Commission promulgated thereunder.

B. Exceptions

1. Prior written authorization is not required for emergency repairs to a dam which is in imminent danger of failing. However, the dam owner shall report such emergency repairs to MDEQ by close of business on the next business day following the incident and file a written report with MDEQ within five (5) days of the incident.
2. Written construction authorization shall not be required for:
 - a.) a peripheral dam or levee eight (8) feet or less in height, measured from the point of lowest elevation of its toe, regardless of the impounded storage volume; or
 - b.) a dam that impounds twenty-five (25) acre-feet or less at maximum storage volume; or
 - c.) a dam that does not impound a watercourse with a continuous flow of water, as determined by the Commission;

Any person or entity proposing to construct, enlarge, repair, or alter any dam or reservoir in reliance upon the provisions of paragraphs II.B.2.(a.-c.) to exempt the project from the requirement to obtain written authorization must submit a notification of the planned project to MDEQ prior to the onset of construction. If, upon review of such notification, the Commission determines that the proposed dam poses a potential threat to downstream lives and property; the person or entity proposing the project may be required to comply with design and safety requirements contained in Section IV of this regulation. The Commission may enforce compliance with such design and safety standards in the interest of public safety, notwithstanding the fact that written authorization may not be required for the project. The pre-construction notification shall be submitted on a form prescribed by the Permit Board.

4. Prior written authorization is not required for recurring routine maintenance activities including but not limited to mowing, grading or filling ruts in roadways that cross the dam, filling ruts or repairing other surface damage caused by vehicles or animals on the slopes, filling eroded areas in the surface of an embankment to establish or maintain the turf, or other similar activities.

C. Limitations

1. The Board's receipt, comment, or approval of any design, construction, or modification does not relieve the dam's owner, consulting engineer, consulting Geologist, contractor, equipment supplier, attorney, or any other party of any liabilities or responsibilities. Board and/or MDEQ approval of, or comment on, any document does not establish or convey any liability or responsibility to the Board and/or MDEQ, nor does such approval or comment represent any assurances that the project will comply with any authorization requirements or otherwise perform as intended by the owner, consulting engineer, consulting Geologist, contractor, equipment supplier, attorney or other parties. The dam owner and/or any person responsible for constructing, enlarging, repairing, or altering a dam or reservoir shall comply with all conditions of the Board's authorization to construct and ensure that all construction, operation, and maintenance activities achieve such compliance. It is the responsibility of the dam owner/applicant to obtain all other approvals, permits, clearances, easements, and/or agreements for the construction and/or operation of the dam which may be required by federal, state, or local law or regulation.
2. Written authorizations by the Board expire one (1) year from the date of issuance if work has not commenced on the project. If the work cannot be commenced within the one-year period, the dam owner or any other person responsible for the project must request a time extension from the Board, in writing, at least thirty (30) days prior to the expiration of the one-year authorization period. The written request shall provide an explanation of project delays and an estimated construction commencement date. The Board will normally grant a time extension, on proper application therefor, unless the Board determines that circumstances surrounding the project have so changed that the construction and operation of the dam as originally proposed would violate state or federal laws or regulations. If the applicant allows the authorization to expire, a new application must be submitted and approved prior to the onset of construction.
3. The hazard classification assigned to a dam by the Board is subject to change based on future developments that may increase the potential threat to life and property in the event of a dam failure. The dam owner and/or any person responsible for the construction and/or operation of a dam or reservoir assume all risks associated with designing and constructing the dam to meet less than the most stringent design criteria for high-hazard dams, including the risk of having to make modifications to the dam to meet future heightened regulatory requirements associated with a change in classification.

III. Application Content and Procedure

- A. Any person or entity proposing to construct, enlarge, repair, or alter a dam or reservoir shall submit either an application or a pre-construction notification (if the provisions of paragraph II. B. apply) to the Board, on forms prescribed by the Board, at least thirty (30) days prior to the anticipated commencement of

construction. The submittal must have a United States Geologic Survey (USGS) topographic map, or portion thereof, attached to it showing the location of the proposed dam and reservoir including a clearly marked access route to the site and marked locations and general descriptions of all buildings, drainage structures or culverts, roads, railroads, bridges, and utility lines within two-miles downstream of the site of the proposed dam.

B. If the provisions of paragraph II. B. do not apply, and the potential threat to life or potential property damage that would result from failure of the proposed dam rises to the level of significance characteristic of a high hazard or significant hazard classification, the application package also must include two complete sets of design documents prepared in accordance with the following requirements:

1. Engineering drawings, specifications, and engineering reports shall be prepared, signed, and sealed by a professional engineer.
2. Drawings shall be prepared to a scale that provides sufficient detail for review of all project components.
3. Specifications shall include detailed descriptions of all work to be performed and materials to be used in the construction.
4. Engineering reports shall include, but not be limited to, hydrologic calculations, hydraulic calculations, geotechnical investigation, stability analysis, dewatering plan, and provisions for internal drainage. Portions of the investigation at the site of the dam and within the catchment area including, but not limited to, characterization of geologic formations, assessment of groundwater conditions, and/or other geologic conditions, factors, and processes which may impact the design of the dam may be performed by a professional geologist. If a professional geologist produces documents in support of the design of a project, the work products must be signed and sealed by the professional geologist.
5. If a professional geologist produces documents in support of the design of a project, the work products must be signed and sealed by the professional geologist.

C. The Board may require the applicant to supply any additional information necessary to evaluate an application, including the following:

1. Whether the proposed dam will provide adequate safety for lives and property; and/or
2. Whether the proposed dam will adversely affect riparian or other beneficial water uses, or plans for the proper utilization of the water resources of the state, and/or

3. Any other information the Board deems appropriate.

IV. Design and Safety Requirements

- A. Any modification, alteration, enlargement, or major repair of an existing dam, whether requested by the owner or directed by the Commission, will be subject to the current design standards for the appropriate hazard classification as set forth in this regulation.
- B. The owner of any existing dam, regardless of its condition, that poses an unacceptable threat to downstream lives or property may be required by the Commission either to bring the dam into compliance with current standards or take the dam out of service by draining the impoundment and removing the dam.
- C. High Hazard dams must be capable of safely passing the runoff from a 100-year rainfall event through the principal spillway without activating the emergency spillway. The 100-year rainfall event is established by the National Weather Service and varies for different areas of the state. The proper design rainfall event for the county where the proposed dam is located can be obtained from MDEQ or from the nearest Natural Resources Conservation Service (NRCS) office. The runoff from one hundred percent (100%) of the Probable Maximum Precipitation (PMP), as defined in paragraph 1.R. of this regulation, must be passed through the principal and emergency spillway and/or stored in the reservoir without overtopping the dam. The appropriate PMP for each county as obtained from the National Weather Service Bulletins and the rainfall distribution curve to be used in design routings are provided at Appendix A to this regulation. The Commission may require the owner or operator of a high hazard dam that does not meet this requirement to take remedial action to bring the dam into compliance with all current dam safety requirements or to breach the dam.
- D. Within thirty (30) days after completion of a high hazard dam, the owner shall submit one (1) complete set of as-built plans and specifications to the Board. The submittal also shall include a letter signed by the professional engineer responsible for the project, certifying that the dam was constructed in accordance with the Board approved plans and specifications.
- E. Significant hazard dams shall be designed to control the contributory watershed runoff from at least fifty percent (50%) of the PMP without overtopping the dam. The owner and any other persons responsible for the construction and operation of the dam shall assume all risks for future costs to upgrade a dam in the event the hazard classification changes. Applicants for authorization to construct significant hazard dams must comply with the document submittal requirements set forth for high hazard dams in paragraph III.B. Within thirty

(30) days after completion of a significant hazard dam, the owner shall submit one (1) complete set of as-built plans and specifications to the Board accompanied by a letter signed by the professional engineer responsible for the project, certifying that the dam was constructed in accordance with the Board approved plans and specifications.

- F. Low hazard dams shall be designed to control the contributory watershed runoff from at least thirty-five percent (35%) of the PMP without overtopping the dam. The owner and any other persons responsible for the construction and operation of the dam shall assume all risks for future costs to upgrade a dam in the event the hazard classification changes. Drawings to be submitted with the application for a low hazard dam shall include, but not be limited to, a plan view of the dam (including all appurtenant works) and sections through the dam at the centerline of the principal spillway and at the centerline of the emergency spillway if it is located in the dam. The applicant shall provide written notification of completion of the dam to the Board, within thirty (30) days after the dam has been constructed, and either certify that the dam was constructed as shown in the drawings previously submitted or submit new as-built drawings.
- G. Because the size and type of pipe used for the principal spillway is one of the most critical elements in the design of high hazard and significant hazard dams, the professional engineer responsible for the project shall provide the Board with detailed hydraulic, hydrologic, and structural computations supporting selection of the size and type of pipe to be used. Detailed drawings and specifications relating to the installation of the pipe shall include, but not be limited to, construction measures that adequately address critical loading, bedding, backfill, compaction, and seepage precautions related to installation of the pipe.
- H. The Freeboard Hydrograph shall be used to determine the top of dam elevation and the size and crest elevation of the emergency spillway for high hazard dams.
- I. The soils in an earthen emergency spillway shall be capable of withstanding the water velocities generated when the emergency spillway is activated without experiencing excessive erosion.
- J. Side slopes of all dams shall be a minimum of three horizontal to one vertical (3:1).
- K. The owner or operator of a high hazard dam shall develop an Emergency Action Plan (EAP) for the dam. The Board may direct the owner or operator of a significant hazard dam to develop an Emergency Action Plan (EAP). The EAP shall be submitted to the Board for approval. Once approved, a copy of the EAP will be maintained on file by the Board. The owner or operator of the dam shall review the EAP on an annual basis to assure that the information contained therein is current. Revisions to the EAP, as necessary, shall be furnished to the Board and all other persons involved in the implementation of the EAP. The

owner or operator also shall be responsible for conducting or coordinating periodic training and exercises to assure that personnel involved in the implementation of the EAP are properly prepared to carry out their responsibilities in the event of an emergency.

V. General Conditions of Authorization

- A. No materials shall be placed in a watercourse that will impede or block the natural flow of water without prior written authorization from the Permit Board and other appropriate federal, state, and local authorities. Additionally, any activity involving the discharge of dredged or fill material or any other construction in any state waters that are also subject to federal regulation under Section 404 of the 1972 Clean Water Act and/or Section 10 of the Rivers and Harbors Appropriation Act of 1899 shall be conducted in accordance with appropriate provisions of those federal statutes.
- B. A permit or written authorization issued by the Permit Board does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State, or local laws or regulations. No impoundment may be constructed that will adversely affect riparian or other beneficial water uses or plans for the proper utilization of state waters, or that will cause flooding of upstream property unless the owner of the proposed dam has legally acquired the right to do so. The Commission may prescribe minimum flow releases from any dam or reservoir, as necessary, to protect downstream uses or otherwise prudently manage available surface water.
- C. Any dam that impounds a watercourse with a continuous flow shall be designed so that the established minimum flow for the stream (as established by the Commission) is maintained.
- D. The owner and/or any person responsible for the construction, enlargement, repair, or alteration of a dam on a watercourse lying, in whole or in part, within a levee district duly constituted under the laws of the State of Mississippi, shall first obtain permission for the work from the board of the levee district and shall provide proof of such permission with the application to the Board.
- E. Owners of earthen dams covered under this regulation shall establish and maintain a healthy turf on the exposed faces of the dam to prevent erosion, and shall mow frequently enough to prevent the encroachment of woody vegetation into the slopes of the dam embankment.
- F. Owners of High Hazard or Significant Hazard dams will be required to prohibit livestock grazing on the dam in order to prevent damage to the turf and to prevent erosion associated with establishment of animal trails

- G. In addition to the general conditions contained herein, the Board may place special conditions on any authorization to construct or modify a dam.
- H. The Commission may order the removal of a dam after it has been constructed or modified when it is determined that the dam does not meet criteria and/or standards established by the Board or the Commission and/or otherwise fails to adequately protect lives and property.
- I. A Surface Water Use Permit may also be required for any person to impound and store water behind a dam.
- J. The owners or operators of high hazard or significant hazard dams shall maintain records and documents related to the original construction, recurring inspections, maintenance, repairs, and alterations of the dam for the life of the project. Such records shall be made available for inspection, or copies of such records furnished, upon request by the Department.

VI. Inspection and Reporting

- A. The owner and the operator of a dam shall be responsible for the proper operation and maintenance as well as the structural integrity of the dam. In order to fulfill this responsibility, the owner and/or the operator should perform a visual inspection of the dam at least every sixty (60) days and after every major rainfall event over the watershed. Any symptoms of dam failure observed during such visual inspections shall be immediately reported to MDEQ.
- B. The owner or operator of a high hazard or significant hazard dam shall have a detailed inspection of the dam performed by a registered professional engineer with experience in the design and construction of dams not later than March 1, 2006, and thereafter at such recurring intervals as may be directed by the Department. A checklist form prescribed and furnished by MDEQ shall be used to record observations during the inspection. The report on findings of scheduled detailed inspections (including the completed MDEQ prescribed checklist and an evaluation of the operation, maintenance, and the structural integrity of the dam), bearing the signature and seal of the professional engineer performing the inspection, shall be submitted to the Board within sixty (60) days after completion of the inspection.
- C. MDEQ employees are authorized to make inspections at any time to evaluate the operation, maintenance, and structural integrity of dams and reservoirs. The owner or operator shall be required to perform, at the owner's or operator's expense, such work as may be necessary to correct deficiencies in maintenance and operation or accomplish necessary repairs identified by such inspections. If deficiencies are not corrected or repairs are not made as specified in the inspection report, the Commission may order owners or operators to take remedial action or remove the dam in order to safeguard lives and property.

D. If, upon inspection, the Board or the Commission determines that:

1. A dam was constructed without obtaining required prior written authorization from the Permit Board;
2. A dam was not constructed in accordance with the plans and specifications upon which the Board based its written authorization;
3. The dam may not provide adequate safety for lives and property;
4. The dam may adversely affect riparian or other beneficial water uses, or plans for the proper utilization of the water resources of the state; or
5. The owner and/or operator of the dam has allowed the dam to deteriorate and remain in an unsafe condition after having been ordered to make the necessary repairs or modifications, the Board or the Commission may:
 - a.) cause the dam to be removed or breached;
 - b.) require the owner and/or operator to take remedial action;
 - c.) revoke or modify any authorization pertaining thereto; or
 - d.) take other action the Commission deems appropriate, within its jurisdiction.

VII. Confidential Information

Procedures for declaring submitted information confidential and for agency handling of such information are found in Miss. Code Ann. Section 49-17-39, Section 51-3-44, and the Commission's Regulations Regarding the Review and Reproduction of Public Records (MCEQ-2).

VIII. Enforcement

- A. Any person who allows a dam to deteriorate to an unsafe condition may be ordered to make necessary repairs to restore it to a safe condition. If appropriate repairs are not made, the Commission may take action to correct unsafe conditions, or to require removal of the dam, and the Board may revoke or modify any written authorization pertaining thereto.
- B. Enforcement of this regulation shall be governed by Miss. Code Ann. Sections 49-17-31, 49-17-33, 49-17-35, 49-17-37, 49-17-41, and Sections 51-3-49, 51-3-51, and 51-3-55.

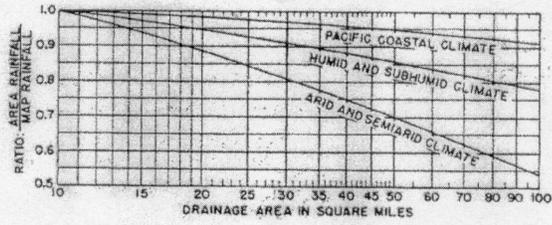
IX. Correspondence and Adequacy of Notice

- A. General -- All regulated dam owners shall inform MDEQ of any address changes, changes in ownership, or changes in the designated agent of the owner within fifteen (15) days of any such changes, and must readily accept all mail sent to them from the Commission, MDEQ, or the Permit Board.
- B. Registered or certified mail -- Registered or Certified Mail sent with proper postage and to the last address provided to MDEQ by the dam owner of record shall be considered adequate notification of notice served if MDEQ is notified that the mail was delivered and accepted or if the mail is returned as rejected or unclaimed by the addressee.
- C. Refusal to accept mail -- Refusal to accept mail from the Commission, the Permit Board, the Department, or its designee, shall be considered a violation of this regulation.

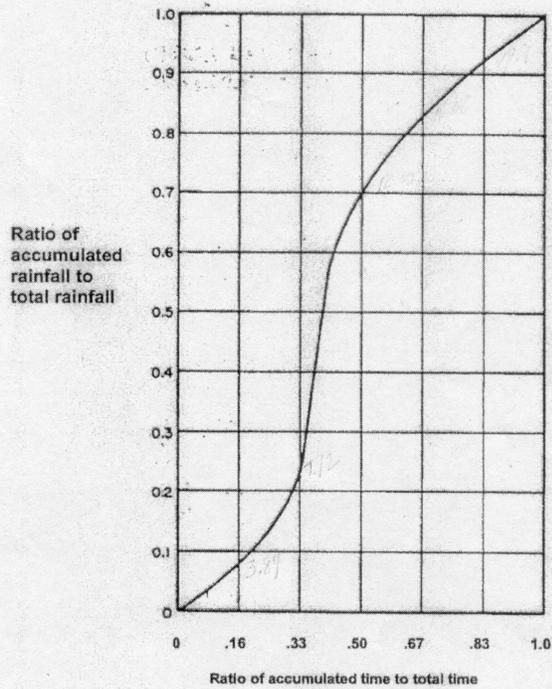
X. Hearings and Appeals

Any person aggrieved by any initial action of the Permit Board to issue, deny, transfer, modify or revoke a permit or written authorization may request an evidentiary hearing before the Permit Board regarding the decision. Procedures for hearings and further appeals of Permit Board decisions are set forth in Mississippi Code Annotated Section 49-17-29.

APPENDIX A
HYDROLOGIC DESIGN CRITERIA



Areal Adjustment



Dimensionless Design Storm Distribution

A-1

PMP (24 hour duration) for MS Counties							
COUNTY	PMP (in.)		COUNTY	PMP (in.)		COUNTY	PMP (in.)
Adams	46.1		Itawamba	41.3		Perry	47.0
Alcorn	40.2		Jackson	47.8		Pike	46.9
Amite	46.7		Jasper	45.3		Pontotoc	41.5
Attala	43.4		Jefferson	45.7		Prentiss	40.7
Benton	40.4		Jeff Davis	46.1		Quitman	41.4
Bolivar	42.1		Jones	46.1		Rankin	44.8
Calhoun	42.0		Kemper	44.0		Scott	44.6
Carroll	42.8		Lafayette	41.2		Sharkey	43.6
Chickasaw	42.1		Lamar	46.8		Simpson	45.5
Choctaw	43.0		Lauderdale	44.6		Smith	45.3
Claiborne	45.3		Lawrence	46.2		Stone	47.6
Clarke	45.3		Leake	44.0		Sunflower	42.4
Clay	42.5		Lee	41.3		Tallahatchie	41.9
Coahoma	41.4		Leflore	42.6		Tate	40.7
Copiah	45.5		Lincoln	46.2		Tippah	40.4
Covington	46.1		Lowndes	42.8		Tishomingo	40.4
DeSoto	40.4		Madison	44.2		Tunica	40.7
Forrest	47.0		Marion	46.8		Union	41.0
Franklin	46.2		Marshall	40.5		Walthall	46.9
George	47.5		Monroe	42.1		Warren	44.6
Greene	46.9		Montgomery	42.7		Washington	43.0
Grenada	42.3		Neshoba	44.0		Wayne	46.0
Hancock	48.3		Newton	44.6		Webster	42.5
Harrison	48.0		Noxubee	43.4		Wilkinson	46.7
Hinds	44.7		Oktibbeha	42.8		Winston	43.4
Holmes	43.3		Panola	41.2		Yalobusha	41.8
Humphreys	43.3		Pearl River	47.6		Yazoo	43.8
Issaquena	43.8						

Note – These data interpolated or extrapolated from Figure 20 of Hydrometeorological Report No. 51, Probable Maximum Precipitation Estimates, United States East of 105th Meridian, Office of Hydrology, National Weather Service, U.S. Department of Commerce, NOAA, June 1978. Consideration shall be given to updated National Weather Service references applicable to the location of the dam site as data becomes available.

A-2