CEII VERSION

EMERGENCY ACTION PLAN

HEBGEN DEVELOPMENT

Missouri-Madison Project No. 2188-09

NATDAM-MT00134

Hydro Generation
11 East Park
Butte, MT 59701

December 18, 2019

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EAP Signatures

PART I: EAP INFORMATION

A. Summary of EAP Responsibilities

Tables A.1 and A.2 provide brief summaries of broad Emergency Action Plan (EAP) responsibilities and Northwestern Energy (NWE) responsibilities respectively, as a general reference for implementing this EAP. Additional details on procedures and general responsibilities for activation of this EAP are provided in Sections E and F, respectively, later in this document.

Table A.1: HEBGEN EAP RESPONSIBILITY SUMMARY

Northwestern Energy (NWE)	1. Detect, verify, and assess emergency conditions at the dam 2. If appropriate, evacuate area immediately below the dam 3. Notify emergency management and regulatory agencies 4. Notify downstream and upstream dams 5. Take corrective actions 6. Issue condition status reports 7. Declare termination of the emergency
County Emergency Services	1. Receive NWE condition status reports 2. Notify respective county Disaster and Emergency Services (DES) Coordinator(s) 3. Notify Public within respective counties, as necessary 4. Conduct evacuation from inundation areas within respective counties, if required. All evacuation activities will be coordinated by the respective County Sheriff 5. Provide mutual aid between counties if requested and able
City/Local Emergency Services	1. Receive NWE condition status reports 2. Notify Public within respective cities/local vicinities, as necessary 3. Conduct evacuation from inundation areas within respective localities, if required
Montana Disaster and Emergency Services (DES)	1. Receive condition status reports from NWE and/or respective county sheriffs 2. Contact the Governor's office 3. Be prepared to offer assistance to local and county officials
US National Weather Service (Great Falls)	1. Receive NWE condition status reports 2. Issue flood warnings and work with county sheriffs for Emergency Alert System (EAS) activation to supplement EAP notifications 3. Provide additional advanced warning to downstream areas

Table A.2: NORTHWESTERN ENERGY RESPONSIBILITIES SUMMARY

NWE Observer/Plant Operator NWE Plant O&M Supervisor	1. Detect and confirm incident at the dam 2. Determine emergency level 3. Make calls on notification flowchart 4. If appropriate, evacuate area immediately downstream of the dam 5. Coordinate with HSO and Engineering on emergency operations/procedures 6. Implement emergency operations/procedures 7. Provide regular status updates to HSO or senior management
Hydro System Operator (HSO) – Generation Control Center	1. Detect incident from alarms 2. Confirm incident via camera systems, if available 3. If no one is on-site, determine emergency level and dispatch operator to site 4. Make calls on notification flowchart 5. Coordinate with Operator and Engineering on emergency operations/procedures 6. Coordinate operations with upstream and downstream dams 7. Provide regular status updates to senior management
Hydro Operations – Supervisor On-Call	1. Make timely contact with each county sheriff/911 center on notification flowchart and clearly communicate situation at the dam 2. Support Operator and HSO, as appropriate 3. Receive status updates from HSO, Operator, or senior management 4. Provide regular status updates, as appropriate
NWE Superintendent, Hydro O&M	1. Support Operator and HSO on emergency level 2. Make calls on notification flowchart 3. Determine emergency operation and construction procedures 4. Coordinate with HSO on emergency operations/procedures 5. Dispatch engineers and construction crews, as required 6. Dispatch engineer as technical liaison to Emergency Operations Center 7. Provide regular status reports to senior management
NWE Chief Dam Safety Engineer	1. Make calls on notification flowchart 2. Initiate periodic status report conference calls with dam site, HSO, engineering, and corporate communications 3. Provide regular status reports to Emergency Operations Center 4. Coordinate with upper management 5. Coordinate with corporate communications staff and liaison at Emergency Operations Center
NWE Lead Resource Coordinator	1. Make calls on notification flowchart 2. Support HSO, as appropriate 3. Receive regular status updates 4. Provide regular status updates, as appropriate
NWE Director of Corporate Communications	1. Dispatch public relations staff, as appropriate 2. Participate in periodic status report conference calls with dam site, HSO, engineering, and management 3. Provide input to staff on emergency communications 4. Represent NWE to media

B. Notification Flowcharts

Notification flowcharts are provided on the following pages for each of the four color coded dam safety emergency level categories listed below:

Imminent Failure – Time has run out and the dam has failed, is failing, or is about to fail.

Potential Failure – Conditions are present at the dam that could lead to a failure.

Non-Failure – Incident at the dam that will not by itself, lead to a failure, but requires investigation by and notification of internal and/or external personnel.

High Flow – Flooding is occurring on the river system, but there is no apparent threat to the integrity of the dam.

Revised 12/18/2019

HEBGEN DEVELOPMENT

MISSOURI-MADISON PROJECT NO. 2188-09

WARNING FLOWCHART/NOTIFICATION FLOWCHART

IMMINENT FAILURE

THIS PROCEDURE TO BE IMPLEMENTED WHEN THE DAM HAS FAILED, IS FAILING, OR IS ABOUT TO FAIL

THIS STEP APPLICABLE DURING PERIODS WHEN DAM IS UNATTENDED
HYDROMET DAM FAILURE ALARM MODEM CALLS:

NWE HEBGEN ATTENDANT'S HOME: (406) 646-[redacted]
JEREMY BUTCHER'S CELL: (406) 788-[redacted]
NWE HYDRO SYSTEM OPERATOR (HSO): (406) 268-[redacted]
MADISON PLANT: (406) 533-[redacted]
NWE HYDRO SYSTEM OPERATOR (HSO) CELL: (406) 241-[redacted]

(DEPENDING ON THE SEVERITY OF THE EMERGENCY, THE PLANT OPERATOR(S) SHALL HAVE THE OPTION OF MAKING INITIAL CONTACT WITH THE GALLATIN COUNTY SHERIFF; THEN CONTACTING THE HYDRO SUPERVISOR ON-CALL)

NWE ASSISTANT RESERVOIR ATTENDANT
BRET PEARSON
HEBGEN DAM OFFICE: (406) 548-[redacted]
CELL: (406) 640-[redacted]
HOME: (406) 646-[redacted]

NWE PLANT FOREMAN
KURT KELLER
PLANT: (406) 533-[redacted] **OR** (406) 682-[redacted] **OR**
CELL: (406) 647-[redacted]

OPERATORS
DAN CELL: (406) 490-[redacted] DAVID CELL: (406) 490-[redacted]
MITCH CELL: (406) 490-[redacted]

MADISON OPERATOR ACTIVATE CAMPGROUND SIRENS

CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
CHANNEL
[redacted]

(OPERATOR MAY ASK HSO TO MAKE HIS CALLS)

(1)

NWE HYDRO OPERATIONS,
SUPERVISOR ON-CALL
REFER TO ON-CALL SCHEDULE **OR**
CALL HYDRO SYSTEMS OPERATOR (HSO) FOR SUPERVISOR ON-CALL

(2)

NWE HYDRO SYSTEM OPERATOR (HSO)
GENERATION CONTROL CENTER
(406) 268-[redacted] **(24 HR)**
CELL: (406) 241-[redacted]

(6)

NWE LEAD RESOURCE COORDINATOR
JAKE STAGNOLI
OFFICE: (406) 497-[redacted]
CELL: (406) 490-[redacted]

(5)

NWE DIRECTOR HYDRO O&M
JEREMY CLOTFELTER
OFFICE: (406) 268-[redacted]
CELL: (406) 868-[redacted]
HOME: (406) 467-[redacted]

(1)

NATIONAL WEATHER SERVICE
GREAT FALLS, MONTANA
(406) 952-[redacted] **(24 HR)**

(2)

PUBLIC RELATIONS SPECIALIST
JO DEE BLACK
OFFICE: (406) 497-[redacted]
CELL: (406) 788-[redacted]
(866) 622-[redacted] **(24HR)**

(1)

WEST YELLOWSTONE POLICE DISPATCH
LOCAL: DIAL 911 or (406) 646-[redacted]

GALLATIN COUNTY SHERIFF - BRIAN GOOTKIN
BOZEMAN 911 DISPATCH CENTER
DISPATCH: (406)-[redacted] **(24 HR HIGH PRIORITY)**

DEPUTY SHERIFF IN WEST YELLOWSTONE
MATT STUBBLEFIELD
CONTACT THRU POLICE DISPATCH 911 **OR**
(406)-[redacted] (BOZEMAN DISPATCH) or CELL: (406)-[redacted]

(THIS POINT OF CONTACT WILL ASSUME RESPONSIBILITY FOR NOTIFYING GALLATIN COUNTY OFFICIALS HAVING DISASTER AND EMERGENCY SERVICES RESPONSIBILITIES)

(4)

ENNIS POLICE DEPARTMENT
JOHN MOORE: CELL: (406) 748-[redacted]
Town of Ennis: (406) 682-[redacted] (DAY TIME ONLY)

(2)

MADISON COUNTY SHERIFF
PHIL FORTNER
LOCAL: DIAL 911 **(24 HR)**
DISPATCH: (406) 843-[redacted] **(24 HR)**

(THIS POINT OF CONTACT WILL ASSUME RESPONSIBILITY FOR NOTIFYING MADISON COUNTY OFFICIALS HAVING DISASTER AND EMERGENCY SERVICES RESPONSIBILITIES)

(3)

BROADWATER COUNTY SHERIFF
WYNN MEEHAN
LOCAL DIAL 911
OFFICE: (406) 266-[redacted] **OR** (406) 266-[redacted] **(BOTH 24 HR)**

(THIS POINT OF CONTACT WILL ASSUME RESPONSIBILITY FOR NOTIFYING BROADWATER COUNTY OFFICIALS HAVING DISASTER AND EMERGENCY SERVICES RESPONSIBILITIES)

(1)

CAMPFIRE LODGE
JIM OR WENDIE SLATTERY
(406) 646-[redacted]
During winter months this number will forward calls to Wendie's cell

(2)

US FOREST SERVICE
CUSTER GALLATIN NATIONAL FOREST
JASON BREY – DISTRICT RANGER
Office: (406) 823-[redacted] or Work Cell: (406) 529-[redacted] **OR**
BRIAN THOMPSON: (660) 359-[redacted]

(WEST YELLOWSTONE SHERIFF: (406) 646-[redacted] OR 911)
*DILLON INTERAGENCY DISPATCH: (406) 683-[redacted]

(3)

US FOREST SERVICE
BEAVERHEAD-DEER LODGE NAT'L FOREST
MADISON RANGER DISTRICT
DALE OLSEN – DISTRICT RANGER
OFFICE: (406) 682-4253; CELL: (406) 925-[redacted]
*DILLON INTERAGENCY DISPATCH: (406) 683-[redacted]

(4)

US BUREAU OF LAND MANAGEMENT – ENNIS
CHRIS McGRATH
CELL: (406) 531-9173; OFFICE: (406) 682-[redacted] **OR**
CORNIE HUDSON: CELL: (406) 865-[redacted]

*DILLON INTERAGENCY DISPATCH: (406) 683-[redacted]

ALERT THE FOLLOWING RESERVOIRS OF THE SITUATION AND REQUEST THAT A COORDINATED DRAFT BEGIN OF EACH DOWNSTREAM RESERVOIR AND TO PREPARE FOR PASSING HIGH FLOWS

(7)

BROADWATER DAM
STATE OF MONTANA (DNRC)
POWERHOUSE CONTROL ROOM (406) 266-[redacted] **OR**
(406) 444-6659 (HELENA) **(BOTH ARE DAY TIME ONLY)**
(406) 498-[redacted] **(24 HR CELL) OR**
(406) 595-[redacted] OR (406) 600-[redacted]

(8)

CASPER CONTROL CENTER
US BUREAU OF RECLAMATION
(307) 234-[redacted] **OR** (307) 261-[redacted]
(BOTH 24 HR)
CASPER CONTROL CENTER WILL NOTIFY CANYON FERRY DAM

****NOTE: *DILLON INTERAGENCY DISPATCH IS NOT A 24/7 DISPATCH CENTER****

(1)

MONTANA DISASTER & EMERGENCY SERVICES
Duty Officer: (406) 324-[redacted] **(24 HR)**
(406) 431-[redacted] **(24 HR CELL)**

GOVERNOR'S OFFICE
STATE OF MONTANA
OFFICE: (406) 444-[redacted]

(2)

NORTHWESTERN ENERGY
GRID OPPERATIONS CONTROL CENTER
(24 HR.): (406) 494-[redacted] PRESS 1 FOR SCHEDULER **OR**
(406) 497-[redacted] PRESS 1 **OR** (406) 497-[redacted] PRESS 1

NORTHWESTERN ENERGY
BOZEMAN DIVISION
SUPERVISOR ON-CALL
(REFER TO ON-CALL SCHEDULE)

(9)

CHIEF DAM SAFETY ENGINEER
CARRIE HARRIS
OFFICE: (406) 497-[redacted]
CELL: (406) 490-[redacted]
2nd CELL: (406) 225-[redacted]

NOTE:
FOR VOICE MAIL OR ANSWERING MACHINE MESSAGES, REFER TO SECTION E.2.

FERC - PORTLAND
REGIONAL ENGINEER
DOUG JOHNSON
OFFICE: (503) 552-[redacted]
CELL: (253) 691-[redacted]
HOME: (503) 206-[redacted]
OR CALL
BRANCH CHIEF
KARL SWANSON
OFFICE: (503) 552-[redacted]
CELL: (503) 928-[redacted]

THIS DIAGRAM IS CURRENT FOR 2020 AND REFLECTS ALL CHANGES PER THE 2019 ANNUAL REVIEW, 12/18/2019.

NOTIFICATION WARNING EXAMPLE

"This is John Doe, Plant Operator for NWE at Hebgen Dam. I am calling to implement the Hebgen Dam EAP "Imminent Failure" Flowchart notification procedure on page 4 of the Plan. This is not a test! I repeat, this is not a test." Explain the failure circumstances and conclude with "Do you understand how to carry out your responsibilities according to the EAP?"

NOTE: SHERIFF AND DES SHALL BE RESPONSIBLE FOR PROVIDING EMERGENCY SERVICES TO NOTIFY AND EVACUATE AFFECTED RESIDENTS WITHIN THEIR JURISDICTIONAL AREA.

→ *(1), ETC. INDICATES ORDER OF CALLS*

HEBGEN DEVELOPMENT

Revised 12/18/2019

MISSOURI-MADISON PROJECT NO. 2188-09

WARNING FLOWCHART/NOTIFICATION FLOWCHART

POTENTIAL FAILURE

THIS PROCEDURE TO BE IMPLEMENTED WHEN CONDITIONS EXIST AT THE DAM THAT COULD LEAD TO A FAILURE

NWE ASSISTANT RESERVOIR ATTENDANT
BRET PEARSON
HEBGEN DAM OFFICE: (406) 548-[redacted]
CELL: 640-[redacted]
HOME: (406) 646-[redacted]

NWE PLANT FOREMAN
KURT KELLER
PLANT: (406) 533-[redacted] OR (406) 682-[redacted] OR
CELL: [redacted] 647-[redacted]

OPERATORS
DAN CELL: (406) 490-[redacted] DAVID CELL: (406) 490-[redacted]
MITCH CELL: (406) 490-[redacted]

NWE HYDRO OPERATIONS,
SUPERVISOR ON-CALL
REFER TO ON-CALL SCHEDULE OR
CALL NWE HYDRO SYSTEM OPERATOR (HSO)
FOR SUPERVISOR ON-CALL
(406) 268-[redacted] **(24 HR)**
CELL: (406) 241-[redacted]

WEST YELLOWSTONE POLICE DISPATCH
LOCAL: DIAL 911 or (406) 646-[redacted]

(2) **GALLATIN COUNTY SHERIFF - BRIAN GOOTKIN**
BOZEMAN 911 DISPATCH CENTER
DISPATCH: (406) 585-[redacted] **(24 HR HIGH PRIORITY)**

DEPUTY SHERIFF IN WEST YELLOWSTONE
MATT STUBBLEFIELD
CONTACT THRU POLICE DISPATCH 911 OR
(406) 585-[redacted] (BOZEMAN DISPATCH) or CELL: (406) 580-[redacted]

(3) **MADISON COUNTY SHERIFF**
PHIL FORTNER
LOCAL: DIAL 911 **(24 HR)**
DISPATCH: (406) 843-[redacted] **(24 HR)**

(1) **NWE DIRECTOR HYDRO O&M**
JEREMY CLOTFELTER
OFFICE: (406) 268-[redacted]
CELL: (406) 868-[redacted]
HOME: (406) 467-[redacted]

CASPER CONTROL CENTER
US BUREAU OF RECLAMATION
(307) 234-[redacted] **OR** (307) 261-[redacted]
(BOTH 24 HR)
CASPER CONTROL CENTER WILL NOTIFY CANYON FERRY DAM

(1)

CHIEF DAM SAFETY ENGINEER
CARRIE HARRIS
OFFICE: (406) 497-[redacted]
CELL: (406) 490-[redacted]
2nd CELL: (406) 225-[redacted]

(2)

FERC - PORTLAND
REGIONAL ENGINEER
DOUG JOHNSON
OFFICE: (503) 552-[redacted]
CELL: (253) 691-[redacted]
HOME: (503) 206-[redacted]
OR CALL
BRANCH CHIEF
KARL SWANSON
OFFICE: (503) 552-[redacted]
CELL: (503) 928-[redacted]

→ *(1), ETC. INDICATES ORDER OF CALLS*

NOTE:
FOR VOICE MAIL OR ANSWERING MACHINE MESSAGES, REFER TO SECTION E.2.

NOTE:
AN ASSESSMENT OF THE SITUATION WILL DETERMINE WHETHER A COORDINATED DRAFT OF DOWNSTREAM RESERVOIRS IS REQUIRED, AND IF EMERGENCY OFFICIALS SHOULD BE NOTIFIED.

THIS DIAGRAM IS CURRENT FOR 2020 AND REFLECTS ALL CHANGES PER THE 2019 ANNUAL REVIEW, 12/18/2019.

NOTE:
IF THE SITUATION WERE TO DEVELOP INTO A SITUATION OF IMMINENT FAILURE, THE "WARNING FLOWCHART" FOR IMMINENT FAILURE SHOULD BE IMPLEMENTED

HEBGEN DEVELOPMENT

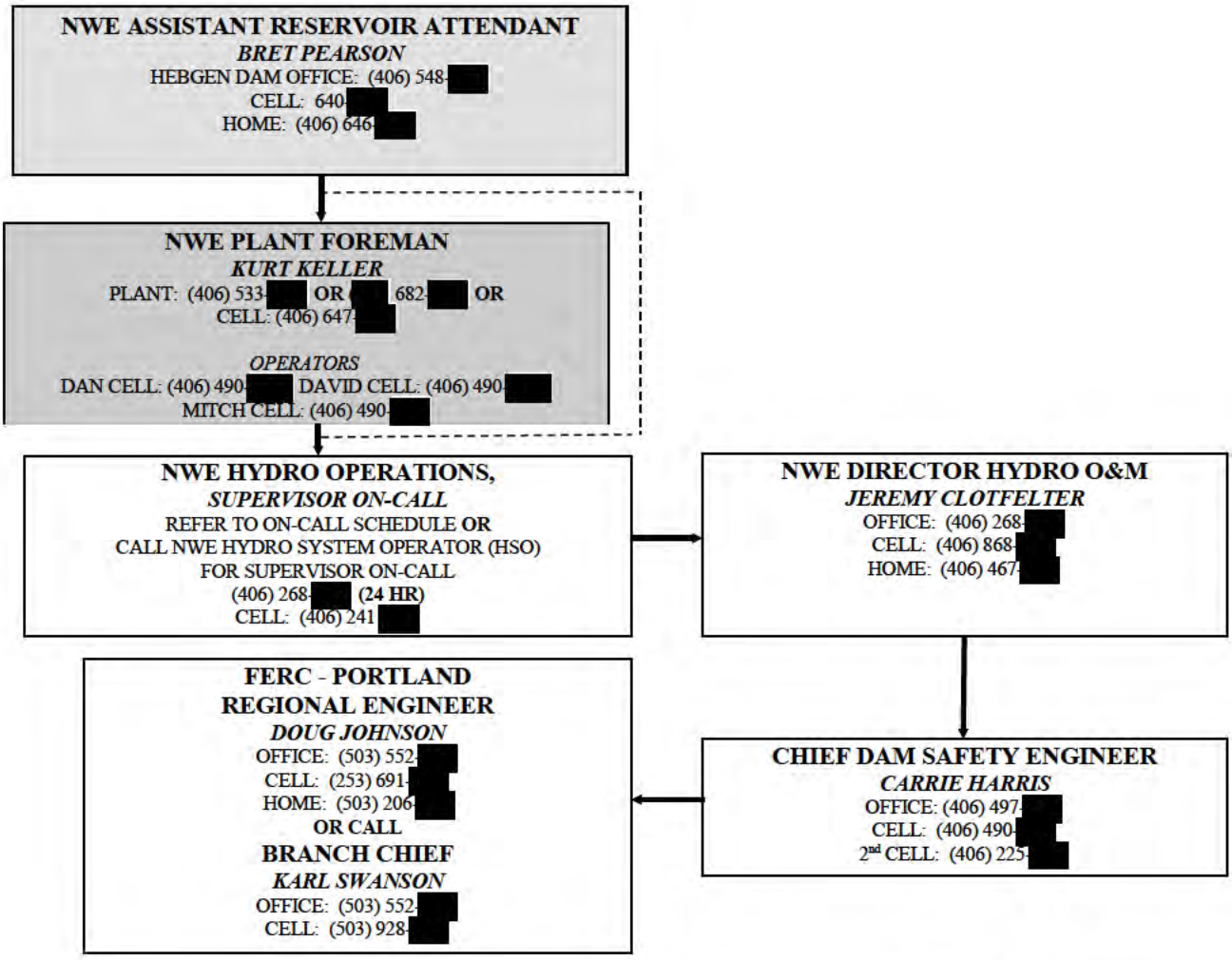
Revised 12/18/2019

MISSOURI-MADISON PROJECT NO. 2188-09

WARNING FLOWCHART/NOTIFICATION FLOWCHART

NON-FAILURE

THIS PROCEDURE TO BE IMPLEMENTED WHEN CONDITIONS EXIST AT THE DAM THAT COULD LEAD TO A FAILURE



NOTE:
FOR VOICE MAIL OR ANSWERING MACHINE MESSAGES, REFER TO SECTION E.2.

NOTE:
AN ASSESSMENT OF THE SITUATION WILL DETERMINE IF EMERGENCY OFFICIALS SHOULD BE NOTIFIED.

NOTE:
IF THE SITUATION WERE TO DEVELOP INTO A SITUATION OF POTENTIAL FAILURE OR IMMINENT FAILURE, THE "WARNING FLOWCHART" FOR POTENTIAL FAILURE OR IMMINENT FAILURE SHOULD BE IMPLEMENTED

THIS DIAGRAM IS CURRENT FOR 2020 AND REFLECTS ALL CHANGES PER THE 2019 ANNUAL REVIEW, 12/18/2019.

HEBGEN DEVELOPMENT

Revised 12/18/2019

MISSOURI-MADISON PROJECT NO. 2188-09

WARNING FLOWCHART/NOTIFICATION FLOWCHART

HIGH FLOW

*THIS PROCEDURE IS TO BE IMPLEMENTED WHEN **HIGH FLOW** OR FLOODING WILL OCCUR DOWNSTREAM BECAUSE OF NWE OPERATING PROCEDURES DURING RIVER LEVELS THAT ARE ALREADY AT OR NEAR FLOOD STAGE. (THE FLOOD STAGE IS UNDETERMINED BUT LIMITED BY A QUAKE LAKE OUTFLOW OF 3500 CFS.)*

NOTE:
IT IS IMPORTANT TO STRESS THAT THIS IS AN INFORMATION-CALL ONLY, AND THAT THE DAM IS NOT IN DANGER OF FAILURE.

NWE LEAD
RESOURCE COORDINATOR
JAKE STAGNOLI
OFFICE: (406) 497-[redacted]
CELL: (406) 490-[redacted]

PUBLIC RELATIONS SPECIALIST
JO DEE BLACK
OFFICE: (406) 497-[redacted] CELL: (406) 788-[redacted] (866) 622-[redacted] **(24HR)**

CAMPFIRE LODGE
JIM OR WENDIE SLATTERY
(406) 646-[redacted]
During winter months this number will forward calls to Wendie's cell

US FOREST SERVICE
BEAVERHEAD-DEER LODGE NAT'L FOREST
MADISON RANGER DISTRICT
DALE OLSEN – DISTRICT RANGER
OFFICE: (406) 682-[redacted] CELL: (406) 925-[redacted]

*DILLON INTERAGENCY DISPATCH: (406) 683-[redacted]

MADISON COUNTY SHERIFF
PHIL FORTNER
LOCAL: DIAL 911 **(24 HR)**
DISPATCH: (406) 843-[redacted] **(24 HR)**

BROADWATER COUNTY SHERIFF
WYNN MEEHAN
LOCAL DIAL 911
OFFICE: (406) 266-[redacted] **OR** (406) 266-[redacted] **(BOTH 24 HR)**

NWE HYDRO OPERATIONS,
SUPERVISOR ON-CALL
REFER TO ON-CALL SCHEDULE **OR**
CALL NWE HYDRO SYSTEM OPERATOR (HSO)
FOR SUPERVISOR ON-CALL
(406) 268-[redacted] **(24 HR)**
CELL: (406) 241-[redacted]

CHIEF DAM SAFETY ENGINEER
CARRIE HARRIS
OFFICE: (406) 497-[redacted]
CELL: (406) 490-[redacted]
2nd CELL: (406) 225-[redacted]

NOTE: *DILLON INTERAGENCY DISPATCH IS NOT A 24/7 DISPATCH CENTER

(1) **NATIONAL WEATHER SERVICE**
GREAT FALLS, MONTANA
(406) 952-[redacted] **(24 HR)**

(2)

(3) (4) **US FOREST SERVICE**
CUSTER GALLATIN NATIONAL FOREST
JASON BREY – DISTRICT RANGER
Office: (406) 823-[redacted] or Work Cell: (406) 529-[redacted] **OR**
BRIAN THOMPSON: (660) 359-[redacted]

(WEST YELLOWSTONE SHERIFF: (406) 646-[redacted] OR 911)
*DILLON INTERAGENCY DISPATCH: (406) 683-[redacted]

(5)

(6) **US BUREAU OF LAND MANAGEMENT – ENNIS**
CHRIS McGRATH
CELL: (406) 531-[redacted] Office: (406) 682-[redacted] **OR**
CORNIE HUDSON: CELL: (406) 865-[redacted]

DILLON INTERAGENCY DISPATCH: (406) 683-3975

(7) **WEST YELLOWSTONE POLICE DISPATCH**
LOCAL: DIAL 911 or (406) 646-[redacted]

GALLATIN COUNTY SHERIFF - BRIAN GOOTKIN *BOZEMAN 911 DISPATCH CENTER*
DISPATCH: (406) 585-[redacted] **(24 HR HIGH PRIORITY)**

DEPUTY SHERIFF IN WEST YELLOWSTONE
MATT STUBBLEFIELD
CONTACT THRU POLICE DISPATCH 911 **OR**
(406) 585-[redacted] (BOZEMAN DISPATCH) or CELL: (406) 580-[redacted]

(8)

(9)

(10)

(11)

FERC - PORTLAND
REGIONAL ENGINEER
DOUG JOHNSON
OFFICE: (503) 552-[redacted]
CELL: (253) 691-[redacted]
HOME: (503) 206-[redacted]
OR CALL
BRANCH CHIEF
KARL SWANSON
OFFICE: (503) 552-[redacted]
CELL: (503) 928-[redacted]

→ *(1), ETC. - INDICATES ORDER OF CALLS*

THIS DIAGRAM IS CURRENT FOR 2020 AND REFLECTS ALL CHANGES PER THE 2019 ANNUAL REVIEW, 12/18/2019.

C. Statement of Purpose

This EAP has been prepared in accordance with the requirements of the Federal Energy Regulatory Commission (FERC) Order Number 122, issued on January 21, 1981 (Federal Register/Volume 46, No. 18, January 28, 1981) and revised in accordance with the provisions of Section 12.22(a.)(1), on April 5, 1985 (issued February 22, 1988, with addendum issued September 9, 1988). Since that time, an initiative was developed to provide national (Federal, state, local) consistency in the content of Emergency Action Plans at dams throughout the country. As a result, the *ad hoc* Interagency Committee on Dam Safety (ICODS) prepared and approved Federal guidelines for emergency action planning at dams which was published by the Federal Emergency Management Agency (FEMA) in October 1998. The FEMA guidelines were again revised and published in July 2013. As a result of the latest Federal initiative revisions, the FERC Guidelines Chapter 6 – Emergency Action Plans were further revised and the final revisions were published in July 2015.

This EAP is submitted by NWE as Licensee for the Hebgen Development on the Missouri River, under Missouri-Hebgen FERC Licensed Project No. 2188(09), National Inventory of Dams Number (NATDAM) No. MT00134.

The purpose of this EAP is to provide maximum early warning to all persons involved in the unlikely event of a failure (catastrophic or otherwise) of the dam or other water retaining structures at the Hebgen Development. In addition to providing maximum early warning, our objective is to minimize or eliminate danger to all people and/or property downstream of the project.

Through consideration of both "fair weather" and "major flood" failure modes and their consequences, we have been able to identify areas which may be affected and have based this plan on notification of inhabitants, property owners and recreationists through various public safety agencies and authorities.

It is emphasized that the probability of an emergency of the magnitude considered in this plan is extremely remote and it does not imply that we have concerns about the integrity of the project. The dam is inspected regularly by NWE Operations and Engineering Personnel, annually by FERC engineers, and at five-year intervals by FERC approved independent engineering consultants.

D. Project Description

The Hebgen Development of the Missouri-Madison Project FERC No. 2188(09), NATDAM No. MT00134 is located on the Madison River, a tributary of the Missouri River, in Gallatin County, Montana, near the western boundary of Yellowstone National Park and 15 miles north of West Yellowstone, MT. The 386,184 acre-foot reservoir (Hebgen Lake), 17 miles long and up to 3 miles wide, stores and regulates the flow from a 905-square mile drainage area at the headwaters of the river system on which NWE operates eight hydroelectric plants. Elevations of the tributary area vary from 6,500 to 10,300 feet (see Figure D.1). On August 17, 1959, this dam survived one of the most severe earthquake shocks (7.5 on the Richter scale) that a fill dam in the United States has ever been exposed to.

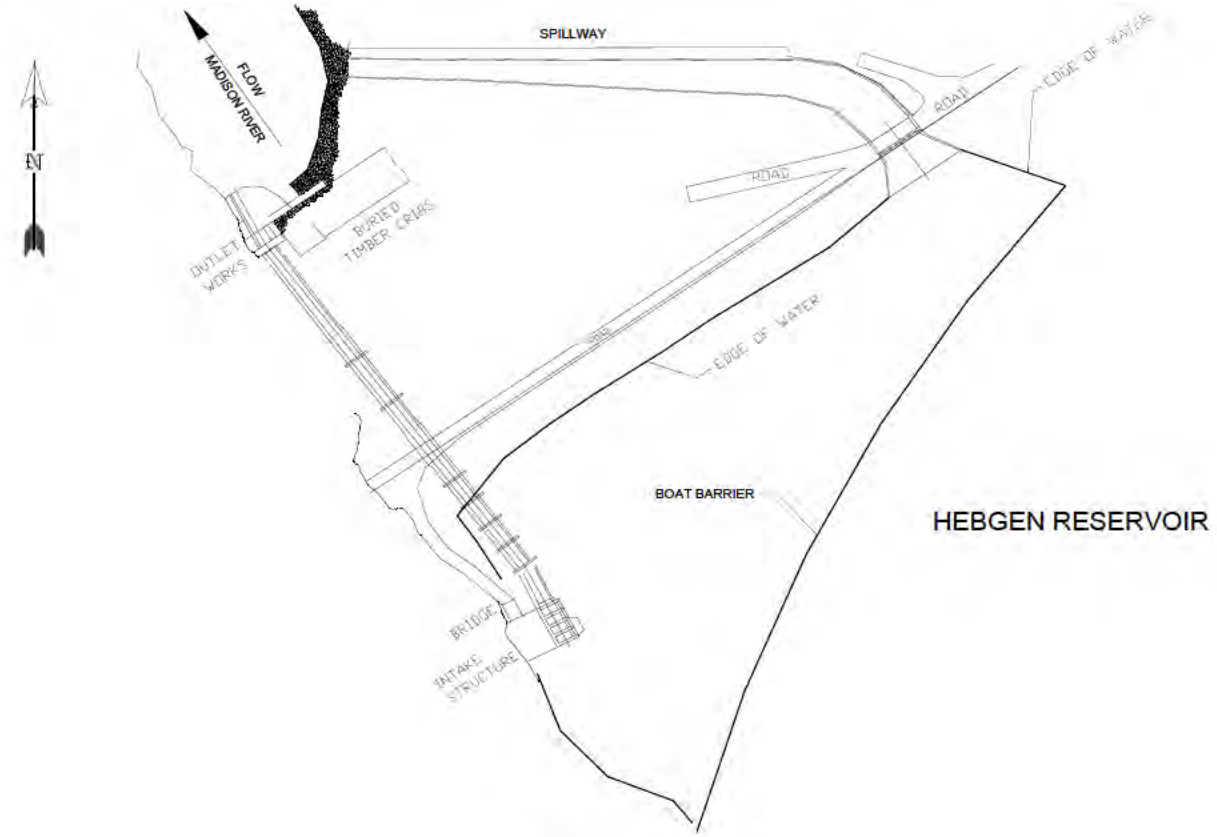
The Hebgen Development consists of an earth and rock-fill dam with a reinforced concrete corewall and a concrete spillway flume that was originally completed in 1915. Originally there was a small powerhouse at the site that produced only enough power for the dam and campsite operations. These generating units and the powerhouse were eliminated in 1966 when a 12.5 kV electric distribution line was extended to the dam from Ennis, Montana.

Dam: The dam is an earth and rock-filled gravity section, 721 feet long, with a maximum height of 87.5 feet (see Figure D.1); the maximum base width is 573 feet and it is 12 feet wide at crest. A concrete core wall extends the entire length of the dam, having a maximum height of 113 feet, a width of 16 feet at the bottom and three feet at the top.

The spillway is a side-channel type, 597 ft. long, located on the right bank of the river. It has a 50-foot-wide, broad-crested weir inlet with vertical slide gates that discharge into a tapered concrete chute that curves back to the river. The approach apron to the inlet is a concrete section with vertical sidewalls. The apron is 91 ft. 6 in. wide at the upstream end then tapers to 50 ft. wide at the inlet. The inlet is controlled by four bays formed by steel gate guides and a central concrete pier. Control is provided by four steel slide gates operated by electric gate actuators.

The original 1911 era intake structure was rehabilitated in 2010-2016 to provide a low level reservoir outlet robust enough to withstand the Maximum Credible Earthquake. The new structure is constructed within the shell of the original structure. The overall outside dimensions are 47 ft. long by 25 ft. wide and 79 ft. tall. The original three foot-thick concrete back wall of the intake is connected with epoxy bonded dowels to the new, 2 foot-thick by 27 foot-long reinforced concrete back wall. The intake structure is anchored to and through the mass concrete behind with 9 post-tensioned multi-strand anchors, and the mass concrete behind the intake is subsequently anchored to the underlying rock with an array of 20 post-tensioned multi-strand anchors. The intake has two gates in the front face for normal and emergency releases that are both protected by a trash rack that extends the full height of the structure. A third gate called the guard gate is positioned at the upstream end of the outlet pipe.

Description of Upstream and Downstream Areas and Topography: Hebgen Lake is fed by numerous rivers and streams, with the largest being the Madison River and South Fork of the Madison River. Many of the tributaries draining into Hebgen Lake have their origins in Yellowstone National Park. With the exception of the upper end of the lake, where the terrain is fairly flat, the reservoir is bounded on three sides by mountainous terrain rising up to 2,500 feet above the surface of the lake. The slopes surrounding the lake do not exhibit any evidence of instability, which could be expected to contribute to or aggravate a dam failure.



NOT TO SCALE

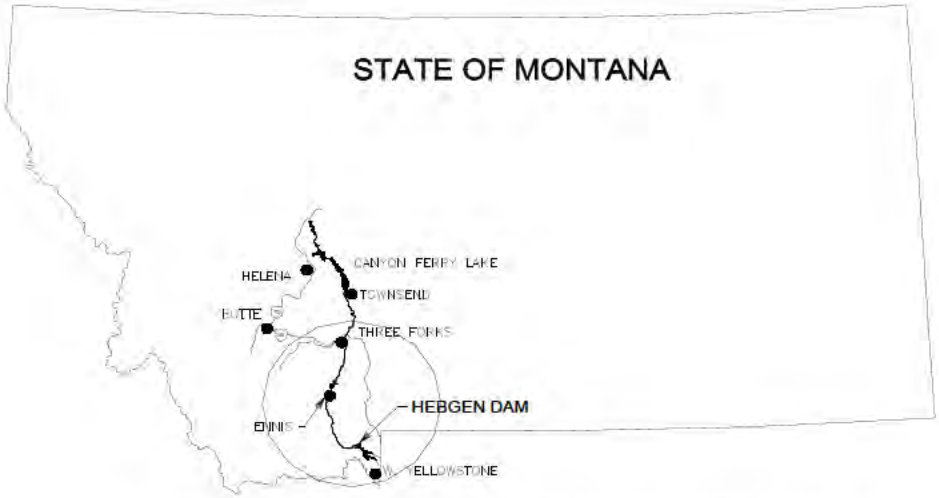


Figure 1

Vicinity Map for Hebgen Dam

12-1-99

The flow that exits the dam is called the Madison River. Cabin Creek and Beaver Creek are among the several small tributaries that enter the Madison River within the first three miles downstream from the dam. Approximately two miles below the dam, the river enters Quake Lake that was formed when a portion of the mountain slid into the valley floor during the August 17, 1959 earthquake. Quake Lake is approximately four miles long. A short distance below Quake Lake, the Madison River enters a wide valley. The Madison River flows in a well-defined channel along the left side of this valley. Much of the area on the right side of the valley floor is a bench elevated above the river. Numerous small tributaries enter the Madison River between Quake Lake and Ennis Lake, with the largest being the West Fork of the Madison River, which enters 17.8 miles downstream of Hebgen Dam.

The Madison River flows into Ennis Lake north of the town of Ennis, Montana, approximately 55 miles downstream of Hebgen Dam. Madison Dam is an overflow, reinforced concrete over rock-filled timber-crib structure. Water is diverted through a 13-foot diameter pipeline, 7,500 feet to the powerhouse. Madison Dam and Powerhouse are located at the upper end of the Bear Trap Canyon, a steep rugged canyon for approximately 11 miles downstream of Madison Dam, which contains sections of white water that are highly regarded by floaters and kayakers. After the canyon, the river flows through a well-drained channel in a valley of moderate terrain until it joins the Gallatin and Jefferson Rivers to form the Missouri River near the town of Three Forks. The Missouri River flows for approximately 19 miles until it enters the reservoir behind Broadwater Dam and then another 19 miles where it enters Canyon Ferry Reservoir, which is approximately 142 miles downstream of Hebgen Dam. Canyon Ferry Reservoir is an extremely large storage reservoir operated by the US Bureau of Reclamation.

E. EAP Response Process

In general, when an unusual or emergency incident is detected at the dam there are four steps that should be followed, which make up the EAP response process:

- Step 1: Incident Detection, Evaluation, and Emergency Level Determination
- Step 2: Notification and communication
- Step 3: Emergency actions
- Step 4: Termination and follow-up

The following sections describe the procedures that will be followed during activation of this EAP.

1. Incident Detection, Evaluation, and Emergency Level Determination

A. Detection

Observations by the Operator to Assist in Detecting that a Potential Failure is Developing

1. Any noticeable settlement, cracking, sloughing of slopes or bulging of structures or embankments or other indications of movement such as binding of gates or other operating mechanisms.
2. Any noticeable increase in the quantity or change in the appearance of seepage through the dam or abutments or the appearance of new leakage not observed previously.
3. Dam failure alarms play an important role in the early detection of dam emergencies. The Hebgen project utilizes a Sutron dam failure alarm system. To avoid redundancy in this Plan, the description of this system is included only in Section G.1. Please refer to that section for a full operational description of the system.

The dam and appurtenant structures are inspected on a weekly basis (weather permitting) by the NWE Madison Dam crew. There is no formal checklist, however, the following items are visually checked:

- Settlement, cracking or sloughing of slopes indicating movement.
- Bulging of structures or embankments indicating movement.
- Increase in quantity or change in appearance of seepage through the dam or abutments (as measured and observed every 15 days - weather permitting - during weir readings at the "tunnel weir" and "spring weir" downstream of the dam).
- Appearances of new leakage not previously observed.
- Condition of the boat barrier across the spillway.
- Abnormalities upstream and downstream of the dam.
- Security, storm damage, vandalism.
- Check the intake screen condition and for debris.

NWE personnel making the inspections will indicate any abnormalities under the "NOTES" section of the Plant Weekly Operating Log Sheet. If everything was found to be normal, that will also be noted and the individual who made the inspection will sign the log sheet.

B. Evaluation

As discussed above, the dam and appurtenant structures will be visually inspected on a regular basis by NWE personnel. The dam and appurtenant structures are also inspected periodically by NWE Engineering Personnel, annually by FERC engineers, and every five years by FERC-approved independent

engineering consultants. Any detection of an abnormal condition such as those indicated above will be immediately reported to the Chief Dam Safety Engineer. The information received by the Chief Dam Safety Engineer will be evaluated and a determination will be made if remedial actions are needed. It is at this point in time a decision will be made to activate the appropriate EAP Notification. NWE Engineering Personnel will dictate what mitigating actions should be taken and if necessary, a team of Operations and/or Engineering Personnel will be dispatched to the site for further investigation. The time factor and means of transportation to the site will depend on the severity of the situation.

In the case of a slowly developing failure, regular inspections of the dam and appurtenant structures help minimize the time from the onset of the emergency to awareness of the emergency.

C. Emergency Level Determination

The four dam safety emergency level categories that could occur are defined as follows:

Imminent Failure – When time has run out and the dam has failed, is failing, or is about to fail.

Examples include failure caused by terrorism, sabotage, major earthquake, etc.

Potential Failure – A situation where a failure may develop, but preplanned actions taken during certain events (major flood, earthquake, evidence of piping, etc.) may prevent or mitigate failure. Time permits a qualified engineer to inspect the dam and assess the potential failure situation.

Examples include rising reservoir levels approaching the top of the non-overflow section of the dam, transverse cracking of an embankment, or a verified bomb threat.

Non-Failure – A situation where there is an event at the dam that WILL NOT, by itself, lead to a failure, but requires investigation and notification of internal and/or external personnel.

Examples include new or varied seepage/leakage on the downstream side of the dam, presence of unauthorized personnel at the dam, or malfunction of a gate.

High Flow – A situation where the waterway is at or near flood stage; however, there is no apparent threat to the integrity of the dam. The primary purpose of this emergency level is to provide information on NWE's operational procedures that may aggravate downstream flooding and to make sure all parties understand the dam is NOT in danger of failing.

D. High Flow Operations

Operations of all NWE Hydro projects are unique and vary from plant to plant. Furthermore, operations at any given plant vary based upon current plant conditions (power demands, maintenance schedules, etc.) and not solely upon river flows. A detailed description of standard operating conditions at the Hebgen Project can be found in the Operations & Maintenance folder on the NWE network shared drive. The following description of plant operations during high river flows is intended as a probable operation scenario for Hebgen Dam.

The Hebgen project is operated and maintained remotely by the NWE Madison Dam Operators. For surveillance purposes NWE employs Assistant and Relief Assistant Reservoir Attendants who reside a

short distance from the dam. A remotely-controlled surveillance camera is also installed on Hebgen Dam, and is utilized by the Madison crew for remote surveillance of the dam and outlet structures.

Communication with the Hebgen/Madison Operator and Hydro System Operator shall be maintained during periods of high flow or in the event of large outflow changes. The Hebgen/Madison Operator and the Hydro System Operator (HSO) in Great Falls monitor the flow in the Madison River headwaters and main stem including gauging stations near West Yellowstone, below Hebgen dam, at the Madison River gauge at Kirby Ranch near Cameron, at Madison Dam, and at the USGS Missouri River Toston gauge. The water flow information from these gauging stations gives the Madison Operators advance notice of actual high flows and allows the Plant Operator to make the necessary adjustments at Hebgen Dam.

The Hebgen Dam inlet structure vertical slide gate has a hydraulic capacity of approximately 3,800 cfs. Standard operating procedures are to manage flows up to this capacity through the inlet structure. As flows continue to rise during high flow events spillway gates are then to be opened to handle additional flows. There is no opening sequence for the spillway gates. Once the four gates are opened for maximum spill crews work to keep the gates clear of debris. In this case a Madison Crew Operator would be stationed at Hebgen Dam to monitor conditions and provide NWE and other EAP contacts apprised of flow and dam conditions. Operation procedures, potential flooding impacts, and EAP notifications during high flow events are summarized in Table E.1 below.

Early and accurate warning of affected upstream and downstream inhabitants and property owners is important during high flow events. The National Weather Service (NWS) is tasked with issuing such warnings to aid property owners in protecting life and property. Furthermore, during major flooding events the NWS works with the local Sheriff's for the activation of the Emergency Alert System (EAS). While NWE has no jurisdictional authority to issue such warnings they do work closely with the NWS during high flow events to provide the most accurate flow information through each respective plant. Activation of the Hebgen Dam EAP is not solely dependent upon high river flows and NWE will not provide additional warnings and or notifications outside of the EAP notification flowcharts on pages 4-7, and discussed below, as they relate to high flow events.

High Flows: Flood stage at any given gauge location is determined by the NWS and USGS and is not established for all stream gauging locations. The term flood stage is defined as the river stage at which flows overtop the river banks and begin to cause damage to property within that reach of the river. Once a river reaches flood stage, the flood severity categories used by the NWS include minor, moderate, and major flooding. Each category has a definition based on property damage and public threat. Further warning definitions, as well as current NWS issued warnings, can be found on the NWS Advanced Hydrologic Prediction Service website at: http://water.weather.gov/ahps2/index.php?wfo=tfx.

Flood Stage in the Madison River near the Hebgen project has not been determined. For the Hebgen project high flow notifications such as for the High Flow Flowchart occur when outflows in the Madison River from Quake Lake reach or exceed 3,500 cfs, as measured at the USGS Madison River Kirby Ranch gauge near Cameron. Flows of 3,500 cfs lead to potential degradation of the natural dam at Quake Lake. The maximum outflow from Hebgen occurred during a 1959 earthquake, which formed Quake Lake, and peaked at a reported 10,200 cfs.

Average Flows: NWE works in cooperation with the USGS to maintain the USGS 6038500 Madison River below Hebgen Dam River Gauge. The Hebgen project impounds roughly 386,184 acre-feet at the maximum normal pool operating level of 6534.87 ft. Average daily river flows through Hebgen dam range from approximately 950 cfs to over 2500 cfs with the most recent high flow event reaching 3,050 cfs in 2011. Hebgen Dam is a "storage only" facility that stores and regulates the flow from a 905 square mile drainage area. The intake structure controls normal operating flows with a single 13-ft by 9-ft vertical slide gate. Flows out of the structure are limited by the capacity of the original 12-foot diameter wood stave, concrete encased discharge pipe. The dam spillway is a reinforced concrete broad-crested weir 47-ft wide with an inclined tapered concrete chute, 677-feet long. Flow in the spillway is controlled by four vertical slide gates. Each gate can release about 3,200 cfs bringing the total maximum spillway discharge capability to 12,800 cfs.

High Flow EAP Notifications: During high flows, notifications will be made according to the EAP as follows:

1. High Flow – In the event the outflows from Quake Lake are at or near 3,500 cfs, as measured at the USGS Madison River Kirby Ranch gauge near Cameron, and it becomes necessary to operationally put additional flow into the waterway, that may increase flooding, the EAP requires the operator notify the NWE Lead Resource Coordinator who will notify first the National Weather Service (NWS) and then the appropriate downstream agencies (see page 7). It is important to stress to all parties notified that this is for their information only and the dam is NOT in danger of failing.

2. Non-Failure – The Plant Operator will activate the Non-Failure EAP Flowchart for any incident at the dam that will not by itself, lead to a failure, but requires investigation and notification of internal and/or external personnel. Examples include: with all gates open and stanchions tripped, the reservoir elevation approaches overtopping non-overflow sections of the dam; new or abnormally varied seepage/leakage on the downstream side of the dam; presence of unauthorized personnel at the dam; or malfunction of a gate. For these types of non-failure events, the operator will make the internal notifications as indicated on page 6. Once contacted, the Supervisor-on-Call will notify the Superintendent, Hydro O&M. The Chief Dam Safety Engineer after being notified by the Superintendent, Hydro O&M, will notify the FERC Regional Office (Portland) of the Non-Failure activation. The appropriate Operations and Engineering Personnel will promptly respond in assessing the situation.

3. Potential Failure – A potential failure situation occurs when a failure may develop, but preplanned actions taken during certain events (major flood, earthquake, evidence of piping, etc.) may prevent or mitigate failure. Time permits a qualified engineer to inspect the dam and assess the potential failure situation. Examples include: rising reservoir levels approaching the top of the non-overflow sections of the dam; transverse cracking of an embankment; or a verified bomb threat. The Plant Operator will consider this a Potential Failure situation as defined by the EAP.

The Plant Operator will immediately notify the NWE Plant Foreman of the situation. The NWE Plant Foreman will make notifications according to the Potential Failure Flowchart (see page 5) (in the event the Plant Foreman is not readily available, the Plant Operator will be responsible for making this contact). Once notified, the Supervisor on Call will notify the Superintendent, Hydro O&M. The Chief Dam Safety Engineer after being notified by the Superintendent, Hydro O&M, will notify the FERC

Regional Office (Portland) of the Potential Failure activation. The appropriate Operations and Engineering Personnel will promptly respond in assessing the situation and take appropriate action. If the assessment indicates the situation represents a Potential Failure, appropriate action may consist of correcting the problem by use of materials and equipment. In the event that the operator or other NWE personnel feels that a situation is developing such that failure is imminent, the Plant Foreman, or Plant Operator in his absence, will immediately implement the notification flowchart for an Imminent Failure in accordance with the EAP.

4. Imminent Failure – The Imminent Failure flowchart will not be activated based upon river flows alone. This flowchart will be activated when time has run out and the dam has failed, is failing, or is about to fail. Examples include: failure caused by terrorism, sabotage, major earthquake; or flows or other conditions have led to the Imminent Failure of the dam.

The Plant Operator will immediately notify the NWE Plant Foreman of the situation. The NWE Plant Foreman will make notifications according to the Imminent Failure Flowchart (see page 4) (in the event the Plant Foreman is not readily available, the Plant Operator will be responsible for making this contact). Once notified, the Supervisor on Call will notify the Superintendent, Hydro O&M. The Chief Dam Safety Engineer after being notified by the Superintendent, Hydro O&M, will notify the FERC Regional Office (Portland) of the Imminent Failure activation.

Table E.1: SUMMARY OF HIGH FLOW OPERATIONS

Madison River Flow at Hebgen (cfs)	Operation Procedures	Potential Impacts	Notifications
< 300	Low flow operations with all flows able to pass through intake structure	None	None
300 to 3,000	Normal operations with intake structure gate up to 3,000 cfs passing outlet pipe. Spillway gates begin to be opened.	None	None
3,000 to 7,000	Spillway gates opened as increased need for spill raises. If inflow is projected to continue to increase, a Madison operator will be stationed at Hebgen Dam to monitor conditions.	Limited flooding of roads and houses near river downstream of the dam. Moderate to significant erosion at Quake Lake as flows exceed 3,500 cfs.	The "High Flow" flowchart is activated. NWS will be consulted as operational releases may increase flooding impacts downstream.
7,000 to 10,000	All spillway gates full open, project passing approximately 7,000 cfs with the reservoir at the Project Boundary and river levels rising. Operator will be stationed on-site 24-7.	Continued significant flooding at Quake Lake.	As conditions reach max spill capacity the "Non-Failure" or "Potential Failure" flowcharts may be activated based on the ability to maintain the reservoir level behind the dam. Maintain open communication with plan holders on flowcharts.
> 10,000	Removal of the spillway gates. Flows in levels exceeding the 3-feet of available free board (NWE datum elevation 6,543.00)	Continued significant flooding at Quake Lake.	Maintain open communication with Hebgen EAP Plan Holders Listed on the "Potential Failure" flowchart in the Hebgen EAP.

2. Notification and Communication

All notifications will be made in accordance with this EAP's Notification Flowcharts found in Section B. This section provides additional details and procedures for reference that may be followed during activation of the EAP for the different emergency levels. **These procedures are applicable to hours of daylight and darkness.**

Sample Communications: In times of emergency, clear and concise exchange of information is essential. Individuals responsible for notifying others of implementation of the EAP for either the "Imminent Failure" or "Potential Failure" conditions should include the following information in their communication message:

- Caller's name, position, and company or agency
- Caller's location
- Initiating (or carrying out) Imminent Failure Flowchart for Hebgen Dam EAP
- "This is **NOT** a test! I repeat, **NOT** a test!"
- Brief description of the situation or potential problem
- The time of the situation or potential problem
- Intended preventive or follow-up actions to be taken

A typical communication from the Plant Operator to the Gallatin County Sheriff might be as follows:

> "This is John Doe, Foreman or Plant Operator for NorthWestern Energy at Hebgen Dam. I am calling to implement the Hebgen Dam Emergency Action Plan "Imminent Failure Flowchart" notification procedure on page four of the EAP. This is **NOT** a test! I repeat, this is **NOT** a test!"
>
> "Hebgen Dam failed at approximately 6:15 a.m. Immediately prior to the failure, we had a full reservoir and outflows were at 1,000 cubic feet per second - about normal for this time of year. I will try to evacuate any individuals in the proximity of the dam."
>
> **"Do you understand how to carry out your responsibilities according to the EAP?"**

NOTE: In order to be sure that the person receiving your message understands what you have told him/her, and know how to proceed with the activation of the EAP, have them repeat your message back to you.

NOTE: It is important to record date, times and individuals that you have spoken to for verification later.

If you receive a notification that the EAP is being implemented, and are unsure about the authenticity of the call, call the point of contact back at the phone number listed in the EAP prior to continuing down the Imminent Failure or Potential Failure Flowchart(s).

When You Receive Voice Mail or an Answering Machine:

1. **Leave a Message** that tells the person you are calling:
    - Who you are;
    - That you are calling to inform them as part of the EAP notification process (test or actual event);

- That you are going to try contacting them through their secretary, receptionist, etc.; and
- That if you cannot reach them you are going to contact the next person in the notification flowchart.

2. **Follow the guidance on the person's Voice Mail message and attempt to have the person contacted as appropriate.**
3. **If the person is not available or you cannot get the secretary, receptionist, etc., call the next person identified on the notification flowchart. Remember - TIME IS OF THE ESSENCE!!!**
4. **DO NOT let the EAP notification process fail because of voice mail or an answering machine.**

NOTE: In the event contact cannot be made, continue down the flowchart until direct contact has been made; then ensure that all bypassed points of contact are notified.

A. Imminent Failure

NWE Operator/Plant Foreman: In the event of imminent failure, the Assistant Reservoir Attendant or Relief Assistant Reservoir Attendant in his absence will go to the dam, assess the damage and verify the severity of the failure. Upon confirmation of imminent failure, the Assistant Reservoir Attendant or Relief Assistant Reservoir Attendant in his absence will immediately implement the Imminent Failure Flowchart (page 4) by contacting the Madison Plant Foreman. For the sake of clarity, a statement such as "this is **NOT** a test, I repeat, **NOT** a test" should be used at the beginning of each contact. This will clearly distinguish an actual emergency from a "test" or "drill" situation (see the previous page for sample communication information).

The Madison Plant Foreman will notify the following of the imminent or actual failure (listed in order of priority):

1. Hydro Operations Supervisor On-Call
2. Hydro System Operator (HSO) Generation Control Center, Great Falls (24 hours a day, 365 days a year)

In the event that the Plant Foreman is not readily available the Assistant Reservoir Attendant will be responsible for the two contacts above.

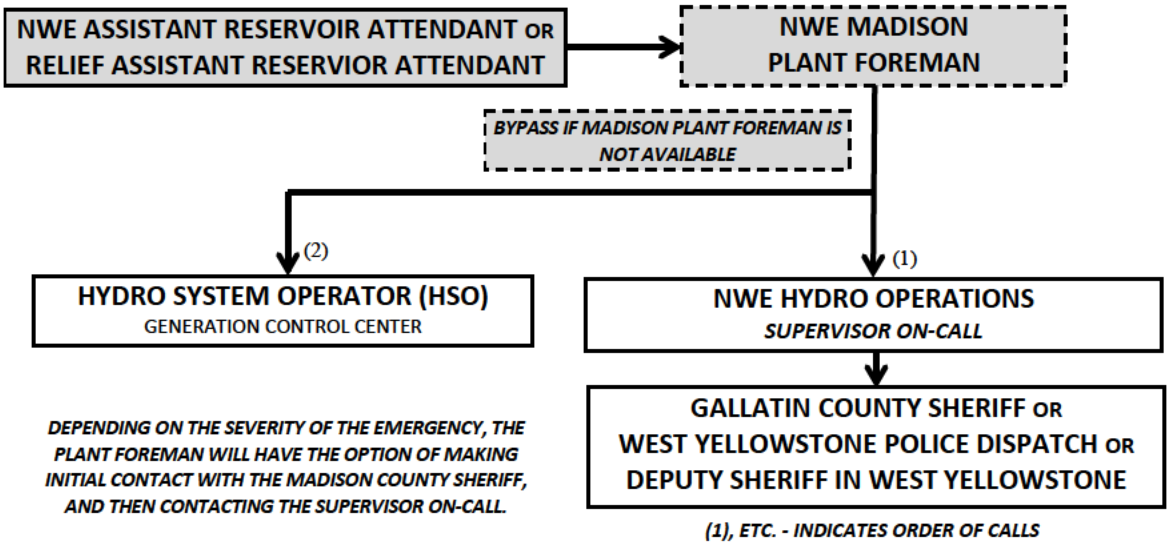
Depending on the severity of the emergency, the Plant Foreman, or Plant Operator in his absence, has the option of making his initial contact with the Gallatin County Sheriff and then contacting the Hydro Operations Supervisor On-Call.

Alert and evacuate all campers, fishermen and tourists, etc., in the vicinity of the dam to the safety of higher ground. The Campfire Lodge, a short distance downstream of the dam, will be notified of the threat by the Hydro Systems Operator and the Assistant Reservoir Attendant, if available, as soon as possible. Notification to the Campfire Lodge is a first priority. The Campfire Lodge is in operation primarily during the summer months.

Evacuation to higher ground shall be by the quickest and most convenient route available depending on the circumstances and left to the good judgment of those involved. Signs are posted near the Campfire Lodge and Beaver Creek Campground to assist the public in evacuating to higher ground.

The mode of communication will depend on the severity of the failure. The NWE radio may have to be used to relay information from the dam, to the Hydro System Operator (HSO) and to other supervisors. A portion of the Imminent Failure Flowchart on page 4 for this area of notifications follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Assistant Reservoir Attendant/Plant Foreman

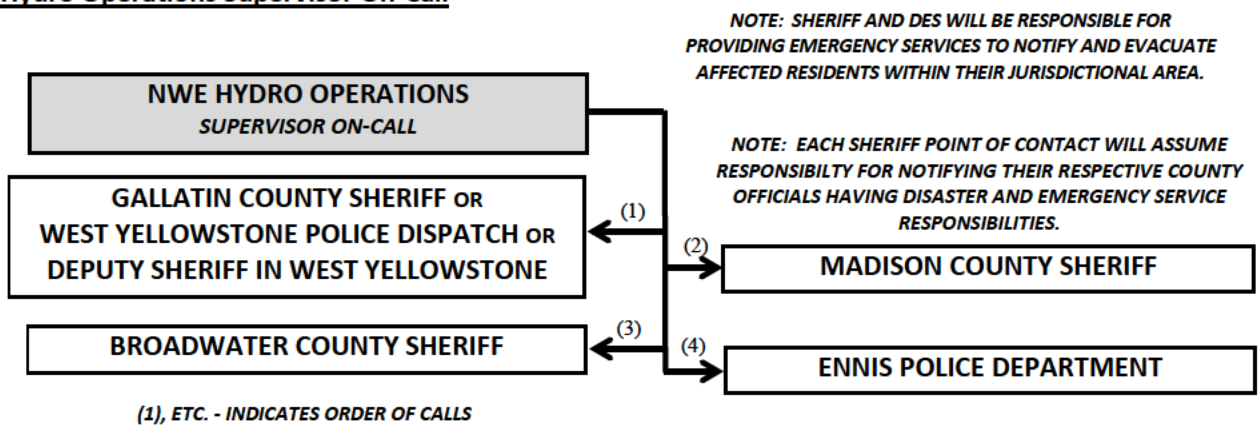


NWE Supervisor On-Call: Immediately after being notified of the failure or imminent failure, the NWE Hydro Operations Supervisor On-Call will notify the following county sheriffs:

1. Madison County Sheriff, Virginia City
2. Gallatin County Sheriff, Bozeman
3. Broadwater County Sheriff, Townsend

These respective county sheriffs will notify the Disaster and Emergency Services (DES) Coordinator for their respective county. A portion of the Imminent Failure Flowchart on page 4 for this area of notifications follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Hydro Operations Supervisor On-Call



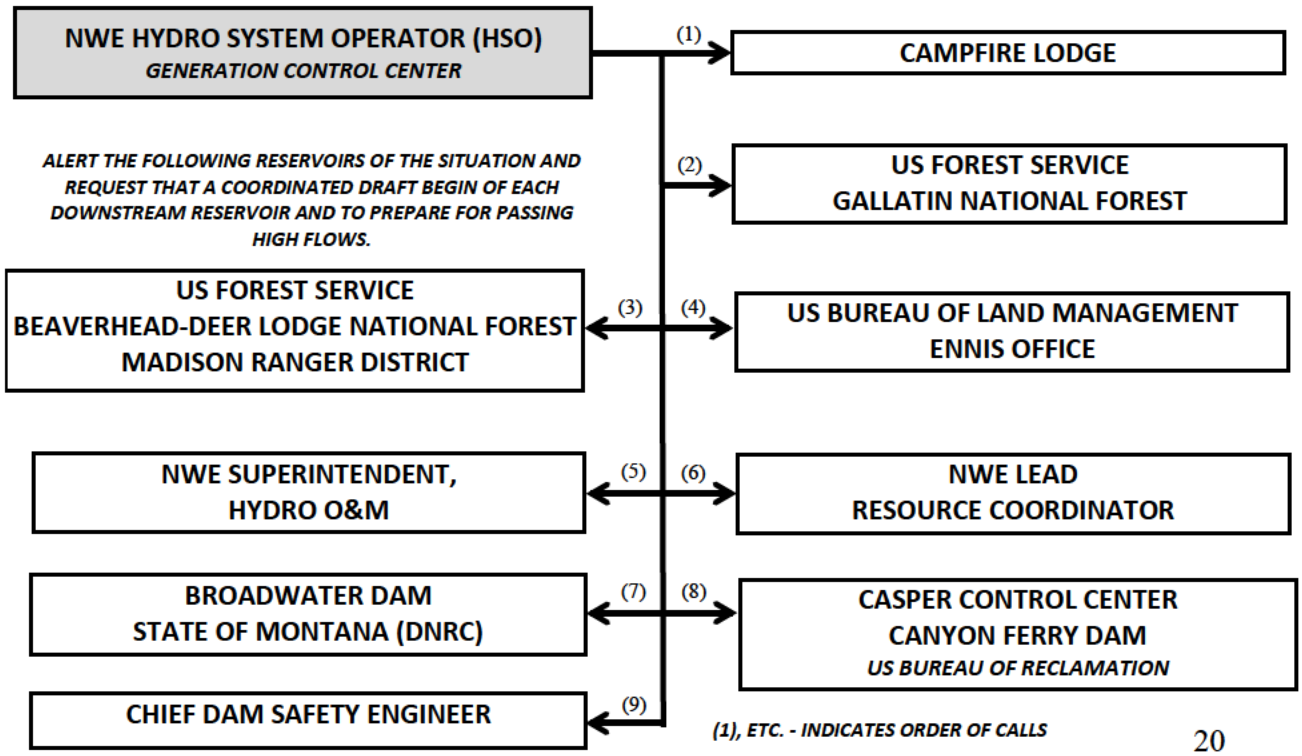
NWE Hydro System Operator (HSO): Immediately after being notified of the imminent failure or failure, the HSO at the Generation Control Center will begin to notify those in his/her area of the flowchart. The contacts in this area of notification responsibility follow in priority order:

1. Campfire Lodge
2. US Forest Service – Gallatin National Forest
3. US Forest Service – Beaverhead – Deer Lodge National Forest
4. US Bureau of Land Management
5. NWE Superintendent, Hydro O&M
6. NWE Lead Resource Coordinator
7. Broadwater Dam/Plant (State of Montana)
8. Casper Control Center, Canyon Ferry Dam (US Bureau of Reclamation)
9. NWE Chief Dam Safety Engineer

At Madison Dam, a Plant Operator who resides at the development is "on duty" 24 hours a day. All information required to contact the operator/maintenance person on duty (annual schedule, home phone numbers, etc.) is distributed to the HSO and the Supervisor On-Call.

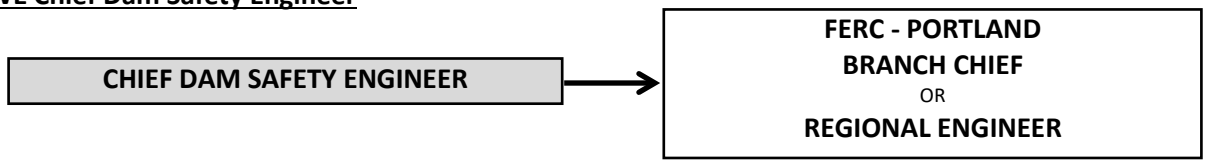
NOTE: In the event that the Plant Operator/Foreman is unable to make personal contact with the Hydro Operations Supervisor On-Call, he will request that the Hydro System Operator (HSO) dispatcher make the calls to the sheriff's departments listed in this plan after the dispatchers initial call duties. The reasoning is that in reality, the Plant Operator has immediate evacuation duties and cannot afford the time to make the sheriff's department calls. This portion of the Imminent Failure Flowchart on page 4 follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

Hydro System Operator (HSO), Generation Control Center (24 hours)



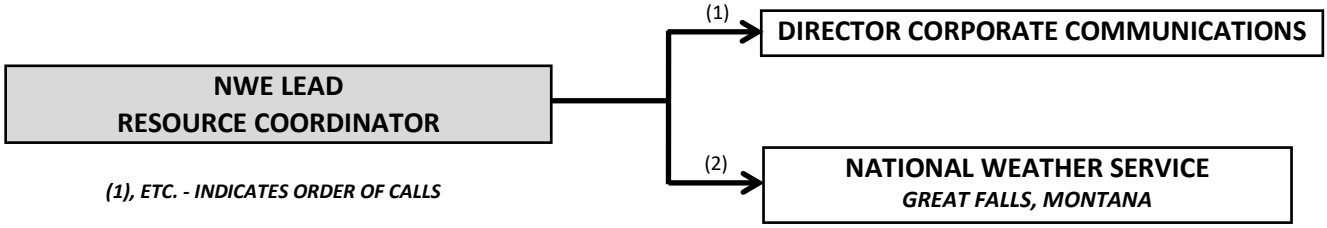
Chief Dam Safety Engineer: After being notified by the NWE Hydro System Operator (HSO), the Chief Dam Safety Engineer will notify the FERC Portland Regional Office – Branch Chief or Regional Engineer. This portion of the Imminent Failure Flowchart on page 4 follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Chief Dam Safety Engineer



Lead Resource Coordinator: After being notified by the Hydro System Operator (HSO), the Lead Resource Coordinator will notify the Director Corporate Communications and the National Weather Service, Great Falls. This portion of the Imminent Failure Flowchart on page 4 follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Lead Resource Coordinator

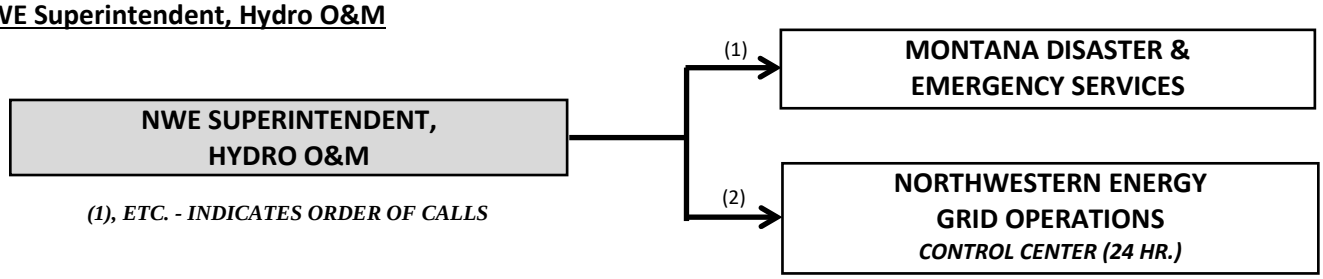


Superintendent, Hydro O&M: After being notified by the Hydro System Operator, the Superintendent, Hydro O&M will notify the following in order of priority:

1. Montana Disaster and Emergency Services, Helena
2. NorthWestern Energy Grid Operations Control Center

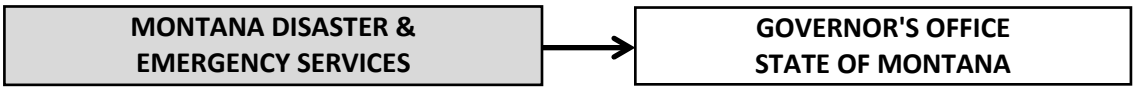
The portion of the Imminent Failure Flowchart on page 4 for this area of notification responsibility follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Superintendent, Hydro O&M

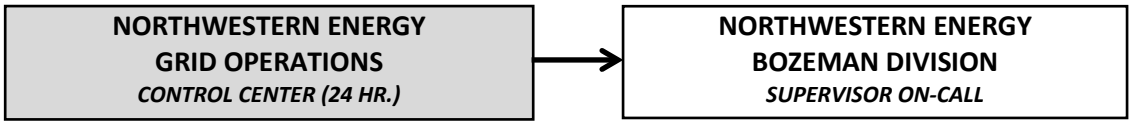


Montana Disaster and Emergency Services: After being notified by the Superintendent, Hydro O&M, the Montana Disaster and Emergency Services (DES) will notify the Governor's Office of the situation.

The portion of the Imminent Failure Flowchart on page 4 for this area of notification responsibility follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):



NorthWestern Energy Grid Operations Control Center: After being notified by the Superintendent, Hydro O&M, the NWE Grid Operations Control Center will notify the NWE Bozeman Division Supervisor-On-Call to inform them of the situation. The portion of the Imminent Failure Flowchart on page 4 for this area of notification responsibility follows (see page 4 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):



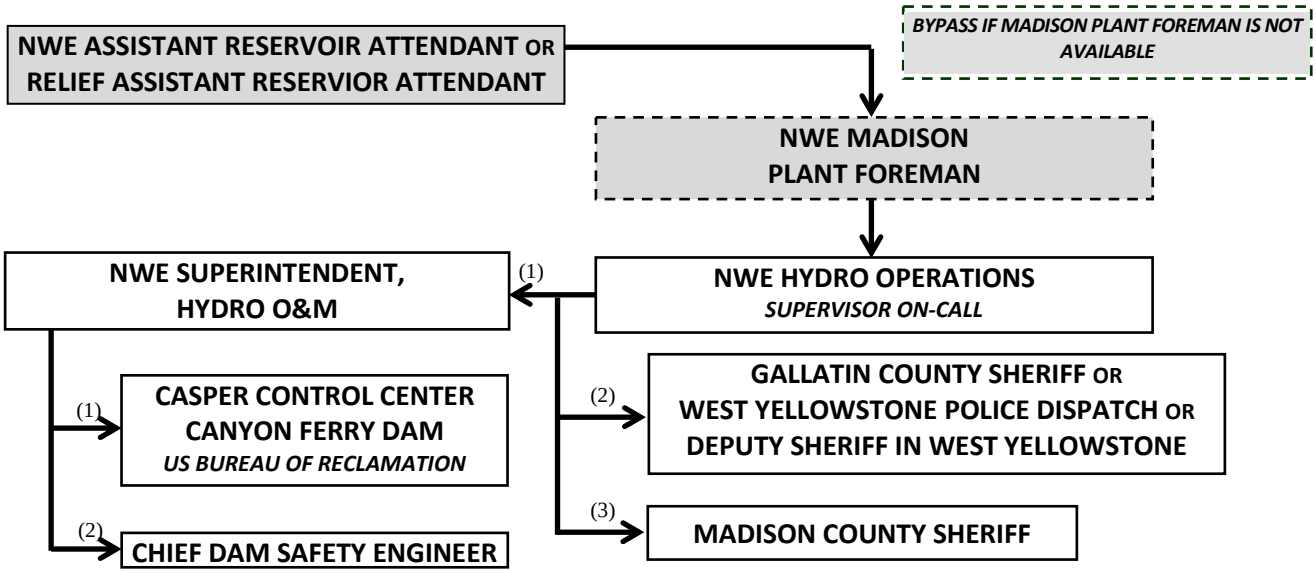
NWE Plant Operator at Madison Dam: The Plant Operator(s) who lives near Madison Dam will be requested to take the appropriate actions in anticipation of high river flows (i.e., open spill gates, secure and isolate the plant, etc.).

Plant Operator(s) at Broadwater and Canyon Ferry Dams: The Plant Operator(s) at Broadwater and Canyon Ferry plants will be requested to take the appropriate actions in anticipation of high river flows (i.e., pull or trip slide panels, open spill gates, deflate rubber dams, open radial gates, etc.).

B. Potential Failure

In the event that there are indications that a Potential Failure situation may be developing (Section E.1.C), the Assistant Reservoir Attendant or Relief Assistant Reservoir Attendant in his absence will notify the Madison Plant Foreman. The Madison Plant Foreman or the Assistant Reservoir Attendant in his absence will immediately notify the Supervisor On-Call and stand by for further instructions. The Supervisor On-call will notify the Superintendent, Hydro O&M and the Gallatin and Madison County Sheriffs. The Superintendent, Hydro O&M will contact the Chief Dam Safety Engineer, who will in turn notify the FERC Portland Regional Office and inform them of the problem. The portion of the Potential Failure Flowchart on page 5 for this area of notification follows (see page 5 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

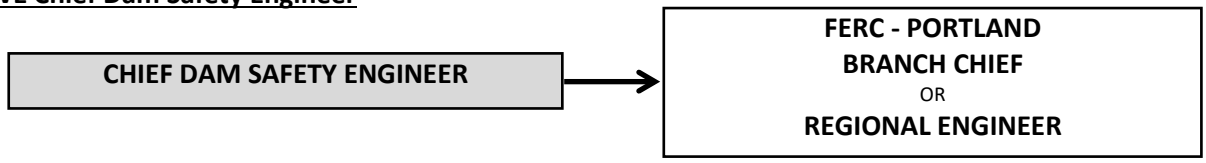
NWE Assistant Reservoir Attendant/Madison Plant Foreman



(1), ETC. - INDICATES ORDER OF CALLS

As mentioned, the Chief Dam Safety Engineer will notify the Portland Office of the FERC. The portion of the Potential Failure Flowchart on page 5 for this area of notification responsibility follows (see page 5 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Chief Dam Safety Engineer



After notification is complete, the appropriate NWE Operations and Engineering personnel will promptly respond in assessing the situation and recommending actions to correct the problem. An assessment of the situation will determine whether a coordinated draft of downstream reservoirs is required. If the use of materials and equipment is required, the appropriate contractor will be notified and the problem will be corrected.

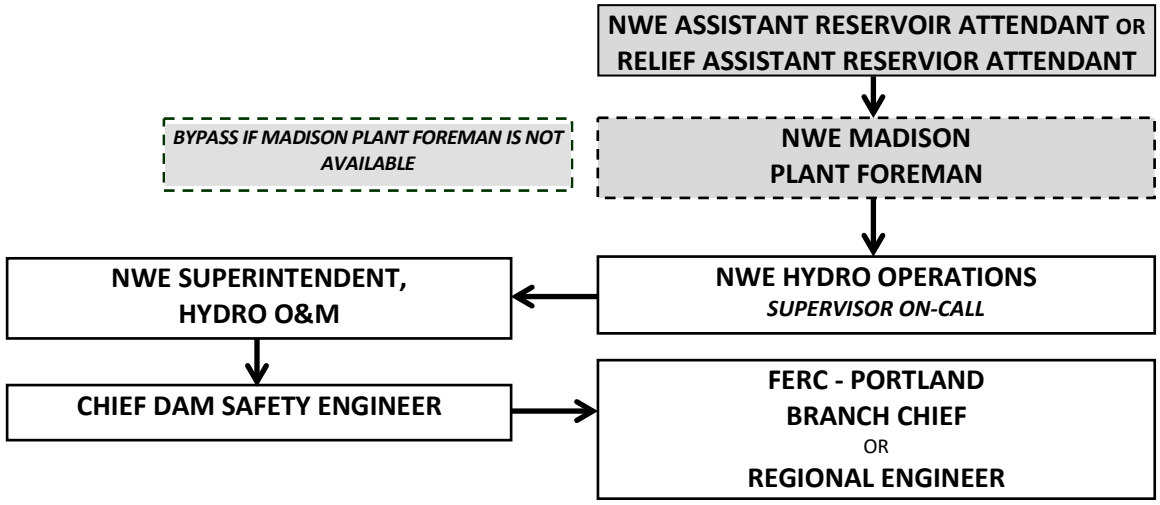
It should be noted that in the unlikely event the Assistant Reservoir Attendant cannot contact the Madison Plant Foreman or the Chief Dam Safety Engineer; he should contact the Superintendent, Hydro O&M.

In the event that the Madison Plant Foreman, or the Assistant Reservoir Attendant in his absence, feels that the potential failure situation is escalating to a point of imminent failure, before NWE Operations and Engineering Personnel can respond, he/she will immediately initiate the warning flowchart for Imminent Failure (see page 4). The notification procedures for that emergency level are set forth in Section E.2.A.

C. Non-Failure

If a situation develops or incident occurs that is outside of typical conditions at the dam; however does not appear to affect the integrity of the dam or will not by itself result in a failure (Section E.1.C), the Plant Operator will immediately notify the Plant Foreman. The Plant Foreman will then notify the Supervisor On-Call and stand by for further instructions (in the event that the Plant Foreman is not readily available, the Plant Operator will notify the Supervisor On-Call). The Supervisor On-call will notify the Superintendent, Hydro O&M. The Superintendent, Hydro O&M will contact the Chief Dam Safety Engineer, who will in turn notify the FERC Portland Regional Office and inform them of the incident. The portion of the "Non-Failure" Flowchart on page 6 for this area of notification follows (see page 6 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Assistant Reservoir Attendant/Madison Plant Foreman



As mentioned, the Chief Dam Safety Engineer will notify the Portland Office of the FERC. After notification is complete, the appropriate NWE Operations and Engineering personnel will promptly respond in assessing the situation and recommending actions to correct the problem. If the use of materials and equipment is required, the appropriate contractor will be notified and the problem will be corrected.

It should be noted that in the unlikely event the Assistant Reservoir Attendant cannot contact the Madison Plant Foreman or the Hydro Supervisor On-Call; he should contact the Superintendent, Hydro O&M.

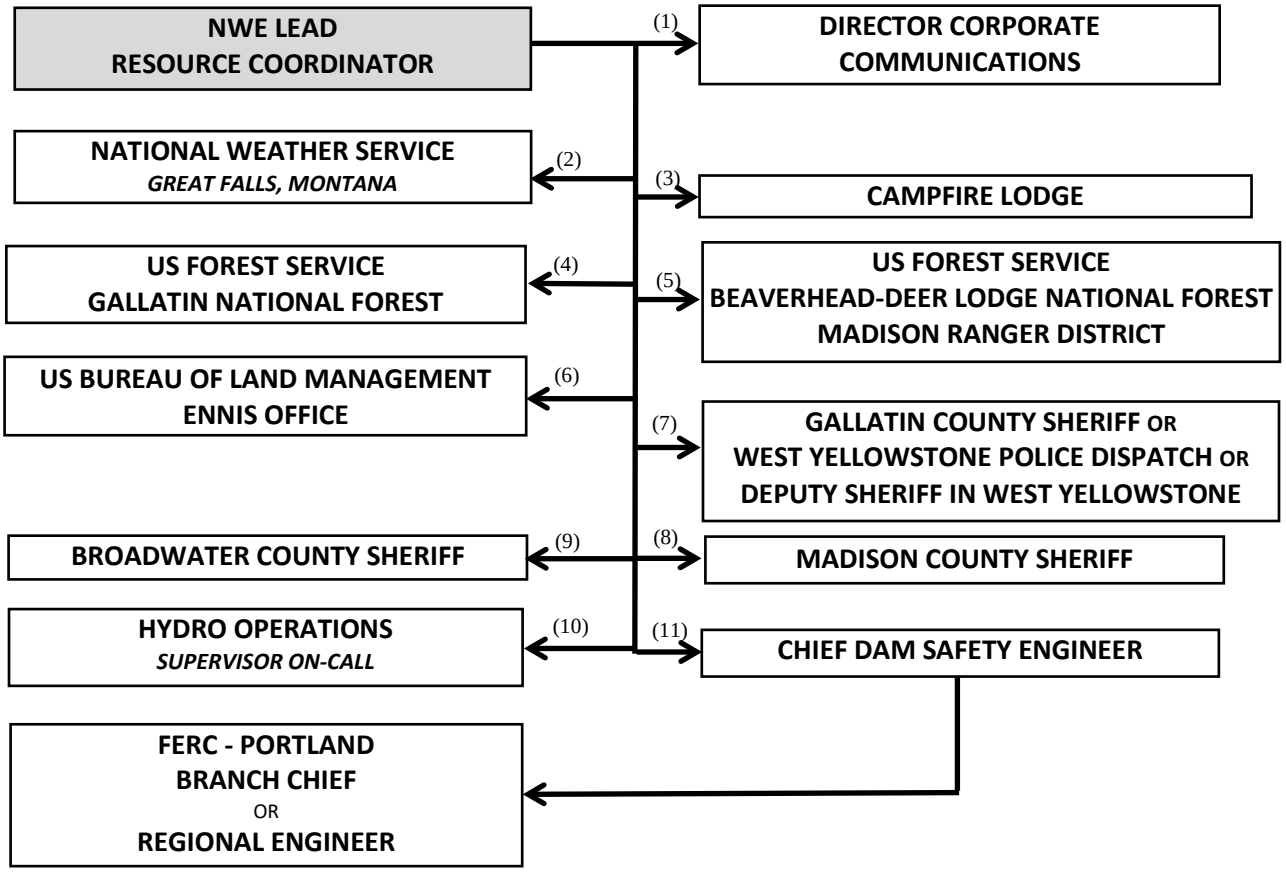
In the event that the Madison Plant Foreman, or the Assistant Reservoir Attendant in his absence, feels that the non-failure situation is escalating to a point of potential failure or imminent failure, before NWE Operations and Engineering personnel can respond, he/she will immediately initiate the warning flowchart for a Potential Failure (see page 5) or Imminent Failure (see page 4). The notification procedures for these emergency levels are set forth above in Parts E.2.A and E.2.B.

D. High Flow

In the event the waterway below Hebgen Dam is at or near flood stage (13.5 feet at the USGS Ulm gage) and it becomes necessary to operationally put additional flow into the waterway that may cause

flooding, the Lead Resource Coordinator will notify the Director Corporate Communications, the National Weather Service (NWS), the Campfire Lodge, Gallatin and Beaverhead Forest Service, US Bureau of Land Management, the Gallatin, Madison and Broadwater County Sheriffs and the NWE Supervisor On-Call and the Chief Dam Safety Engineer. The Chief Dam Safety Engineer will notify the FERC Portland Regional office. It is important to stress to these agencies that this is for their information only, and make sure all parties understand the dam is NOT in danger of failing. The portion of the notification flowchart on page 7 for this area of notification responsibility follows (see page 7 for complete flowchart information (i.e., names, office and home phone numbers, etc.)):

NWE Lead Resource Coordinator



3. Emergency Actions

After making notifications of a Potential Failure or Imminent Failure according to this EAP, NWE will make efforts to save the dam and minimize impacts to life, property, and the environment. During this step a continual process will occur of taking actions, assessing the situation, and providing status updates through the communication channels opened during initial notifications. The EAP will likely go through changes in emergency levels during this step and Step 2 as the situation improves or deteriorates.

Table E.2 below provides a tabulated reference of emergency actions that will be taken for various conditions or incidents at Hebgen Dam to mitigate impacts associated with the condition or incident.

Table E.2: EMERGENCY ACTIONS

Description of Condition	Action Priority	Action to be Taken
HIGH WATER LEVEL / LARGE SPILLWAY RELEASE		
Reservoir stage reaches maximum normal pool elevation and continues to rise	1	If not already complete, make notifications on the High Flow and Non-Failure Flowcharts
	2	Open spill gates and/or trip select stanchions to maintain reservoir level at or near normal pool elevation
	3	Open all spill gates full open and/or trip all stanchions to provide maximum spillway capacity if reservoir level cannot be maintained at normal pool elevation
	4	Make notifications on the Potential Failure Flowchart
	5	Check for signs of erosion at spillway, spillway apron/immediate downstream channel, intake structure, downstream dam face, and abutments
	6	Perform additional tasks as directed by HSO or Engineering Personnel
STRUCTURAL DEFORMATION		
Development or evidence of new cracks, offsets, settlement, sliding, overturning, foundation or other piping, or erosion.	1	During Daily Inspections: inspect handrails and dam walkways for alignment; identify new or abnormal leakage, cracks, or offsets; check for debris against dam; identify rock falls or evidence of movement; and identify other abnormalities up and downstream of the dam
	2	Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos, document location on a site plan and in daily inspection report
	3	Notify NWE Engineering Personnel and provide all data collected
	4	Inspect other areas of the dam; collect piezometer and water level data as instructed by Engineering Personnel. Record any changes in condition. Carefully observe dam for signs of settlement or other offsets, seepage, cracking, piping, or movement
	5	Engineering Personnel will review information collected by operator and provide additional instructions as necessary
	6	If prudent for the condition, initiate survey monitoring
	7	Make notifications on the Non-Failure, Potential Failure, or Imminent Failure Flowcharts as warranted by conditions
Earthquake or other seismic event occurs within the vicinity of the dam	1	Operator will immediately begin an inspection of the dam and surrounding areas as follows: inspect handrails and dam walkways for alignment; identify new or abnormal leakage, cracks, or offsets; identify rock falls or evidence of movement along shorelines; identify other abnormalities up and downstream of the dam; check for sinkholes; look for evidence of whirlpools in the reservoir
	2	Notify NWE Engineering Personnel and provide information about the situation and all data collected
	3	Inspect other areas of the dam; collect piezometer and water level data as instructed by Engineering Personnel. Record any changes in condition. Carefully observe dam for signs of settlement or other offsets, seepage, piping, cracking, or movement

	4	If deemed necessary by identified conditions, the Superintendent, Hydro O&M will coordinate with the Chief Dam Safety Engineer to dispatch Engineering Personnel to the site
	5	Continue to monitor and inspect the dam with Engineering Personnel and provide status reports to the Chief Dam Safety Engineer and the Superintendent, Hydro O&M
	6	Make notifications on the Non-Failure, Potential Failure, or Imminent Failure Flowcharts as warranted by conditions
GATE MALFUNCTION OR FAILURE		
Dam gates/valves structurally damaged by sabotage, debris, component failure resulting in an uncontrolled release of water	1	Close all other open gates, if necessary
	2	If possible, install flashboards to stop or slow flow through the damaged gate
	3	Make notifications on the Non-Failure Flowchart, Engineering Personnel may be dispatched to the site and evaluate the problem
	4	The Superintendent, Hydro O&M will coordinate with the Chief Dam Safety Engineer to determine if a remediation contractor should be dispatched to the dam to make necessary repairs
	5	Repair or replace the gate/valve as necessary
	6	Make notifications on the Potential Failure or Imminent Failure Flowcharts as warranted by conditions
SABATOGE AND OTHER SECURITY ISSUES		
Criminal action with significant damage to the dam structure where substantial repairs are required and the integrity of the facility is compromised	1	Contact law enforcement authorities and restrict access to the facility.
	2	Contact the NWE Superintendent, Hydro O&M, the Chief Dam Safety Engineer, and the Hydro Security Coordinator. Refer to the Hebgen Security Plan for additional procedures
	3	Evaluate damage and begin inspection of the entire dam to identify additional potential damage. Based on inspection determine if extent of damage warrants an activation of the EAP
	4	The Superintendent, Hydro O&M will coordinate with the Chief Dam Safety Engineer to dispatch Engineering Personnel to the site
	5	Perform additional tasks as directed by HSO or Engineering Personnel
	6	Make notifications on the Non-Failure, Potential Failure, or Imminent Failure Flowcharts as warranted by conditions

Additional details and information about operating procedures and emergency response actions/procedures are located in the Hebgen Dam Operations Manual and Standard Operating Procedures (SOPs).

4. Termination and Follow-up

A. Termination

The last step of the EAP response process is critical for disseminating information that the emergency has ended and for improving the response process for the future. Termination procedures are very streamlined because they primarily involve communication with the NWE Chief Dam Safety Engineer, which will be continuous and ongoing during the entire EAP response process.

The decision to terminate the EAP activation will be made through a coordinated effort and continuous communications between onsite personnel, particularly Engineering Personnel, the Superintendent, Hydro O&M, and the Chief Dam Safety Engineer. The constant back and forth flow of information on success and failure of emergency actions is the most important procedure so the best decisions can be made about continued remediation efforts or termination. The Chief Dam Safety Engineer, as the responsible authority for NWE, will ultimately decide that an emergency condition no longer exists at the dam once conditions have stabilized.

In some cases, the Chief Dam Safety Engineer may be onsite and will make determinations without cumbersome and potentially problematic information relays, which will likely result in higher confidence that termination by NWE is appropriate.

Once the decision has been made to terminate activation of the EAP by the Chief Dam Safety Engineer, the Chief Dam Safety Engineer will notify NWE's Director of Corporate Communications. Emergency management officials or incident command will then be notified by either the Chief Dam Safety Engineer or NWE's Director of Corporate Communications, as appropriate, that the emergency condition no longer exists at the dam.

It is important that NWE and emergency management officials agree on when it is appropriate to terminate the emergency.

Emergency management officials will terminate the public emergency response efforts and lift evacuation orders once it is safe for the public to return to their homes or areas affected by the emergency.

B. Follow-Up

After the incident has been terminated, NWE will conduct an evaluation of the incident with the participation of emergency management officials and other incident participants, as appropriate.

The following will be discussed and evaluated in an after-action review:

- Events prior to, during and following the emergency
- Significant actions taken by each participant, and what improvements would be practicable for future emergencies
- All strengths and deficiencies found in procedures, materials, equipment, staffing levels, and leadership
- Corrective actions identified to improve the plan and a defined course of action to implement the corrections

The results of the after-action review will be documented in an Evaluation Report or After Action Report (AAR) chaired by NWE, which will be used as a basis for revising the EAP.

F. General Responsibilities

1. Licensee Responsibilities

It is NWE's responsibility to initiate effective and timely warning to the designated responsible parties according to this plan in the event of a dam failure, potential failure, or release of waters that may exacerbate flooding with regards to the four classifications stated in Section E.1.C. In addition, the EAP response process procedures are included in Section E.1.A and B and will not be repeated in the following sections.

Assistant Reservoir Attendant/Madison Plant Foreman: The Assistant Reservoir Attendant or Relief Assistant Reservoir Attendant in his absence is responsible for detecting, evaluating, and confirming incidents at the dam as part of their day-to-day duties. In the event of an emergency, the Assistant Reservoir Attendant is responsible for determining the emergency level and immediately implementing the appropriate flowchart by contacting the Madison Plant Foreman.

The Madison Plant Foreman is then responsible for contacting the Hydro Operations Supervisor On-Call and Hydro System Operator HSO). It should be noted that depending on the severity of the emergency, the Madison Plant Foreman will have the option of making his initial contact with the Gallatin County Sheriff, and then contacting the Hydro Operations Supervisor On-Call.

After making the designated notifications according to the appropriate flowchart, and in the event of imminent failure, the Plant Foreman and/or Assistant Reservoir Attendant will alert and evacuate all fishermen, tourists, and campers in the vicinity of the dam and nearby Campfire Lodge to the safety of higher ground.

Emergency operations/procedures will be coordinated with the HSO, Engineering Personnel, and the Madison Plant Foreman and/or Assistant Reservoir Attendant will implement them as directed.

It will continue to be the responsibility of the Madison Plant Foreman and/or Assistant Reservoir Attendant to maintain communications and provide status/situational updates to the HSO, Supervisor On-call, and Engineering throughout the emergency or until relieved after Engineering Personnel arrive onsite.

Hydro Operations Supervisor On-Call: The supervisor on-call is the first point of contact for the Madison Plant Foreman and/or Assistant Reservoir Attendant during an emergency at the dam. In the event of Imminent Failure or Potential Failure EAP activation, the Hydro Operations Supervisor On-Call is responsible for notifying the county sheriffs (see page 4).

The Hydro Operations Supervisor On-Call is responsible for maintaining communications with the Plant Foreman and/or Assistant Reservoir Attendant, HSO, and Engineering Personnel, to receive and provide status updates as necessary. The Supervisor On-Call will continue to provide support as requested and will provide an alternate central point of contact for emergency managers if the Chief Dam Safety Engineer is not available.

Hydro System Operator (HSO): The Hydro System Operator (HSO) is located at the Generation Control Center (GCC) in Great Falls, Montana and is manned 24 hours a day, 365 days a year as a monitoring and dispatch center. The HSO is the fourth call made by the dial out modem connected to the dam failure alarm at Hebgen (see Section G.1). As a result, the HSO is also responsible for detecting, evaluating, and confirming incidents at the dam. If an incident is confirmed and the Assistant Reservoir Attendant /Madison Plant Foreman cannot be reached, the HSO will determine the emergency level and activate the appropriate EAP. The HSO will also dispatch the Assistant Reservoir Attendant, Madison Plant Operator or Engineering Personnel if no one is on-site.

If contacted by the Plant Foreman, the HSO will immediately begin to make notifications according to the flowchart for the EAP level activated. It should be noted, that the HSO will be asked to make the necessary contacts for the Hydro Operations Supervisor On-Call in the event the Plant Foreman cannot make contact with him.

After all notifications have been made, the HSO will begin to coordinate emergency operations/procedures with the Plant Foreman and Engineering Personnel as appropriate or directed. This includes coordinating operations with downstream dams as outlined in Section E.3.

The HSO is responsible for maintaining communications with the Plant Foreman and/or Assistant Reservoir Attendant, Hydro Operations Supervisor On-Call, and Engineering Personnel, to receive and provide status updates as necessary. The HSO will continue to provide support as practicable to all levels of NWE throughout the emergency.

Superintendent, Hydro O&M: The Superintendent, Hydro O&M is responsible for supporting the activated EAP level by making notifications according to the appropriate flowchart. After making the designated notifications, the Superintendent is responsible for determining the emergency operations and construction procedures that will be implemented in response to the emergency at the dam.

The Superintendent will begin coordination of the emergency operations/procedures at the dam with the HSO, the Plant Foreman and/or Plant Operator, and Engineering Personnel. This will likely include dispatching Engineering Personnel and construction crews/resources to the site depending on the EAP emergency level activated. If necessary, the Superintendent will also dispatch Engineering Personnel to the Emergency Operations Center, if established, to be a liaison to Emergency Managers.

The Superintendent, Hydro O&M will maintain communications by receiving and providing status updates between the HSO, Engineering Personnel, and Senior Management as appropriate. Management support for response efforts will also be an ongoing responsibility for the Superintendent until the end of the emergency.

Chief Dam Safety Engineer: In all cases, the Chief Dam Safety Engineer is responsible for contacting the FERC Regional Office in Portland, OR. In addition, the Chief Dam Safety Engineer will be the NWE contact for the sheriffs after the Hydro Operations Supervisor On-Call makes initial contact. If the Chief Dam Safety Engineer cannot be reached, the Supervisor On-Call will be the alternate NWE contact for emergency managers.

The Chief Dam Safety Engineer will initiate periodic status report conference calls with the dam site, HSO, Engineering Personnel, and Corporate Communications to continue to provide up to date information about the emergency to Senior Management. The Chief Dam Safety Engineer will be the point of contact with the Emergency Operations Center, if established, to relay information to a designated liaison at the Emergency Operations Center.

The Chief Dam Safety Engineer is NWE's designated representative with authority to terminate activation of the EAP.

Lead Resource Coordinator: The Lead Resource Coordinator will be responsible for making notifications according to the EAP flowchart for the activated emergency level. In addition, the Lead Resource Coordinator is responsible for coordination of river flows and will contact and maintain communication with the National Weather Service (NWS) to keep them informed of the coordination efforts.

Director Corporate Communications: The Director of Corporate Communications is responsible for disseminating information to the media and the public on a periodic basis throughout the emergency. This may be accomplished by dispatching public relations staff and providing input to staff on emergency communications.

2. Notification and Communication Responsibilities

NWE Assistant Reservoir Attendant /Plant Foreman: The Assistant Reservoir Attendant is responsible for immediately contacting the Madison Plant Foreman, if available. The Plant Foreman is then responsible for notifying the Hydro Operations Supervisor On-Call. However, depending on the severity of the emergency, the Plant Foreman will have the option of making his initial contact with the Gallatin County Sheriff, and then contacting the Hydro Operations Supervisor On-Call.

The Supervisor "On-Call" rotation involves assigned NWE Hydro Operations Supervisors. Each Supervisor On-Call has a cell phone if he or she cannot be contacted at the office or at home.

After the Hydro Operations Supervisor On-Call has been notified, the Plant Foreman is responsible for notifying the Hydro System Operator (HSO) in Great Falls, Montana. (In the event that the Plant Foreman is not readily available, the Plant Operator will assume the Plant Foreman's notification responsibilities.)

The Plant Foreman, or Assistant Reservoir Attendant in his absence, has the continued responsibility to keep local authorities and NWE personnel advised on conditions at the dam during an emergency or until relieved of this responsibility. Again, the mode of communication will depend on the severity of the failure. The NWE radio system may have to be used to relay information from the dam, to the Hydro System Operator (HSO) and to the Chief Dam Safety Engineer.

NWE Hydro Operations Supervisor On-Call: In the event of Imminent Failure or Potential Failure EAP activation, the Hydro Operations Supervisor On-Call is responsible for notifying the following County Sheriffs listed in priority order by county:

1. Gallatin County Sheriff, Bozeman/West Yellowstone

2. Madison County Sheriff, Virginia City
3. Broadwater County Sheriff, Townsend
4. Ennis Police Department, Town of Ennis

After initial notification, the Chief Dam Safety Engineer will be the NWE contact for continued communications with the sheriffs. If the Chief Dam Safety Engineer cannot be reached, the Supervisor On-Call will be the alternate NWE contact.

NWE Hydro System Operator (HSO): Immediately after being notified of Imminent Failure or Potential Failure, the Hydro System Operator (HSO) in Great Falls, Montana, will initiate his/her contacts under the EAP. Those contacts are listed below in priority order.

1. Campfire Lodge
2. US Forest Service – Gallatin National Forest
3. US Forest Service – Beaverhead – Deer Lodge National Forest
4. US Bureau of Land Management, Ennis Office
5. NWE Superintendent, Hydro O&M
6. NWE Lead Resource Coordinator
7. Broadwater Dam/Plant (State of Montana)
8. Casper Control Center, Canyon Ferry Dam (US Bureau of Reclamation)
9. NWE Chief Dam Safety Engineer

The HSO will continue to operate as an internal communication hub in the event of an emergency to allow for continued communications between the Plant Foreman, Superintendent Hydro O&M, Chief Dam Safety Engineer, Engineering Personnel, and Senior Management.

NWE Superintendent, Hydro O&M: Immediately after being notified of the Imminent Failure or Potential Failure, the Superintendent, Hydro O&M will notify the following, which are listed in priority order:

1. Montana Disaster and Emergency Services, Helena, Montana
2. NorthWestern Energy Grid Operations Control Center

The Chief Dam Safety Engineer and the Superintendent, Hydro O&M will consult with the appropriate NWE Operations and Engineering Personnel to promptly respond in assessing the situation.

NWE Chief Dam Safety Engineer: The Chief Dam Safety Engineer is responsible for contacting the FERC Regional Office in Portland, OR. The Chief Engineer is responsible for initiating status report conference calls to maintain open communications and current status information.

After initial notification, the Chief Dam Safety Engineer will be the primary point of contact for continued communications with the Sheriff's departments.

NWE Lead Resource Coordinator and Director Corporate Communications: The Lead Resource Coordinator will be responsible for contacting and maintaining communications with the National Weather Service (NWS) to keep them updated on the emergency status. The Director of Corporate

Communications is responsible for disseminating information to the media and the public on a periodic basis throughout the emergency.

County Sheriff's Offices/Dispatch Centers: Each sheriff's office is responsible for notifying and maintaining communications with the Disaster and Emergency Services (DES) Coordinator for their respective county. In addition, the county sheriff's and dispatch centers will likely serve as communication hubs between emergency responders and the general public and will be responsible for coordinating evacuation activities.

The National Weather Service (NWS): The NWS has the responsibility for issuing flood warnings and will use its warning system to supplement the notification set in motion by the implementation of the Imminent Failure EAP Flowchart (page 4). In addition, as set forth above, the Lead Resource Coordinator will maintain communications with the NWS to keep them informed of river flow coordination efforts. This will enable the NWS to monitor the situation and provide additional advanced warning to areas downstream from the break.

Plant Operator(s) at Broadwater and Canyon Ferry Dams: The Plant Operator(s) will be responsible for notifying or alerting anyone within the vicinity of the dam to evacuate to higher ground.

Montana Disaster and Emergency Services: Montana Disaster and Emergency Services (DES) will contact the Governor's office and inform them of the situation. They will also stand by and be prepared to offer assistance to local and county officials having disaster and emergency responsibilities.

NWE Grid Operations Control Center: In the event of an activation of the Imminent Failure EAP, the NWE Grid Operations Control Center will contact the NWE Bozeman Division Supervisor-On-Call to inform them of the situation.

3. Evacuation Responsibilities

After the Supervisor On-call and Hydro System Operator (HSO) have been notified, the Plant Operator will evacuate all fishermen, tourists and campers in the vicinity of the powerhouse and dam to the safety of higher ground. This step may have already been taken in the case of a "Potential Failure" EAP activation.

All other evacuation activities will be coordinated by the Gallatin County Sheriff's office, which will be the local emergency management contact.

4. Monitoring, Security, Termination, and Follow-Up Responsibilities

A. Monitoring

In the event of Imminent Failure or Potential Failure EAP activation, NWE will dispatch Engineering Personnel to the dam site to provide technical evaluation and onsite response management during the emergency. Once onsite, an engineer will be designated as the Incident Monitor and will be the onsite contact for providing status updates to the Chief Dam Safety Engineer, the Superintendent, Hydro O&M, HSO, and others. The Incident Monitor will provide frequent updates as the situation changes, during the periodic status report conference calls, or as contacted by the NWE response team.

In some cases, the Hydro Supervisor On-Call may respond to the dam site; in this case, the Supervisor On-Call will assume the role of the onsite Incident Monitor.

B. Security

If an incident occurs at the dam that requires activation of this EAP, security efforts will be coordinated through the Superintendent, Hydro O&M and Hydro Security Coordinator.

NWE has developed security plans for its dams that provide guidance for security measures during emergency incidents. The security plan and this EAP have been further integrated by an Internal Emergency Response and Rapid Recovery Plan (IERRP). The IERRP is not intended to replace either plan; however, it ensures a coordinated and integrated response to an emergency whether natural or weather-related (e.g., storms, flooding) emergencies or man-made (e.g., security incident, threat) emergencies.

The Superintendent, Hydro O&M and Hydro Security Coordinator will determine the level of security necessary for the dam during an incident and will dispatch contracted security personnel and/or local law enforcement if resources are available to provide security at the site.

Local law enforcement agencies have the primary responsibility for conducting evacuations, if required. As a result, they may not have enough resources to also provide security at the site. They should only be used to provide security if requested and able as a secondary resource.

C. Emergency Termination

There are two conditions requiring a termination of the emergency. One has to do with emergency conditions at the dam and the other is related to the evacuation and disaster response. NWE will be responsible for making the decision that an emergency condition no longer exists at the dam. The designated party will be the Chief Dam Safety Engineer, who will disseminate that information to the Director of Corporate Communications.

The applicable state or local emergency management officials are responsible for termination of the evacuation or disaster response activities.

NWE, state, and local officials should agree on when it is appropriate to terminate an emergency. In addition, they should cooperate to determine if a news release is appropriate for media broadcast to the general public, notifying them the emergency condition has been terminated.

D. Follow-Up Evaluation

Following an emergency, NWE is responsible for conducting an evaluation and review of the incident that will include input from all participants. NWE is also responsible for documenting the evaluation and preparing an After Action Report (AAR). The AAR will be submitted to the FERC and will be used as a basis for revising the EAP.

5. EAP Coordinator Responsibilities

The EAP Coordinator for NWE is:

Dustin Kaste
11 East Park
Butte, Montana 59701
Phone: (406) 497-3429

The EAP coordinator is responsible for EAP related activities, including but not limited to, revising the EAP as needed, conducting training seminars/orientations, coordinating exercises, and to act as the liaison between state and local agencies and NWE. The EAP Coordinator is also the contact for all stakeholders and involved entities if there are questions about the plan.

G. Preparedness

1. Surveillance and Monitoring

The Hebgen project is operated and maintained by the NWE Madison Dam crew. For surveillance purposes NWE employs an Assistant Reservoir Attendant, who resides a short distance from the dam in the NWE housing complex. A second, Relief Assistant Reservoir Attendant, lives several miles from the dam. In late 2008, a remotely-controlled surveillance camera was installed on Hebgen Dam that is utilized by the Madison Crew and others for remote surveillance of the dam and outlet structures.

A Sutron data collection platform (DCP) is in service at Hebgen. The Sutron system has both routine monitoring and dam failure alarm capabilities. This DCP is tied into the USBR Hydromet system, which collects data in the Boise, Idaho VAX Computer for reservoir level and river flow rate monitoring. In particular, the DCP at Hebgen collects data on the Hebgen Reservoir elevation (taken at the forebay) and the USGS downstream river gage elevation (taken approximately 1,450 feet below the dam on the Madison River).

Incorporated into the Sutron data collection platform (DCP) at Hebgen Dam is a dam failure alarm equipped with a dial out modem with voice output. This device monitors flow in the downstream river gage and immediately initiates a computer automated call-out sequence to the Assistant Reservoir Attendant and other NWE personnel to notify them of potential issues at Hebgen Dam associated with significant changes in river flow rates. The parameters that will initiate an alert and warning, are:

1. **Alarm #1** - Corresponds to 3,000 cfs (2.93 ft on the downstream river gage). This flow rate is identified as a limit to prevent the possibility of erosion of the natural dam at Quake Lake. When this alert level is reached, the computer will increase its data collection rate and begin dialing predetermined phone numbers in sequence until the alarm is acknowledged (see Computer Call-Out Sequence below).
2. **Alarm #2** - Corresponds to 6,000 cfs (3.90 ft on the downstream river gage). This flow rate exceeds the highest flow experienced at Hebgen Lake (except for the 1959 earthquake - 10,200 cfs). When this warning level is reached, the computer will begin calling telephone numbers in sequence until the alarm is acknowledged:
3. **Alarm #3** – Rate of Change – This alarm is activated when the downstream river gage level has risen more than one foot in one hour or within a 15 minute period.

Computer Call-Out Sequence: When the alarm is activated the individuals listed below are immediately called by telephone in the listed sequence. The voice alarm message will simply state that there is a "Hebgen dam failure alarm". The system will continue to call the contacts below at least twice until the alarm has been acknowledged. The system has been programmed so that only the Madison Operators and/or Plant Supervisor can acknowledge and override the alarm.

1. NWE Hebgen Office in the Assistant Reservoir Attendant's House: (406) 646-[redacted]
2. NWE Madison and Hebgen Supervisor Jeremy Butcher: (406) 788-[redacted]
3. 24-Hour Hydro System Operator (HSO), Great Falls: (406) 268-[redacted]
4. NWE Madison Plant: (406) 533-[redacted]

5. 24-Hour Hydro System Operator (HSO), Great Falls - CELL: (406) 241-[redacted]

Once a “Hebgen dam failure alarm” is received, the Assistant Reservoir Attendant will physically inspect conditions at the dam. In the case that the attendant is not reached, the Madison Plant Crew can utilize the remote-controlled video camera from the Madison Plant to determine if a significant event has occurred.

The Hydro System Operator (HSO) in Great Falls can access the USBR Hydromet computer in Boise, Idaho, through a computer terminal to obtain the most up-to-date forebay and downstream river gage elevations. This data will indicate to the dispatcher what adjustments must be made at the dam (i.e., open/close head gate to the outlet pipe or open/close vertical slide gates on the spillway). The NWE Hydro System Operator (HSO) will immediately call the Assistant Reservoir Attendant or Relief Assistant Reservoir Attendant in his absence, in the event these elevation figures become alarming (i.e., not normal).

The HSO, anyone in Hydro Operations, and/or anyone in Hydro Generation can also interrogate the site directly at any time and receive the latest information that has been collected by calling (406) 646-9394.

Audible alarms have been installed by NWE at the USFS Cabin Creek campground and the privately-owned Campfire Lodge, both located just a short distance below Hebgen Dam. The alarms were permanently activated in mid-October 2010. Signs have been placed at a total of four locations at both campgrounds to instruct visitors to evacuate to high ground in the event of a dam failure. These alarms are not incorporated directly into the dam failure alarm call out sequence, and are activated remotely by the Madison Plant Crew.

2. Evaluation of Detection and Response Timing

As previously mentioned, The Hebgen Project is inspected regularly, with the Assistant Reservoir Attendant available 24 hours a day, living adjacent to the dam. The Assistant Reservoir Attendant conducts routine inspections of the dam and NWE Engineering Personnel conduct scheduled dam safety inspections or additional inspections as warranted due to Assistant Reservoir Attendant or Madison Plant Operator surveillance and/or requests. As a result, detection of even a slowly developing potential issue with the dam would likely happen very quickly (i.e., potentially within 24 hours, but likely within less than a week). In addition, because the Assistant Reservoir Attendant is onsite, a rapidly developing problem, like sabotage, would also likely be identified quickly (i.e., while it’s occurring).

Response times will vary based on the severity of the issue, which correlates to the emergency level determination made for an incident or emergency and resulting EAP activation. For all emergency levels NWE will have personnel onsite since employees live near Hebgen Dam. Engineering Personnel and supervisors will also respond and be available onsite in the event of an EAP activation. For Hebgen, non-resident NWE personnel can be onsite within one to two hours to further evaluate conditions at the dam.

Phone drills have been conducted at Hebgen every other year from 1990 – present. Because the notification procedures for Madison and Hebgen are virtually identical; the plants rotate performing the annual phone drill.

The combination of rapid detection and notification provided by NWE personnel ensures maximum early warning to everyone involved and allows emergency managers to expedite their response to the maximum extent practicable.

3. Access to the Site

Hebgen Dam is located directly south of Montana Highway 287. Access is from the east via Montana Highway 191 westbound onto Highway 287 or from the north down Highway 287 from Ennis, MT.

Driving time for responders from Ennis is approximately 50 minutes.

4. Response during Periods of Darkness

There are six high-pressure sodium vapor streetlights on top of the dam. One additional streetlight is located on the intake structure.

In the event of a loss of power, releases through the outlet pipe can be controlled by operating the gates with power supplied by a LPG powered standby generator located in a building behind the intake structure. Releases through the spillway can be controlled by use of a hand-held drill on the hoisting mechanism of each of the six vertical slide gates. A 3,500-watt portable gasoline powered generator is also available for this purpose.

Hand-held lanterns and flashlights can provide adequate light during hours of darkness if power sources for lighting fail.

With an Assistant Reservoir Attendant living at the development, the response time during hours of darkness will be kept to a minimum.

5. Response during Weekends and Holidays

At all times, there is a Hydro Supervisor On-Call. The Supervisor "On-Call" rotation involves assigned NWE Hydro Operations Supervisors. Each Supervisor has a cell phone that is to be used if he or she is not available at the office or at home.

The alarm system and callout system is virtually the same as that described in detail under Section G.1.

6. Response during Adverse Weather

After any measurable snowfall, the highway is plowed and sanded by the State Highway Department. The dam is also accessible by foot from U.S. Highway 287. NWE maintains a snowmobile at its Hebgen garage to cross the dam during heavy snowfall.

During periods of adverse weather when flooding could occur (heavy rainfall, prolonged rainfall, heavy runoff due to the snow melt, etc.), NWE's Madison crew will check the reservoir and dam as part of their weekly rounds.

The following types of incidents occurring along or near the reservoir can affect operation, performance and safety of the dam and its appurtenant facilities:

- Large landslides into the reservoir causing high waves at the dam and the possibility of overtopping, erosion and other damage at the dam.
- Landslides, rock falls and avalanches near the dam and structures.
- Large floating debris and ice, which could block spillways and intakes.

In the scenario that the intake control bridge access is blocked, the following options are available to the operators needing emergency access to the intake building:

- Climb along the hillside and access right behind the intake on the other end of the bridge.
- Use a boat to make way across lake and access the main deck level of the intake building from the shoreline or by ladder from the boat.
- If the lake is frozen, make way across lake by foot or motor vehicle and access the main deck level of the intake building from the shoreline or by ladder.

During periods of adverse weather, the Plant Operator or Relief Operator will examine the slopes along the reservoir rim and in the vicinity of the dam and facilities for potential instability including the following:

- Areas with history of previous slides.
- Evidence of incipient slides such as uphill cracks, heaves and dips, and tilted trees.
- Build-up of debris from higher slides or stream overflow above a slope.
- Substantial runoff draining and disappearing into large masses of soil and poor rock.
- Unfavorable geologic features such as steep dips towards the lake or the dam.

7. Alternative Sources of Power

Alternative power can be supplied via several station service reliability options including:

- A permanent standby generator is located in a building behind the intake structure.
- Power feed from Ennis Substation.
- One, portable 45kW backup generator on a trailer kept is also kept in a building behind the intake structure for operating the four vertical slide gates.

The four vertical slide gates at the dam can be operated by normal power from Ennis Substation, or with power from the 45 kW portable backup generator, or manually, making it possible to control emergency releases from the dam.

Releases from the outlet pipe can be controlled by operating the gates with power supplied by the standby generator at the intake. In the event of a power failure an automatic transfer switch starts the generator and transfers all power for the intake, operations building, controls, and all lighting to the standby generator.

8. Emergency Supplies and Information

The following area contractors have machinery that could be used in an emergency and are in close proximity to the project:

Hoe Construction
Box 936
Ennis, Montana 59729
Tim Hoe
(406) 682-[redacted] (W/H)

Matson Excavation
Box 533
Ennis, Montana 59729
Gordon Matson
(406) 682-[redacted] (W)
(406) 682-[redacted] (H)
(406) 580-[redacted] (Cell)
(406) 682-[redacted] (Shop)

Titan Construction
Ennis, Montana 59729
Contact: David Clark
Cell: (406) 599-[redacted]

These contractors can be contacted by phone and will be responsible for notifying their own operating engineers as needed, depending on the type of damage sustained and type of repair(s) required.

Depending on the magnitude of the emergency rapid transportation to the site may be warranted. While many NWE personnel can drive to the site in an hour or less, Table G.1 provides information on local air resources for transportation and reconnaissance.

Table G.1: AIR TRANSPORTATION SERVICES

Sunbird Aviation Gallatin Field – Belgrade (406) 388-[redacted] (24 hr) 1- Turboprop - 7 passenger 3 – Cessna 340's - 5 passenger Contact – Greg Fuller	Central Copters, Inc – Gallatin Field 206 Bell Ranger helicopter-4/5 passenger 6,000# heavy lift capabilities also Office: 586-[redacted] Cell: (406) 581-[redacted] Contact – Mark Duffy
Montana Aircraft Gallatin Field – Belgrade Two Cessna's – 3 & 5 passenger 1-pressurized turboprop-7 passengers (406) 581-[redacted] (24 hr) Contact - Doug Chapman	Carisch Helicopters Gallatin Field – Belgrade (406) 579-[redacted] (24 hr phone) (406) 556-[redacted] (24 hr pager) Bell 206-L4 six passenger helicopter Contact - Mike Carisch
Central Air Services, Inc (406) 350-[redacted] (24 hr) Lewistown, Montana Two, 4 & 6 passenger helicopters Contact – Charlie Rogers	Exec Air – Helena Airport Single and twin engine; up to 7 passenger Lear Jet – 5 passengers (406) 442-[redacted] (24 hr) Contacts: J. Maxness & D. Horhton
Minuteman Aviation, Inc. Missoula International Airport - Missoula (406) 728-[redacted] Helicopters and passenger aircraft	Billings Flying Service Billings (406) 252-[redacted] Heavy Lift and passenger helicopters
Billings Interagency Dispatch Center/USFS Info Line (406) 896-[redacted]	

9. Stockpiled Materials and Equipment

NWE cannot visualize a case in which stockpiling materials or use of equipment could reduce the effect of a dam failure. The processes involved in the sudden failure of an earth fill dam are too powerful to be mitigated by the emergency use of machinery or materials. In the event of a slowly developing situation

such as leakage through the dam or abutment, or eroding downstream material; sources of material and contractors are available within about 30 to 50 miles of the dam.

10. Coordination of Information

NWE is extensively involved in advanced planning for water resource usage in the Madison-Missouri drainage. NWE cooperates with the Natural Resources Conservation Service (NRCS) snow survey and with the USGS in their stream flow gaging. The yearly operation of the project is based on projected forecasts. In addition, NWE communicates daily during the runoff season with the U.S. Army Corps of Engineers concerning flood control procedures and runoff forecasts.

Actions taken to lower the reservoir water surface - It is not possible to lower the reservoir surface significantly, even in the event of a slowly developing failure, due to the tremendous amount of storage in Hebgen Lake.

Operators at Madison Dam, Broadwater Dam, and Canyon Ferry Dam will take appropriate actions to mitigate high river flows (i.e., pull or trip slide panels, open spill gates, deflate rubber dams, etc.).

11. Training and Exercises

A. Training

NWE has developed a training program that is used to train all NWE personnel involved with the EAP at the Hebgen Development. The training is provided on a yearly basis and includes, but is not limited to:

- A general discussion on how to respond properly to an emergency situation
- Procedures to follow throughout an emergency
- Basic communications skills - how and when to use them
    - Samples of typical communications for implementation of the Imminent Failure EAP Flowchart (see page 4) are given to all personnel during this training
- Routine monitoring based on Potential Failure Modes is discussed
- Response plans are reviewed
- The Imminent Failure Flowchart (see page 4) and Potential Failure Flowchart (see page 5) are reviewed for each failure scenario.

This training is held once every calendar year at a time and date to be determined by the EAP Coordinator.

B. Exercises

NWE conducts exercises in accordance with the FERC's guidelines and recommended exercise schedule to maintain familiarity with EAP procedures. The exercises involve NWE employees, emergency managers, and other appropriate stakeholders involved with the implementation of the EAP.

Annual Drills: Annual drills are intended to test the readiness of all personnel involved with the EAP and are typically conducted once every calendar year in conjunction with the annual EAP training. However, the Madison and Hebgen developments rotate between annual drills because they have many of the same stakeholders and are within relatively close proximity to each other.

During annual drills, the following aspects of the EAP process are discussed, simulated, and/or tested:

1. Potential Failure Modes are discussed and followed through with enactment drills.
    i. Relative safety of camp citizenry and downstream inhabitants is weighed and tested, using hypothetical situations.
2. Response during daylight and nighttime conditions.
    i. Training and drills include familiarity and use of all emergency, safety, first aid and substitute equipment.
    ii. Inventory of emergency supplies and resources is verified and updated at training sessions/drills.
3. Communications channels:
    i. Land-line Telephone systems
    ii. Mobile phone systems
    iii. NWE-owned mobile and base station radios
4. Notification procedures are practiced during the training session, emphasizing "test only" conditions, to authenticate all listed phone numbers. The order in which notification is made is the same as that required by an actual emergency. In order to prevent a misunderstanding, no reference to a "dam failure" is made during a "test only" condition. For clarity, the following statements are made at the beginning of each telephone contact: **"This is a <u>test</u> of the Emergency Action Plan for the Hebgen Project. This <u>test</u> <u>only</u> condition is for the implementation of the EAP Warning Flowchart on page 4 of the plan. Again, this is <u>only</u> <u>a test</u>."** The person making the contact should always ask, **"Do you understand how to carry out your responsibility according to the EAP?**" before ending the call.

The success of the annual test of readiness is determined by the EAP Coordinator. A critique of the test and any revisions or updates to the plan (or statement that no revisions or updates were needed) will be included in the EAP Status Report that is submitted to the FERC Regional Engineer no later than December 31 of each year. The critique includes the following:

1. Concerns regarding telephone contacts.
2. Evaluation of the time required to implement the test.
3. Identify areas of improvement to shorten time required to implement the EAP.
4. Address the testing of emergency power sources and remote surveillance systems used to signal an emergency situation (e.g., dam failure alarm).

Immediately following the test, verification is garnered from all entities holding Hebgen EAP manuals so a determination can be made that all have the most up-to-date manual available. This information shall also be included in the critique and submitted in writing to the FERC Regional Engineer by December 31, of each year.

Review of the test procedure will be documented by dam personnel and supervisory personnel. All personnel and agencies identified on the Imminent Failure Flowchart on page 4 will report verification of their phone contacts to the EAP Coordinator.

Comprehensive Drills: The FERC mandates that Comprehensive Drills, such as the Tabletop and Functional Exercise take place at one of NWE's hydro sites annually. Historically, the drills alternated

between the 5 different drainage basins. NWE typically combines the tabletop and functional exercises into back to back, two day events to improve stakeholder participation.

The **Tabletop** drill precedes the functional drill and involves a meeting of NWE officials and state and local emergency management officials in a conference room environment. This is usually considered the trial run of the more stress-induced functional exercise.

The **Functional** drill is the highest level exercise that **does not involve** the full activation of NWE and state and local emergency management agency field personnel and facilities or test the evacuation of residents downstream of the dam. What it **does involve** is all of the various levels of NWE and state and local emergency management personnel that would be involved in an actual emergency participating in an exercise of a stress-induced environment with time constraints that simulates a dam failure and other pertinent specified events. The participants "act-out" their actual roles. The exercise is designed to test the functionality of the EAP and evaluate the coordination activities between NWE and all other agencies.

12. Alternative Systems of Communication

There are various forms of communication systems available at Hebgen Dam. Four voice communication systems are available consisting of Leased Telephone System lines in the office at the dam and Assistant Reservoir Attendant's residence; NWE owned phone system lines in the Assistant Reservoir Attendant's residence; cellular phones; and there are radios in the Assistant Reservoir Attendant's house, in the office at the dam, in NWE vehicles and with every employee. The likelihood of all four systems being inoperable simultaneously is extremely remote. All personnel at the plant are familiar with each system and use them on a regular basis. NWE personnel shall base their selection of which system to use on the situation and on their own good judgment.

NWE has upgraded its radio system to a UHF-band trunked system; however, the original VHF high-band radio system will remain in use at the Madison Plant and Hebgen Dam. The VHF radios will continue to be used primarily because the new UHF-band trunked system does not currently provide coverage at Hebgen Dam itself. In addition, the VHF radios provide the ability to talk with local emergency responders and managers that improves notification and response times for emergencies at Hebgen Dam. The VHF high-band radios provide the following capabilities:

Table G.2: NWE RADIO SYSTEM

Radio Channel (Mode)	Description	Hebgen Dam - Group #3	Tone
1	Repeater	Tx: [redacted]	0250
2	Talk Around	Tx/	
3	Telephone	Tx:	8000
4	Truck to Truck	Tx/	
5	National Power	Tx/	
6	Mutual Aid Silver (Law)	Tx/	
7	Mutual Aid Gold (Government)	Tx/	
8	Mutual Aid Red (Fire)	Tx/	

9	Weather (NOAA)	
10	Weather (NOAA)	
11	Mutual Aid White (Ambulance)	
12	Mutual Aid Brown (DES)	
13	Gallatin Cty Sheriff - North	
14	Gallatin Cty Sheriff - South	
15	Madison Cty Sheriff – Norris Repeater	
16	Pager	
17	Madison R2	

The new UHF-band trunked radio system currently pro unications via zones and talk groups. Within each zone there are t ations to be narrowed down to particular smaller groups or individu

All of NWE's hydro facilities are set up under the Generation Zone. There are 12 talk groups in the Generation Zone that provide radio communications between radios at any one of the dams individually, between one or more dams, or between all of the dams and the Generation Control Center (GCC) simultaneously. The GCC is set up to monitor all of the radio communications within the Generation Zone and associated talk groups.

In the event that all phone systems are down or unavailable a Plant Operator or Plant Foreman can communicate via radio directly with the GCC or any of the other dams if necessary to relay an EAP activation. The GCC can then activate an EAP for any of the dams and begin making the necessary notification phone calls if phone calls cannot be made from the dam experiencing the emergency.

The office at the dam and Assistant Reservoir Attendant's house are equipped with internet connections providing the capability to send and receive company email and instant messages in the event that voice systems are not available.

With social media becoming a more prevalent method of communicating with large volumes of the general public, NWE's corporate communications department will likely utilize social media to communicate information about the incident, response, and follow-up. Emergency managers and the media have also started using social media to rapidly distribute warnings and information about emergency situations, which is anticipated for an incident involving Hebgen Dam.

13. Public Awareness and Communication

NWE has an active public awareness program to provide information related to safety around all of its facilities. Advertisements in the form of roadside billboards and television and radio commercials provide information to the public about typical warning signage and barriers used around NWE hydro facilities.

Due to the location of many of NWE's dams, recreationists frequent the areas immediately upstream and downstream of the dams for fishing, hiking, camping, and other outdoor activities. As a result, NWE posts safety information about recreation near its dams in parking areas, trailheads, or other locations where it is visible to the public.

There is public safety and warning information posted immediately up and downstream from the dam that indicates the types of warning signals used and the resulting actions that will occur at the dam or within the waterway if/when these signals are used. For example, warning signs might indicate, “sounding a wavering alarm tone will result in spill gates opening and downstream flows increasing as a result. Seek higher ground immediately upon hearing this tone.”

As previously mentioned, warning signs and sirens are installed at the USFS Cabin Creek campground and the privately-owned Campfire Lodge to maximize early warning to the public in these campgrounds immediately downstream from the dam.

H. Inundation Maps

The inundation maps contained in map pouches in this section of the plan depict flood wave information for two separate Hebgen Dam breach scenarios. Those scenarios are:

1. A "Fair Weather" breach of the dam, wherein "normal" full reservoir elevation and river flow conditions prevail prior to the dam failure. The "normal" channel is portrayed on the inundation maps, and is based on pre-breach base flows of 1,000 cfs at Hebgen Dam, 1,700 cfs in the Madison River below Quake Lake and 5,400 cfs in the Missouri River.

2. Failure during an "Inflow Design Flood (IDF)" condition. A peak flood inflow of 107,000 cfs into Hebgen Lake, and 9,700 cfs discharge from the dam were assumed to be occurring prior to the failure. The IDF without failure is not shown on the inundation maps. On the inundation maps, the IDF failure is referred to as the "major flood" failure, which is thought to be a more universally understood terminology.

The key map (sheet number one of fourteen) includes a map legend, which explains how the two inundation zones are portrayed on the inundation maps. It is standard on NWE EAP inundation maps to portray the "fair weather" failure inundation boundary by a yellow overlay outside of the normal riverbank, while the "major flood" failure inundation boundary is depicted by a red overlay. In the case of the Hebgen Dam EAP inundation maps, peak flood elevations and resultant inundation zones for the two different breach scenarios are too close to be shown separately, thus, the inundation zone boundary for either breach scenario is portrayed only by the "major flood" red overlay. Used in concert with the elevation contour lines on the maps, the inundation zone boundary lines clearly identify maximum flood wave elevations. A map sheet location index and tables of flood information for key locations are also included on the key map.

In 2015, all NWE inundation maps were re-prepared in the GIS-format in photographic and topographic views. The photographic version of the maps were distributed to plan holders along with the five-year complete revision of the EAP text. Hard copies of the topographic versions of the maps will be provided to any plan holder requesting a set. Both map versions will be included on the EAP information DVD that is provided to all plan holders. The GIS-format inundation maps provide flood planning assistance to county emergency management personnel that was not available on the previous versions of the maps.

Caution should be used in interpretation of the inundation maps. Because antecedent flow conditions and breach scenarios can vary widely, actual flood characteristics could be quite different from either of the floods portrayed. Flood levels and flood wave travel times are approximate, and should only be used as a guideline for establishing evacuation zones. Actual areas inundated would depend on actual failure conditions, and might differ from areas shown on the maps.

PART II: APPENDICES

Appendix A – Investigation and Analyses of Dam Break Floods

1. Method Used to Identify Potentially Inundated Areas

Hypothetical inundation boundaries and flood wave travel times were determined through application of the U.S. National Weather Services' DAMBRK flood forecasting computer software. The DAMBRK model represents one methodology for modeling of dam failures and the use of hydrodynamic theory to predict dam-break flood wave formation and routing. For the Hebgen Project, the DAMBRK study was completed on 5/05/1997 for the Fair Weather model and on 5/22/1997 for the Major Flood model.

In the model, Hebgen Dam was administratively failed using conservative assumptions, and the resultant flood waves for both the "Fair Weather" breach and failure during the "inflow design flood" (IDF) were routed through the downstream river reach to Canyon Ferry Reservoir below Townsend, Montana, a distance of over 140 miles.

2. Assumptions Made in the Analyses

In the "Fair Weather" breach model, it was assumed that antecedent flows into Hebgen Lake and through Hebgen Dam were 1,000 cubic feet per second (cfs). Just downstream from Hebgen Dam, Cabin and Beaver Creeks were assumed to contribute another 700 cfs to Madison River flows. One hundred and two miles downstream from the dam, where the Madison River joins the Jefferson and Gallatin Rivers to form the Missouri River, a total flow of 5,400 cfs was assumed. In the IDF breach model, the maximum inflow to Hebgen Lake was assumed to have peaked at 107,000 cfs, and combined outflows through the outlet works and spillway structure were at 9,700 cfs when the dam began to fail.

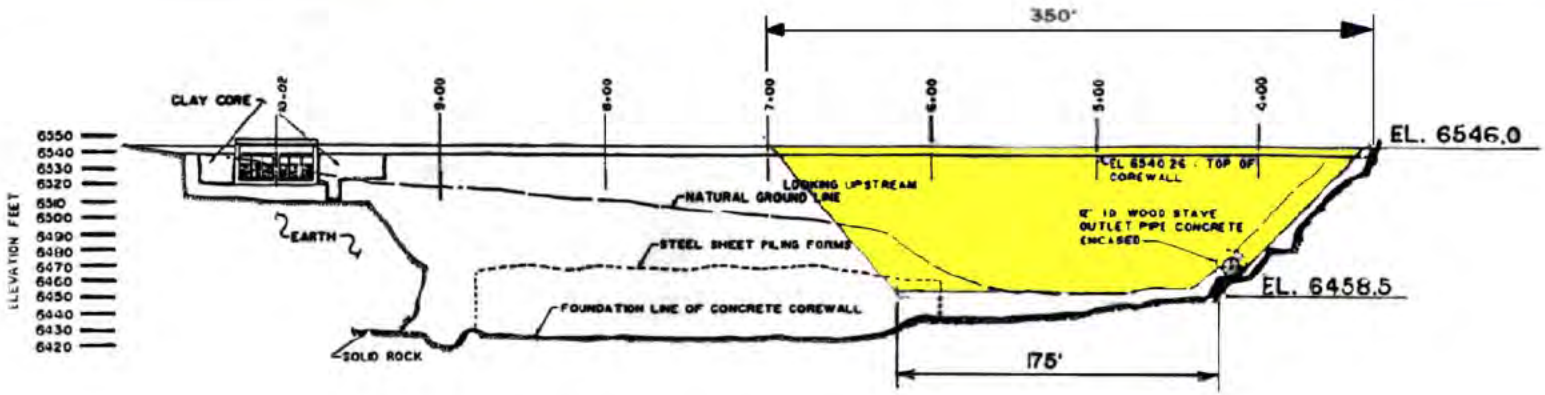
The reservoir was assumed to be at the normal full pond elevation of 6534.87 feet MSL in the "fair weather" breach model. For the IDF breach model, it was assumed that the reservoir had been deliberately surcharged to hold back flood inflows, and the water surface had peaked at elevation 6542.9 feet -- leaving 3.1 feet of freeboard to the dam crest at elevation 6546 feet -- at the time the dam began to fail.

The steady inflow hydrograph of 1,000 cfs used in the "fair weather" breach model is a typical summer flow for the Madison River below Hebgen Dam. Assumptions made about pre-breach conditions in the IDF breach model, including the inflow design flood hydrograph were based on the 1994 Hebgen Development Probable Maximum Flood (PMF) Evaluation, by Raytheon Infrastructure Services Incorporated. Relationships between reservoir water surface elevation, storage capacity, and total discharge capacity were taken from Montana Power Company records and tables.

Figure A-1, on the following page, portrays elevation and section views of the dam, including dimensions, with the assumed breach indicated in yellow.

Figure A1

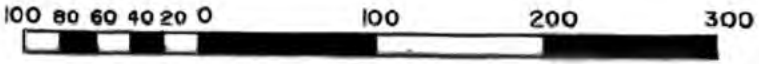
Hebgen EAP Assumed Breach



CROSS-SECTION ALONG ℄ OF COREWALL
LOOKING UPSTREAM
1" = 100'

CROSS-SECTION OF DAM AT STA. 5+00

1" = 100'



SCALE: 1" = 100'

NorthWestern Energy

EMERGENCY ACTION PLAN
HEBGEN DAM
ASSUMED BREACH
FIGURE A1

12-1-98

The assumptions made regarding the temporal and geometric description of the model's Hebgen Dam breach are within the range of suggested breach parameters outlined in the FERC Engineering Guidelines. The breach was assumed to be trapezoid-shaped, with a top width of 350 feet, a bottom width of 175 feet, and a depth of 87.5 feet below the top of the dam, to the elevation of the original ground line. The assumed breach of the engineered, compacted earthen dam took one hour to fully develop.

As a means of logically choosing Manning's n channel roughness values for application in the model, cross-sections at existing gaging stations below Hebgen Dam were analyzed using Manning's equation, whereby the cross-section shape, water surface elevation, and slope were known, and the equation was solved for n. Data was available for gaging stations on the Madison River below Hebgen Dam and below Ennis Lake, and on the Missouri River at Toston. While floods of a magnitude resulting from a dam-failure caused flood have never been measured at these locations, it is thought that analysis of the highest recorded flows at these gaging stations would yield more accurate Manning's n values than those arbitrarily selected from reference books. A Manning's n channel roughness coefficient value of 0.08 was used in the Madison River from Hebgen Dam to Ennis Lake, a value of 0.054 was used in the Madison River from Madison Dam to the Missouri River, and a value of 0.041 was used in the Missouri River from the headwaters to Canyon Ferry Reservoir.

Hydraulic cross-sections for Hebgen Lake, Quake Lake and Ennis Lake were modeled using data from echo fathometer surveys conducted in 1993 and 1994, by Druyvestein, Johnson and Anderson Consulting Engineers. The remaining cross-sections and channel slopes were developed from USGS topographical maps with 10, 20 and 40-foot contour intervals. The 79 cross-sections modeled for the analyses were located where significant changes in channel configuration occur and at sites of specific concern, such as towns, recreation sites, and highway bridges.

3. Consideration of the Domino Effect

The domino effect - a sequential failure of downstream dams as a result of the failure of Hebgen Dam was considered in both the "fair weather" and IDF breach models. As described in Section D, of this plan, the Madison Slide dams the Madison River approximately six miles downstream from Hebgen Dam and impounds Quake Lake. Madison Dam lies sixty-five miles below Hebgen Dam, Broadwater Dam is built on the Missouri River approximately 124 miles downstream of Hebgen Dam, and Canyon Ferry Dam lies nearly 170 miles downstream.

The Hebgen Dam breach outflows for the "fair weather" and IDF breach models -- with peaks of 458,000 cfs and 567,400 cfs, respectively -- were first routed to Quake Lake.

Much consideration was given to deciding how to best model the effect of such high flows on the natural spillway on Quake Lake. The "dam" at Quake Lake was assumed to be very poorly constructed, since it exists as the result of an earthquake-caused landslide. This is evidenced by the fact that erosion of the natural spillway begins to occur at flows over 3,500 cfs. However, the volume of material present in the slide which would have to be moved in order for the slide to "fail" is at least sixteen times the volume that would exist in an engineered earthen dam of similar height. In order to ensure that the Model's output reflect a "worst case" failure of the Madison Slide, a sensitivity analyses of the breach

parameters was performed, wherein a range of conceivable combinations of breach widths, times to failure, etc., were modeled. The “Madison Slide” breach chosen for the model was trapezoidal, with a bottom width of 272 feet, 1:1 side slopes, and a depth of 136.5 feet. Given the considerable amount of earth that would have to be washed away, it was conservatively assumed to take four hours for the breach to fully develop. The resulting outflow hydrograph from the breach of the Madison Slide in the "fair weather" breach model peaked at 714,000 cfs. The peak Quake Lake outflow in the IDF breach model was 842,000 cfs.

By the time the models' flood waves reached Madison Dam, the flows had attenuated to 212,000 cfs ("fair weather" breach), and 289,000 cfs (IDF breach), with much of the attenuation taking place as the flood waves passed through Ennis Lake. A sensitivity analysis of varied Madison Dam breach assumptions was conducted. The model was run with no Madison Dam breach at all, a spillway section breach, and a right abutment breach at various degrees of overtopping. The sensitivity analysis showed that, regardless of the breach (or no breach) chosen, peak flood stages and arrival times at downstream cross-sections varied only slightly. For the model upon which the inundation maps are based, a spillway section breach was assumed to occur when the dam was overtopped by 12.1 feet. This is the amount of overtopping during the peak of a PMF event at Madison Dam.

The flood waves had attenuated to 201,000 cfs ("fair weather" breach), and 277,000 cfs (IDF breach), by the time they reached Broadwater Dam. According to spillway rating data supplied by the State of Montana, the modeled flow would overtop the dam crest by nearly sixteen feet in the case of a "fair weather" breach of Hebgen Dam, and over twenty-two feet in the IDF failure case. Although these inflows are much less than the established PMF for the project (495,000 cfs), Broadwater engineers state that the dam will fail at flows exceeding 69,000 cfs due to washout of the abutments.

Canyon Ferry Reservoir is operated such that the top three feet between elevation 3,797 and 3,800 are designated for exclusive flood control. There are 102,276 acre-feet of storage in this zone. The next 27 feet of storage between elevations 3,770 and 3,797 contain 799,124 acre-feet, and are designated joint-use storage. The reservoir level can fluctuate between elevations 3,700 and 3,800 in order to satisfy the various uses for which it was intended. Over the past several years, Canyon Ferry's average lake level has been approximately fourteen feet below the maximum allowable water surface elevation.

The combined volumes of Hebgen Lake, Quake Lake and Ennis Lake at normal full pond elevations can be contained in the top seventeen feet of Canyon Ferry Reservoir. In the event of a "fair weather" failure of Hebgen Dam, with ten feet of storage available in Canyon Ferry Reservoir, an average release of about 29,000 cfs, commencing one hour after the failure of Hebgen began, until outflows dropped below 29,000 cfs, would necessarily be maintained to not exceed that ten feet of storage. In the event Canyon Ferry Reservoir was full to the top of the active conservation storage pool (el. 3797), Canyon Ferry could stay below the exclusive flood control storage elevation (el. 3800) by maintaining average releases of 80,500 cfs for the period commencing one hour after the Hebgen Dam failure begins, until inflows drop below 80,500 cfs. Canyon Ferry, Hauser and Holter Dams are all capable of passing flows of this magnitude without exceeding normal full pond elevation. Thus, it was judged that failure of Hebgen Dam would not cause Canyon Ferry Dam or other dams downstream to fail.

4. Special Considerations in Dam Breach Analyses

In addition to consideration of the domino effect, several other special considerations were accounted for in the Hebgen DAMBRK model.

One important consideration in development of the model was the discrepancies between the USGS elevation datums and the elevation datums used on NWE drawings, flow rating curves, storage tables, etc., for Hebgen and Madison Dams. In combining geometric data from both USGS and NorthWestern Energy sources, all NWE elevations were converted to the equivalent USGS elevations.

Special care was taken to accurately model Quake Lake, Ennis Lake, and the canyon channel from Ennis Lake's outlet to Madison Dam, so that DAMBRK's dynamic reservoir routing option could be used. Echo fathometer survey data discussed previously in Appendix A.2 was used to replicate these sections. The modeled cross-sectional descriptions of these reaches were checked to ensure the modeled volumes matched accepted elevation/storage relationship data.

The substantial length of the entire reach potentially affected by a failure of Hebgen Dam necessitated division of the river into two separate models. The first model encompassed the 60-miles reach between Hebgen Dam and the upper end of Ennis Lake, including the Madison Slide and Quake Lake. The flow hydrograph at the last cross-section in the first-reach model was then used as the inflow hydrograph for the second-reach model, which consisted of the 84-mile reach from Ennis Lake to Canyon Ferry Reservoir, including the Madison Dam and Broadwater Dam.

5. Results of the Analysis

A major failure of Hebgen Dam, and subsequent failure of the Madison Slide which impounds Quake Lake, would have a catastrophic impact on the downstream floodplain. Campgrounds, farmlands, developments and communities along the river, including Ennis, Three Forks and Townsend, would experience varying degrees of flooding and require selective evacuation. Utility services to these areas could be impacted. Sections of highways near the river would be inundated and impassable, and downstream bridges could be destroyed or damaged by the flood.

Very little attenuation of the breach-caused flood wave occurs in the somewhat constricted valley immediately downstream of Hebgen Dam above Ennis Lake, or in the Bear Trap Canyon below Ennis Lake. However, where the river is impounded as Ennis Lake and where the breach-caused flood surge dissipates across the wide reservoir, the flood hydrograph attenuates significantly. Also, where the river abruptly leaves the Bear Trap Canyon and begins its path toward Three Forks, a great deal of attenuation occurs as the flood waters inundate thousands of acres of low-lying flood plains.

Results of the DAMBRK study are summarized and plotted on the Hebgen Dam EAP inundation maps (contained in map pouches in the inundation map Section VII). The key map (sheet number one of fourteen) contains tables of information, including flood wave heights and travel times, for key locations downstream of Hebgen Dam. The other inundation maps delineate potentially inundated areas on photographic maps of the affected region. Section H further describes the inundation maps.

6. Termination of Flood Routing

As described in Section A.3 of this appendix, the volume of water released due to the modeled failures of Hebgen Dam, the Madison Slide (Quake Lake) and Madison Dam could be contained in Canyon Ferry Reservoir, and/or safely passed by Canyon Ferry Dam. Due to the conservative nature of the assumptions used in the model, it is highly unlikely that a flood wave of the magnitude that the models indicate would actually occur if Hebgen were to fail. Breaches of smaller proportions at any of the three dams -- especially Hebgen Dam or the Madison Slide -- would significantly reduce the peak flow and quantity of water entering Canyon Ferry Reservoir. Based on this fact and that additional storage is available in Hauser and Holter Reservoirs, it is reasonable to discontinue routing of the flood wave at Canyon Ferry Reservoir, approximately 140 river miles downstream from Hebgen Dam. Ongoing assessment of an actual failure event would dictate actions warranted in response to potential flooding below Canyon Ferry.

Appendix B – Plans for Training, Exercising, Updating, and Posting the EAP

1. Training

Training will be provided on a yearly basis for all NWE personnel involved with the EAP at the Hebgen Development. This training will include, but is not limited to:

- A general discussion on how to respond properly to an emergency situation.
- Procedures to follow throughout an emergency.
- Basic communications skills - how and when to use them. Samples of typical communications during implementation of the EAP Imminent Failure Flowchart (see page 4) will be given to all personnel during this training.
- Potential Failure Modes will be discussed.
- Response plans will be reviewed.
- The Imminent Failure Flowchart (see page 4) and Potential Failure Flowchart (see page 5) will be reviewed for each failure scenario.

This training will be held once every 12 months at a time and date to be determined by the EAP coordinator and will be held in conjunction with the annual review of the EAP.

2. Exercise

A. Annual Drills

- Training of all personnel involved with the EAP will be conducted at least once every year. Testing the readiness of all personnel involved with the EAP will be conducted once every year.
- Potential Failure Modes will be discussed and followed through with enactment drills.
    - Relative safety of camp citizenry and downstream inhabitants will be weighed and tested, using hypothetical situations.
- Response plans will be enacted for daylight and nighttime conditions.
    - Training to include familiarity and use of all emergency, safety, first aid and substitute equipment.
    - Inventory of emergency supplies and resources to be maintained and updated at training sessions.
- Communications channels to be tested during training sessions will be:
    - Leased Telephone System phone.
    - NWE-owned phone system
    - NWE-owned mobile and base station radios.
- Notification procedures will be exercised during the training session, emphasize "test only" conditions, to authenticate all listed phone numbers. The order in which notification is made will be the same as that required by an actual emergency. In order to prevent a misunderstanding, no reference to a "dam failure" is to be made during a "test only" condition. For clarity, the following statements should be made at the beginning of each telephone contact: **"This is a test of the Emergency Action Plan for the Hebgen Project. This test only condition is for the implementation of the EAP Warning Flowchart on page 4 of the plan. Again, this is only a**

test." The person making the contact should always ask, **"Do you understand how to carry out your responsibility according to the EAP?"** before ending the call.

The success of the annual test of readiness will be determined by the EAP Coordinator. A critique of the test and any revisions or updates to the plan (or statement that no revisions or updates were needed) will be included in the Hebgen EAP Status Report that is submitted to the FERC Regional Engineer no later than December 31 of each year. The critique will include the following:

- Concerns regarding telephone contacts.
- Evaluation of the time required to implement the test.
- Identify areas of improvement to shorten time required to implement the EAP.
- Address the testing of emergency power sources and remote surveillance systems used to signal an emergency situation (i.e., dam failure alarm).

Immediately following the test, verification will be garnered from all entities holding Hebgen EAP manuals so determination can be made that all have the most up-to-date manual available. This information will also be included in the critique and submitted in writing to the FERC Regional Engineer by December 31, of each year.

Review of the annual test procedure will be documented by dam personnel and supervisory personnel. All personnel and agencies identified on the Imminent Failure flowchart on page 4 will report verification of their phone contacts to the EAP Coordinator.

B. Comprehensive Drills

FERC mandates that Comprehensive Drills, such as the Tabletop and the Functional Exercise, take place at one of NWE's hydro sites annually. Historically, the drills have alternated between five different drainage basins affected by NWE's eleven dams in Montana so that each drainage area has a comprehensive drill once every five years.

The Tabletop drill precedes the functional drill and involves a meeting of NWE officials and the state and local emergency management officials in a conference room environment. This is usually considered the trial run of the more stress-induced functional exercise.

The Functional drill is the highest level exercise that does not involve the full activation of NWE and state and local emergency management agency field personnel and facilities or test the evacuation of residents downstream of the dam. What it does involve is all of the various levels of NWE and state and local emergency management personnel that would be involved in an actual emergency. The exercise takes place in a stress-induced environment with time constraints and simulates a dam failure and other pertinent specified events. The participants "act-out" their actual roles. This exercise is designed to test the functionality of the EAP and evaluate the coordination activities between NWE and all other agencies.

3. Annual Updates

A review of the adequacy of the EAP will be conducted once a year. This review is to verify phone numbers, names, position titles, etc. A determination of any new developments or other changes

downstream or elsewhere will be made to determine whether any revisions to the current EAP are necessary. Revisions will be made immediately after any changes are discovered and updated pages to the EAP will be mailed to each person or entity holding a Hebgen EAP manual. A statement will be furnished to the Regional Engineer prior to December 31 that states the EAP has been thoroughly reviewed and includes the date it was last tested. Attached to this statement will be updated pages or a separate statement that no revisions or updates were needed.

4. Posting the EAP

The Hebgen Imminent Failure EAP Flowchart (see page 4) and Potential Failure Flowchart (see page 5) will be permanently posted in the Madison operator room, behind the operator's desk on the wall.

Copies of the Hebgen EAP will be maintained and readily available at the following locations:

- Assistant Reservoir Attendant's House/NWE Office - Hebgen
- Relief Assistant Reservoir Attendant's House - Hebgen
- NWE Madison Plant
- NWE O&M Supervisor
- NWE Hydro Generation - Butte
- NWE Hydro Operations - Great Falls
- NWE Generation Control Center
- NWE Lead Resource Coordinator - Butte
- NWE Director Corporate Communications - Butte
- NWE Corporate Office - Butte
- NWE Grid Operations Control Center - Butte
- NWE Division Headquarters – Bozeman
- Deputy Sheriff's Office - Gallatin County in West Yellowstone
- Sheriff's Office - Gallatin County
- Sheriff's Office - Madison County
- Sheriff's Office - Broadwater County
- Ennis Police Department – Ennis, MT
- West Yellowstone Police Department – West Yellowstone, MT
- Madison Valley Rural Fire Department – Ennis, MT
- Montana Disaster and Emergency Services - Helena (DES)
- District 3 DES State Representative - Livingston
- DES Coordinator - Madison County
- DES Coordinator - Gallatin County
- DES Coordinator - Broadwater County
- Federal Energy Regulatory Commission – Portland
- State of Montana DNRC - Helena
- Broadwater Dam (State of Montana DNRC)
- U.S. Bureau of Reclamation - Canyon Ferry Dam
- U.S. Bureau of Reclamation - Wyoming Area Office (Casper Control Center)
- U.S. Bureau of Reclamation - Montana Area Office
- U.S. Forest Service - West Yellowstone

- U.S. Forest Service - Ennis
- National Weather Service (NWS) - Great Falls
- U.S. Bureau of Land Management (BLM) Dillon and Ennis Offices
- Campfire Lodge – Hebgen Dam

Appendix C – Site Specific Concerns

The Quake Lake outlet is the site-specific concern for Hebgen Dam. Quake Lake is located approximately 2 miles downstream of Hebgen Dam and was formed by an earthquake induced landslide at the west end of the lake. This property is not owned by NWE; however, the operation or failure of Hebgen Dam along with the two tributaries between Hebgen and Quake Lake contribute to the overall outflows of Quake Lake. The natural restriction of the landslide is stable up to flows of about 3,500 cfs. Flows beyond 3,500 cfs could cause degradation or failure of the natural barrier at the outlet of Quake Lake.

Appendix D – Documentation

Descriptions of EAP plan holder orientation meetings and tabletop and functional exercises are located in Section 2 of the Hebgen EAP Status Report.

Additional forms and documents related to this EAP are provided on the following pages and include:

- Notification Response Form
- EAP Approval Statement
- Hebgen EAP Plan Holders List

NOTIFICATION RESPONSE FORM

HEBGEN PROJECT (FERC PROJECT NO. 2188(09)

Emergency Action Plan Drill

Please complete this form immediately after you are notified that an exercise or actual implementation of the Hebgen Emergency Action Plan (EAP) is in progress. You may wish to use the spaces provided on the 2nd page of this form to record the message(s) received and message(s) conveyed during the exercise.

Please mail the completed form to the person listed below within 24 hours, so that the exercise can be thoroughly documented. Your cooperation is greatly appreciated.

I, _____ (Name) _____ (title) was/was not notified at _____ a.m./p.m. on _____ (date) by _____ (name) via _____ that an exercise of the Hebgen EAP was in progress.

The Hebgen EAP on file with this agency has a revision date of _____ (see Title Page).

_____
(Signature)

_____
(Agency)

Mail form to:

Dustin Kaste
EAP Coordinator
NorthWestern Energy
11 East Park
Butte MT 59701

COMMENTS:

MESSAGE(S) RECEIVED:

1. Contacted by _____
(name/agency)
via (phone #/radio) _____ _____ a.m./p.m.

MESSAGE:

2. Contacted by _____
(name/agency)
via (phone #/radio) _____ _____ a.m./p.m.

MESSAGE:

MESSAGE(S) CONVEYED:

1. Contacted _____
(name/agency)
via (phone #/radio) _____ _____ a.m./p.m.

MESSAGE:

2. Contacted _____
(name/agency)
via (phone #/radio) _____ _____ a.m./p.m.

MESSAGE:

3. Contacted _____
(name/agency)
via (phone #/radio) _____ _____ a.m./p.m.

MESSAGE:

4. Contacted _____
(name/agency)
via (phone #/radio) _____ _____ a.m./p.m.

MESSAGE:

Approval of the EAP

It is necessary that plan holders involved in emergency response acknowledge their roles and responsibilities in the Hebgen EAP. Once signed, copies of these forms are kept on file at NorthWestern Energy's Hydro Generation office in Butte. They are also sent to the Federal Energy Regulatory Commission (FERC). This form requires the signatures of EAP plan holders responsible for emergency response activities only when the entire Hebgen Development EAP is revised (at least once every five years) or when the agencies determine that changes should be made on their evacuation and/or emergency response designations.

I, _____ (name) _____ (title)

_____ (agency) approve of NWE's Hebgen Development Emergency Action Plan and of my responsibility set forth in the EAP.

Signature: _____

Date: _____

HEBGEN EAP PLAN HOLDERS LIST

FERC – Portland, Oregon Office
NorthWestern Energy O & M Supervisor – Bozeman, MT
NorthWestern Energy Madison Dam Foreman – Ennis, MT
NorthWestern Energy Hebgen Dam Assistant Reservoir Attendant – Hebgen Dam
NorthWestern Energy Hebgen Dam Relief Assistant Reservoir Attendant – Hebgen Dam
NorthWestern Energy Hydro Generation – Butte, MT
NorthWestern Energy Superintendent, Hydro O&M – Great Falls, MT
NorthWestern Energy Hydro System Operators – Great Falls, MT
NorthWestern Energy Lead Resource Coordinator– Butte, MT
NorthWestern Energy Director Corporate Communications – Butte, MT
NorthWestern Energy Corporate Office –Butte, MT
NorthWestern Energy Grid Operations Control Center – Butte, MT
NorthWestern Energy Division Headquarters – Bozeman, MT
Deputy Sheriff's Office - Gallatin County in West Yellowstone
Sheriff's Office – Gallatin County
Sheriff's Office – Madison County
Sheriff's Office – Broadwater County
Ennis Police Department – Ennis, MT
West Yellowstone Police Department – West Yellowstone, MT
Madison Valley Rural Fire Department – Ennis, MT
Montana Disaster & Emergency Services – Helena, MT
Montana DES District 3 State Representative – Livingston, MT
DES – Gallatin County
DES – Madison County
DES – Broadwater County
Montana Department of Natural Resources and Conservation – Helena, MT
Broadwater Dam (MT DNRC) – Toston, MT
US Bureau of Reclamation Montana Area Office – Billings, MT
US Bureau of Reclamation Casper Control Center – Casper, WY
US Bureau of Reclamation – Canyon Ferry Dam Helena, MT
US Forest Service Hebgen Lake Ranger District – West Yellowstone, MT
US Forest Service Madison Ranger District - Ennis
US National Weather Service – Great Falls, MT
US Bureau of Land Management – Dillon, MT
US Bureau of Land Management – Ennis, MT
Campfire Lodge – Hebgen Dam

Hebgen Dam Emergency Action Plan

Sheet 1 of 14

"FAIR WEATHER" DAM FAILURE

	LOCATION (MILES DOWNSTREAM OF DAM)		NORMAL RIVER ELEVATION (FEET MSL)	MAXIMUM FLOOD WAVE ELEVATION (FEET MSL)	MAXIMUM FLOW (CFS)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO RISE OF TWO FEET (HOURS)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO MAXIMUM RISE (HOURS)	APPROXIMATE AVERAGE RATE OF CHANGE IN WATER SURFACE ELEVATION BETWEEN RISE OF 2 FEET AND MAXIMUM RISE
1	0.7	CAMPFIRE LODGE	6442.3	6488.3	455,691	19 MINUTES	1 HR. 7 MIN.	0.9 FT/MIN
2	3.2	BEAVER CREEK CAMPGROUND	6390.3	6435.5	439,404	58 MINUTES	2 HR. 14 MIN.	0.6 FT/MIN
3	8.4	SLIDE INN	6173.3	6219.5	713,425	1 HR. 17 MIN.	3 HR. 26 MIN.	0.3 FT/MIN
4	17.8	KIRBY RANCH	5862.4	5907.2	700,234	3 HR. 2 MIN.	4 HR. 19 MIN.	0.6 FT/MIN
5	25.8	KELLY BRIDGE	5679.1	5720.7	685,857	4 HR.10 MIN.	4 HR. 58 MIN.	0.8 FT/MIN
6	32.4	W. MADISON RECREATION AREA	5509.8	5551.0	668,175	4 HR. 58 MIN.	5 HR. 41 MIN.	0.9 FT/MIN
7	35.5	McATEE BRIDGE	5439.5	5470.9	655,422	5 HR. 24 MIN.	6 HR. 5 MIN.	0.7 FT/MIN
8	46.5	VARNEY BRIDGE	5134.3	5157.2	581,469	7 HR. 14 MIN.	7 HR. 50 MIN.	0.6 FT/MIN
9	51.4	EIGHT MILE FORD CAMP GROUND	5013.5	5048.0	554,534	8 HR. 14 MIN.	8 HR. 53 MIN.	0.9 FT/MIN
10	54.9	ENNIS	4930.6	4952.3	539,264	8 HR. 41 MIN.	9 HR. 30 MIN.	0.5 FT/MIN
11	66.2	MADISON POWERHOUSE	4700.3	4746.5	211,687	10 HR. 48 MIN.	19 HR. 31 MIN.	5.1 FT/HR
12	74.1	WARM SPRINGS ACCESS	4506.9	4549.0	211,644	11 HR. 55 MIN.	20 HR. 53 MIN.	4.4 FT/HR
13	78.7	RED MTN CAMPGROUND HWY 84 BRIDGE	4440.0	4457.8	211,594	12 HR. 43 MIN.	20 HR. 14 MIN.	2.1 FT/HR
14	85.9	GREY CLIFF	4303.7	4315.7	211,471	14 HR. 38 MIN.	21 HR. 22 MIN.	1.5 FT/HR
15	99.3	THREE FORKS	4069.7	4080.8	211,086	18 HOURS	23 HR. 46 MIN.	1.6 FT/HR
16	105.0	TRIDENT	4025.2	4053.1	205,756	19 HR. 46 MIN.	27 HR. 36 MIN.	3.3 FT/HR
17	113.5	CLARKSTON	3981.6	4003.0	203,621	21 HR. 31 MIN.	31 HR. 16 MIN.	2.0 FT/HR
18	123.9	BROADWATER DAM	3952.6	3973.3	201,020	23 HR. 17 MIN.	31 HR. 36 MIN.	2.2 FT/HR
19	129.1	TOSTON	3901.1	3915.5	199,250	24 HR. 14 MIN.	32 HR. 38 MIN.	1.5 FT/HR
20	135.4	HIGHWAY 287	3861.0	3874.8	198,970	26 HR. 29 MIN.	35 HR. 7 MIN.	1.4 FT/HR
21	139.2	DEEP CREEK	3839.8	3855.2	198,740	27 HR. 36 MIN.	35 HR. 55 MIN.	1.6 FT/HR
22	142.4	TOWNSEND	3814.2	3826.4	198,654	28 HR. 34 MIN.	35 HR.41 MIN.	1.4 FT/HR

The "Fair Weather" Failure scenario is based on a hypothetical failure during normal summer flows and full reservoir conditions.

"MAJOR FLOOD" DAM FAILURE

	LOCATION (MILES DOWNSTREAM OF DAM)		PRE-BREACH RIVER ELEVATION (FEET MSL)	MAXIMUM FLOOD WAVE ELEVATION (FEET MSL)	MAXIMUM FLOW (CFS)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO RISE OF TWO FEET (HOURS)	APPROXIMATE TIME FROM BEGINNING OF BREACH TO MAXIMUM RISE (HOURS)	APPROXIMATE AVERAGE RATE OF CHANGE IN WATER SURFACE ELEVATION BETWEEN RISE OF 2 FEET AND MAXIMUM RISE
1	0.7	CAMPFIRE LODGE	6447.2	6492.5	564,942	19 MINUTES	1 HR. 7 MIN.	0.9 FT/MIN
2	3.2	BEAVER CREEK CAMPGROUND	6390.3	6442.1	554,338	48 MINUTES	2 HR. 7 MIN.	0.6 FT/MIN
3	8.4	SLIDE INN	6176.6	6222.7	841,408	1 HR. 7 MIN.	3 HR. 19 MIN.	0.3 FT/MIN
4	17.8	KIRBY RANCH	5865.6	5911.3	827,449	2 HR. 46 MIN.	4 HR. 10 MIN.	0.5 FT/MIN
5	25.8	KELLY BRIDGE	5682.4	5723.3	812,968	3 HR. 53 MIN.	4 HR. 43 MIN.	0.8 FT/MIN
6	32.4	W. MADISON RECREATION AREA	5509.1	5553.6	797,385	4 HR. 48 MIN.	5 HR. 22 MIN.	1.2 FT/MIN
7	35.5	McATEE BRIDGE	5442.4	5473.4	786,606	5 HR. 7 MIN.	5 HR. 43 MIN.	0.8 FT/MIN
8	46.5	VARNEY BRIDGE	5136.4	5159.0	717,860	6 HR. 59 MIN.	7 HR. 28 MIN.	0.7 FT/MIN
9	51.4	EIGHT MILE FORD CAMP GROUND	5016.2	5048.6	669,474	7 HR. 47 MIN.	8 HR. 30 MIN.	0.7 FT/MIN
10	54.9	ENNIS	4933.1	4953.9	652,043	8 HR. 25 MIN.	9 HOURS	0.5 FT/MIN
11	66.2	MADISON POWERHOUSE	4703.6	4754.5	289,485	10 HR. 14 MIN.	20 HR. 34 MIN.	2.8 FT/HR
12	74.1	WARM SPRINGS ACCESS	4509.4	4556.3	289,452	11 HR. 55 MIN.	22 HR. 38 MIN.	4.2 FT/HR
13	78.7	RED MTN CAMPGROUND HWY 84 BRIDGE	4442.5	4460.3	289,431	12 HOURS	21 HR. 17 MIN.	1.7 FT/HR
14	85.9	GREY CLIFF	4304.7	4320.5	289,315	13 HR. 41 MIN.	22 HR. 14 MIN.	1.6 FT/HR
15	99.3	THREE FORKS	4071.1	4082.4	288,981	16 HR. 48 MIN.	24 HR. 24 MIN.	1.2 FT/HR
16	105.0	TRIDENT	4027.2	4057.8	282,451	18 HR. 24 MIN.	28 HR. 5 MIN.	3.0 FT/HR
17	113.5	CLARKSTON	3981.6	4008.1	279,422	21 HR. 2 MIN.	32 HR. 34 MIN.	2.3 FT/HR
18	123.9	BROADWATER DAM	3952.6	3980.4	276,594	21 HR. 46 MIN.	31 HR. 50 MIN.	2.8 FT/HR
19	129.1	TOSTON	3901.1	3917.5	270,545	22 HR. 21 MIN.	33 HR. 36 MIN.	1.4 FT/HR
20	135.4	HIGHWAY 287	3861.0	3874.8	270,290	25 HR. 22 MIN.	36 HR. 29 MIN.	1.4 FT/HR
21	139.2	DEEP CREEK	3839.8	3855.2	270,074	--	37 HR. 12 MIN.	--
22	142.4	TOWNSEND	3814.2	3828.3	269,995	26 HR. 5 MIN.	36 HR. 14 MIN.	1.2 FT/HR

The "Major Flood" scenario is based on a hypothetical dam failure during a "Probable Maximum Flood" (PMF) event.

LEGEND

1 Location	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation (Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	0.0	0000.0	0.0	0.0	Hr/Min	Hr/Min
Major Flood	0.0	0000.0	0.0	0.0	Hr/Min	Hr/Min

TYPICAL FLOOD ROUTING CROSS SECTION

ALL ELEVATIONS RELATE TO MEAN SEA LEVEL (MSL)

INDICATES AREA POTENTIALLY INUNDATED BY A "FAIR WEATHER" DAM FAILURE

INDICATES ADDITIONAL AREA POTENTIALLY INUNDATED DUE TO DAM FAILURE UNDER "MAJOR FLOOD" CONDITIONS

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

IMPROVED PRIMARY OR SECONDARY HIGHWAY/ROAD

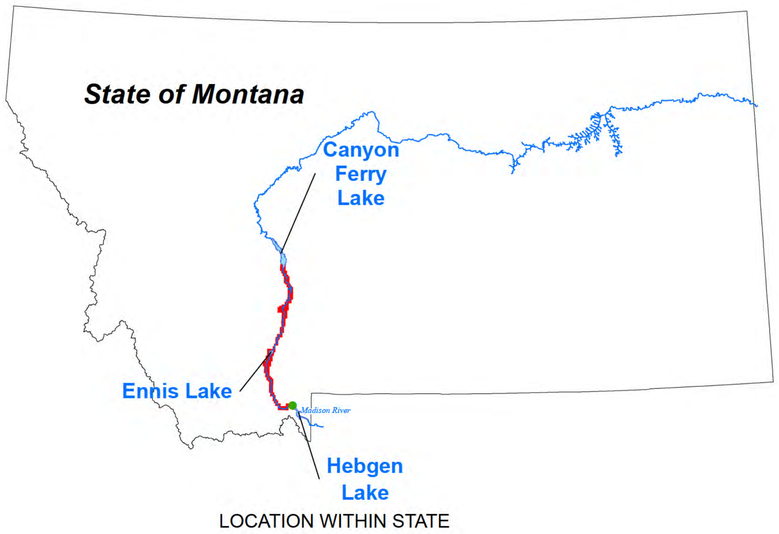
UNIMPROVED ROAD

TRAIL

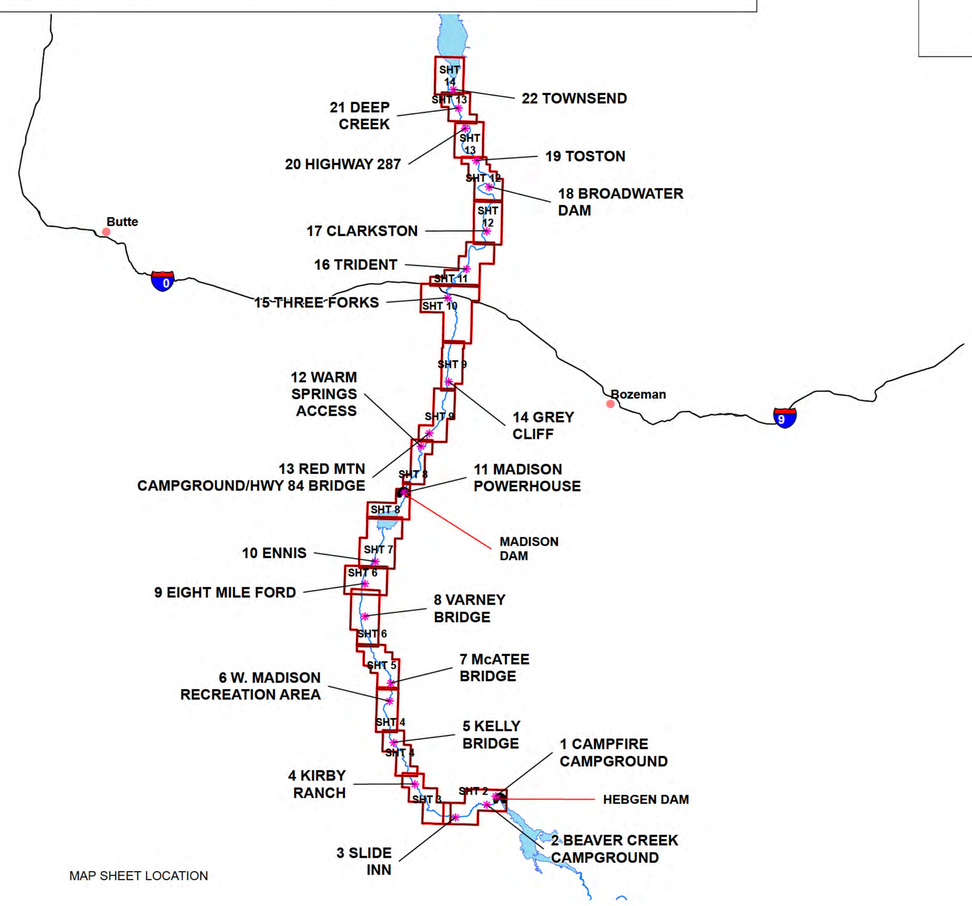
INTERSTATE ROUTE U.S. ROUTE STATE ROUTE

■ □ = BUILDING
(IF NOT SPECIFIED, NO DISTINCTION MADE BETWEEN HOUSES, BARNS, OR OTHER BUILDINGS)

THESE MAPS IDENTIFY ESTIMATED NOTIFICATION ZONES TO BE USED FOR EMERGENCY PLANNING AND MITIGATION PURPOSES BY AGENCIES RESPONSIBLE FOR EVACUATION, AS REQUIRED UNDER THE FEDERAL ENERGY REGULATORY COMMISSION'S REGULATIONS. FLOOD INFORMATION DEPICTED ON THE MAP IS BASED ON A HYPOTHETICAL FAILURE OF THE DAM, THE EFFECTS OF WHICH WERE MODELED USING CURRENT TECHNOLOGY. MAP USERS SHOULD BE AWARE THAT ACTUAL INUNDATED AREAS AND FLOOD WAVE TRAVEL TIMES WOULD DEPEND ON ACTUAL FAILURE CONDITIONS, AND MAY DIFFER FROM AREAS SHOWN ON THIS MAP. THE MAPS AND DATA SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.



LOCATION WITHIN STATE



NOTE: EMERGENCY SHELTER LOCATIONS IN THE INUNDATION ZONE ARE SHOWN ON SHEET #4, #10 & #14

ASEP ELECTRONIC DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/17/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO		
DESCRIPTION	REV PER 2016 UPDATES	NorthWestern Energy	
REV.	5	DEPT. MGR. C. HARRIS; ENG./TECH. HEI; DRAWN HEI	
		SIZE AS SHOWN; HYDRO DIVISION; REV.	
		SIZE D; DWG. NO. 43674-C13; SHT 1 OF 14; 5	

D 22" x 34"

Hebgen Dam Emergency Action Plan

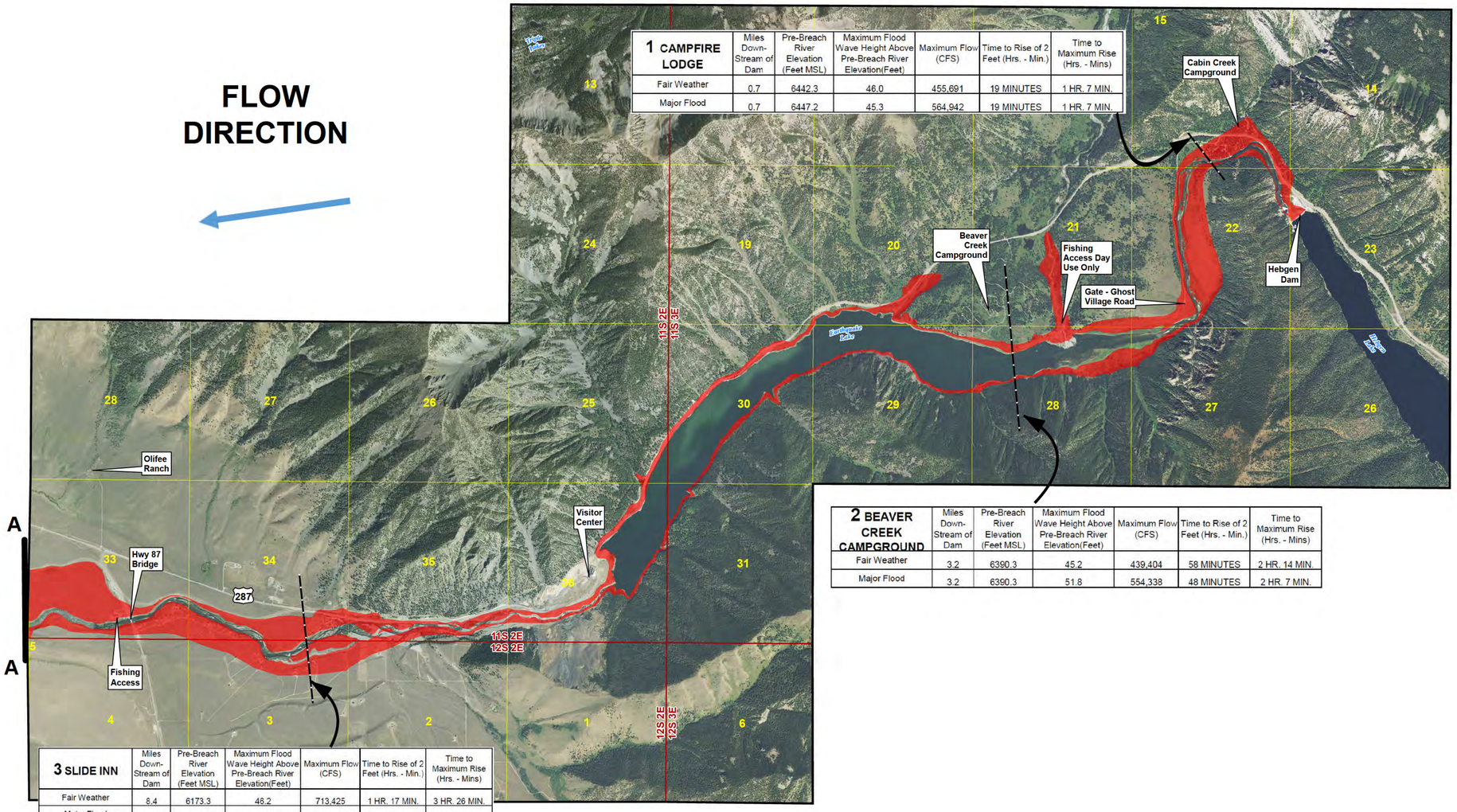
Sheet 2 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

FLOW DIRECTION



1 CAMPFIRE LODGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	0.7	6442.3	46.0	455,691	19 MINUTES	1 HR. 7 MIN.
Major Flood	0.7	6447.2	45.3	564,942	19 MINUTES	1 HR. 7 MIN.

2 BEAVER CREEK CAMPGROUND	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	3.2	6390.3	45.2	439,404	58 MINUTES	2 HR. 14 MIN.
Major Flood	3.2	6390.3	51.8	554,338	48 MINUTES	2 HR. 7 MIN.

3 SLIDE INN	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	8.4	6173.3	46.2	713,425	1 HR. 17 MIN.	3 HR. 26 MIN.
Major Flood	8.4	6176.6	46.1	841,408	1 HR. 7 MIN.	3 HR. 19 MIN.

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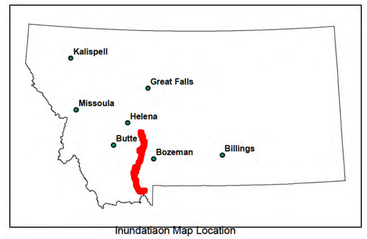
Aerial Photo: NAIP 2013



Inundation Map Location

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DATE 3/17/2016
DFT. CC
ENGR. RO

EMERGENCY ACTION PLAN
INUNDATION MAPS
HEBGEN DAM
F.E.R.C PROJECT 2188(09)

NorthWestern® Energy

DEPT. MGR. C. HARRIS | ENG./TECH. HEI | DRAWN HEI

SIZE AS SHOWN | HYDRO DIVISION | REV.

DESCRIPTION: REV PER 2016 UPDATES
REV. 5

SIZE D | DWG. NO. 43674-C13 | SHT 2 OF 14 | 5

D 22" x 34"

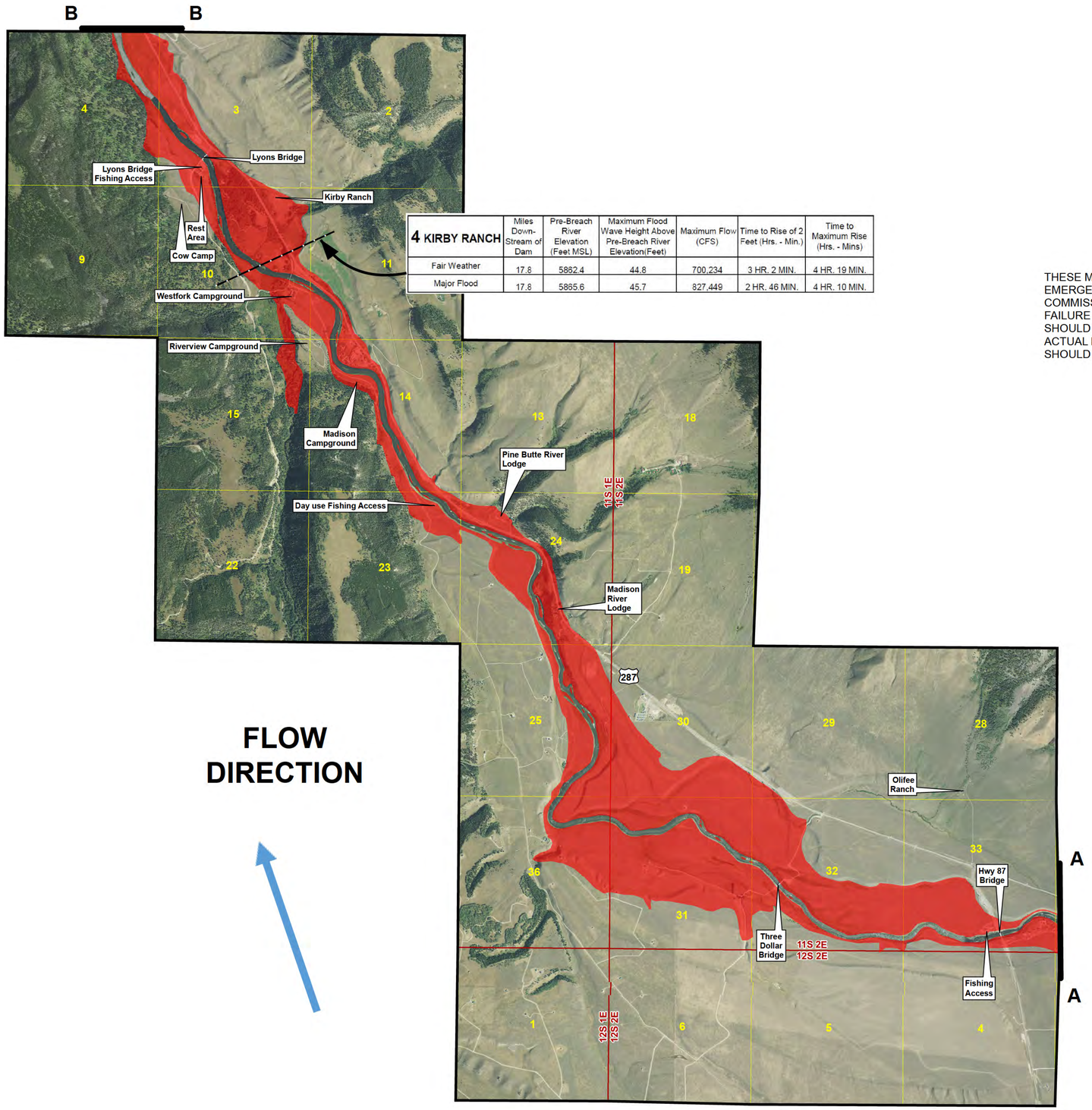
Hebgen Dam Emergency Action Plan

Sheet 3 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.



4 KIRBY RANCH	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	17.8	5862.4	44.8	700,234	3 HR. 2 MIN.	4 HR. 19 MIN.
Major Flood	17.8	5865.6	45.7	827,449	2 HR. 46 MIN.	4 HR. 10 MIN.

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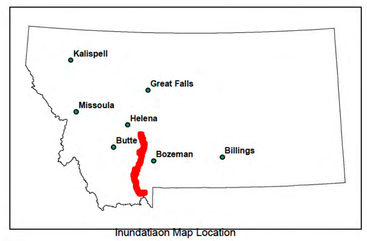
Aerial Photo: NAIP 2013



Inundation Map Location

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ENGR.	RO		
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		DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION / REV.	
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 3 OF 14	5

D 22" x 34"

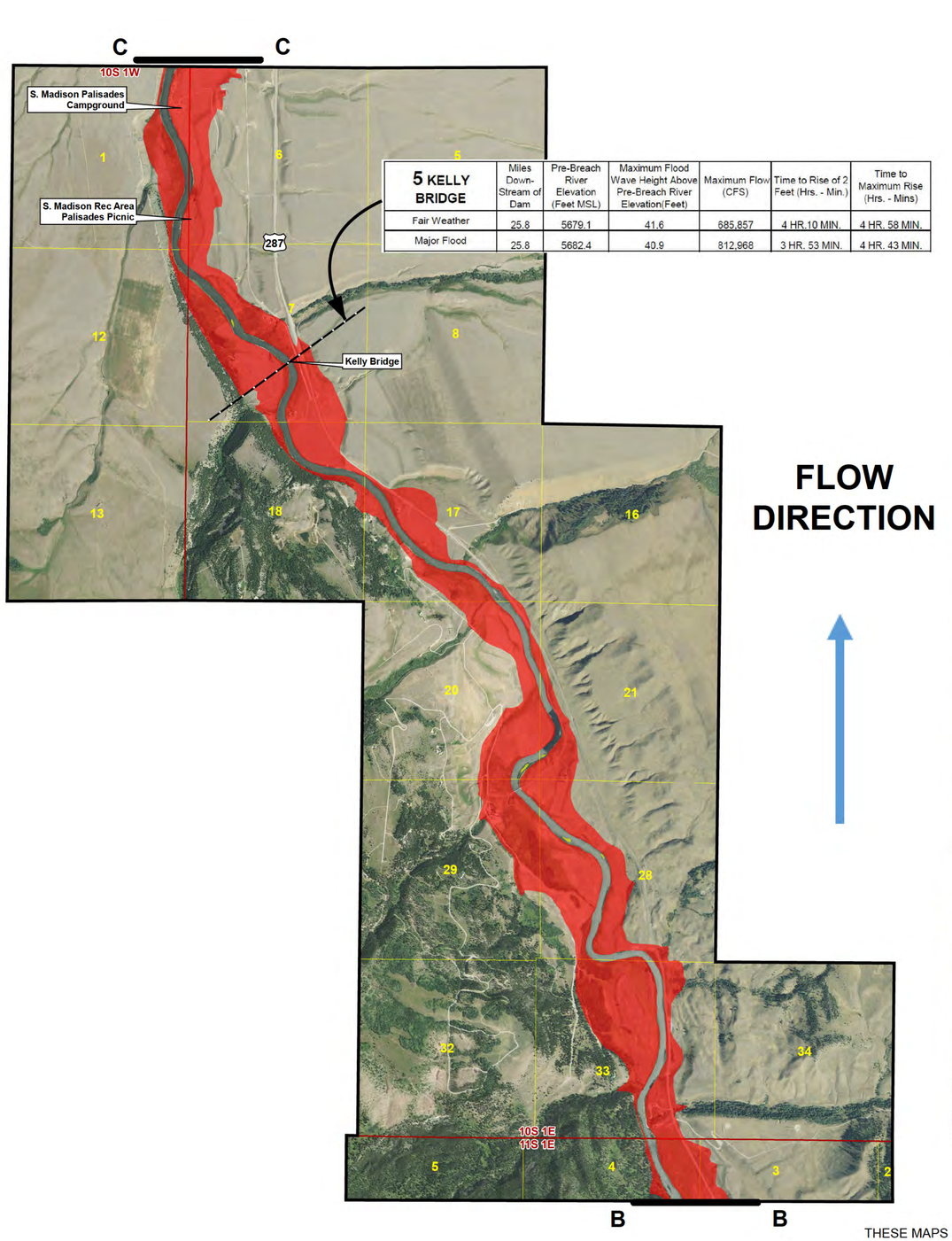
Hebgen Dam Emergency Action Plan

Sheet 4 of 14

"Fair Weather" Dam Failure Inundation Boundary

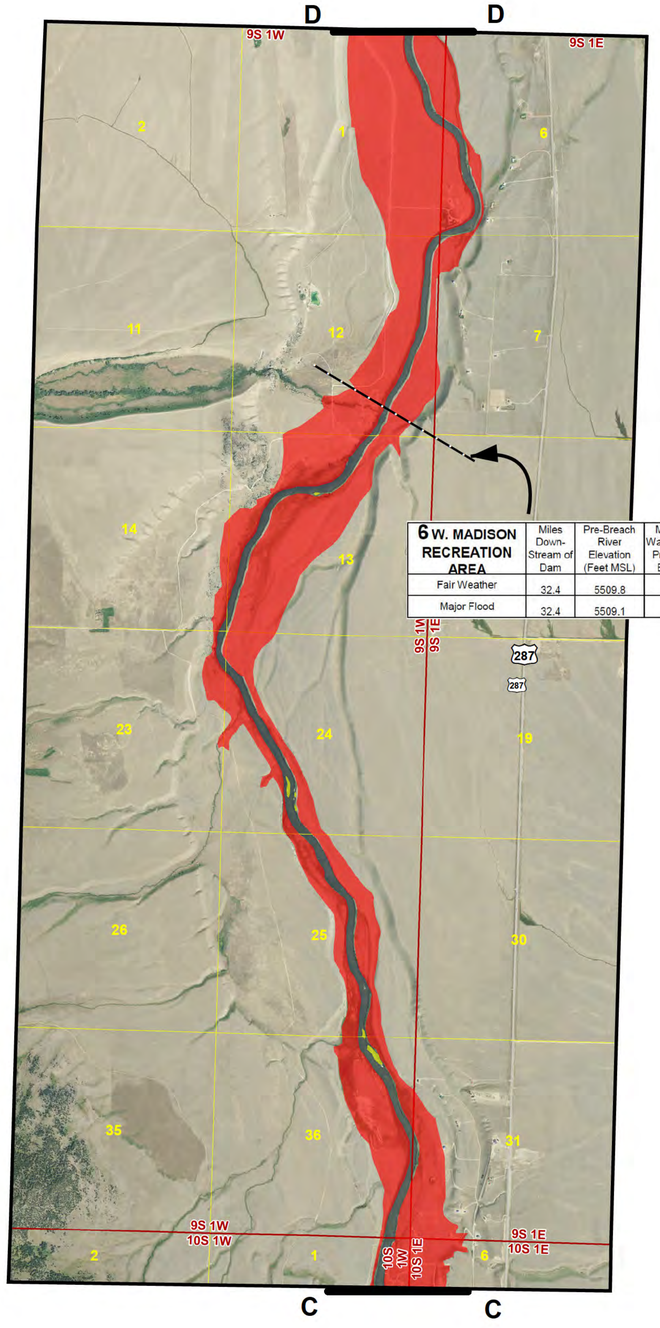
"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.



5 KELLY BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	25.8	5679.1	41.6	685,857	4 HR.10 MIN.	4 HR. 58 MIN.
Major Flood	25.8	5682.4	40.9	812,968	3 HR. 53 MIN.	4 HR. 43 MIN.

FLOW DIRECTION



6 W. MADISON RECREATION AREA	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	32.4	5509.8	41.2	668,175	4 HR. 58 MIN.	5 HR. 41 MIN.
Major Flood	32.4	5509.1	44.5	797,385	4 HR. 48 MIN.	5 HR. 22 MIN.

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Aerial Photo: NAIP 2013

Inundatiaon Map Location

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ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM

REFERENCE DRAWING | DRAWING NUMBER

DATE 3/18/2016

DFT. CC

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DESCRIPTION: REV PER 2016 UPDATES

REV. 5

EMERGENCY ACTION PLAN
INUNDATION MAPS
HEBGEN DAM
F.E.R.C PROJECT 2188(09)

NorthWestern Energy

DEPT. MGR. C. HARRIS | ENG./TECH. HEI | DRAWN HEI

SIZE AS SHOWN | HYDRO DIVISION | REV.

SIZE D | DWG. NO. 43674-C13 | SHT 4 OF 14 | 5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 5 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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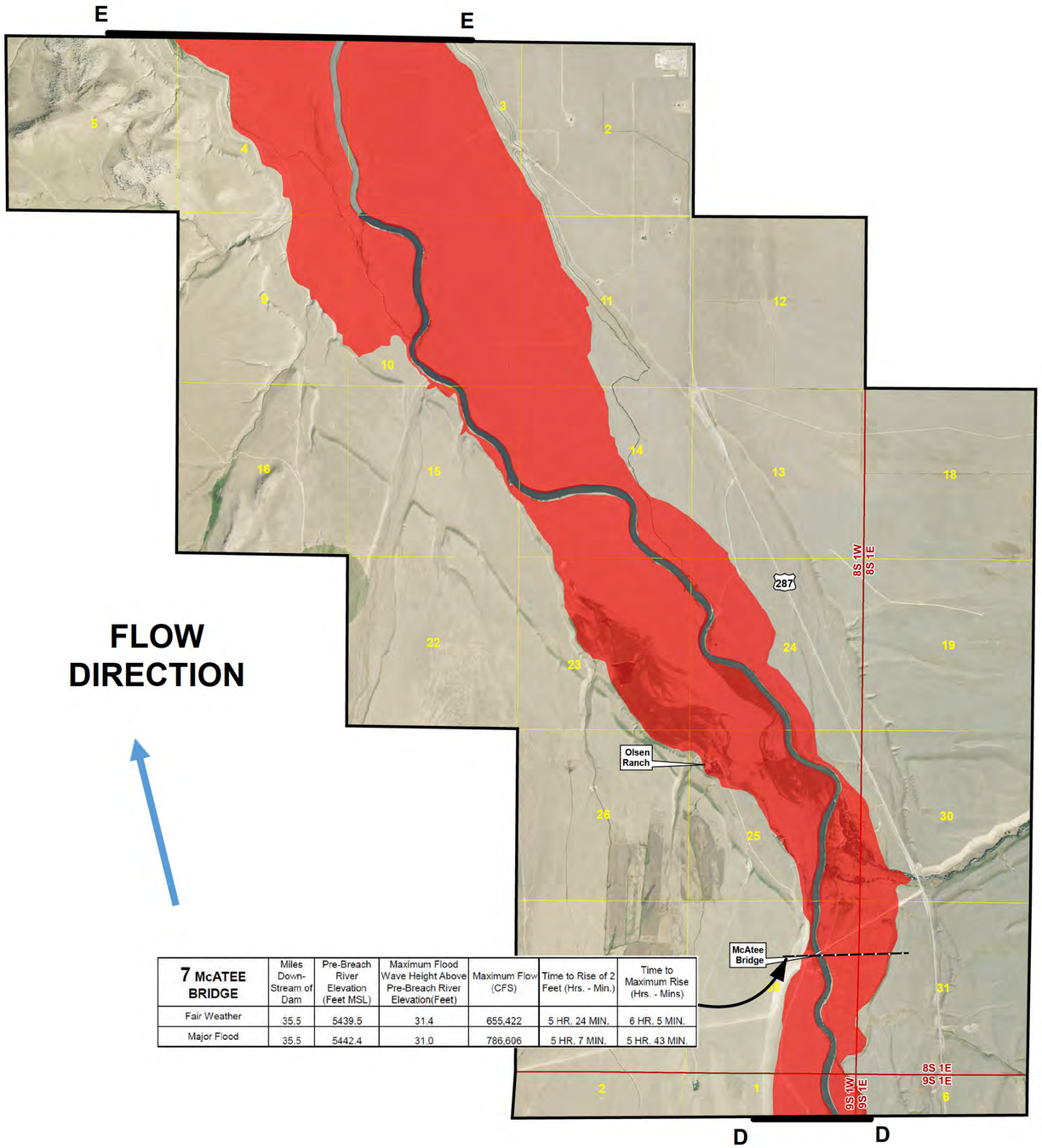

7 McATEE BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	35.5	5439.5	31.4	655,422	5 HR. 24 MIN.	6 HR. 5 MIN.
Major Flood	35.5	5442.4	31.0	786,606	5 HR. 7 MIN.	5 HR. 43 MIN.

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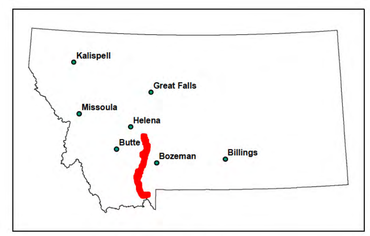
Aerial Photo: NAIP 2013



Inundatiaon Map Location

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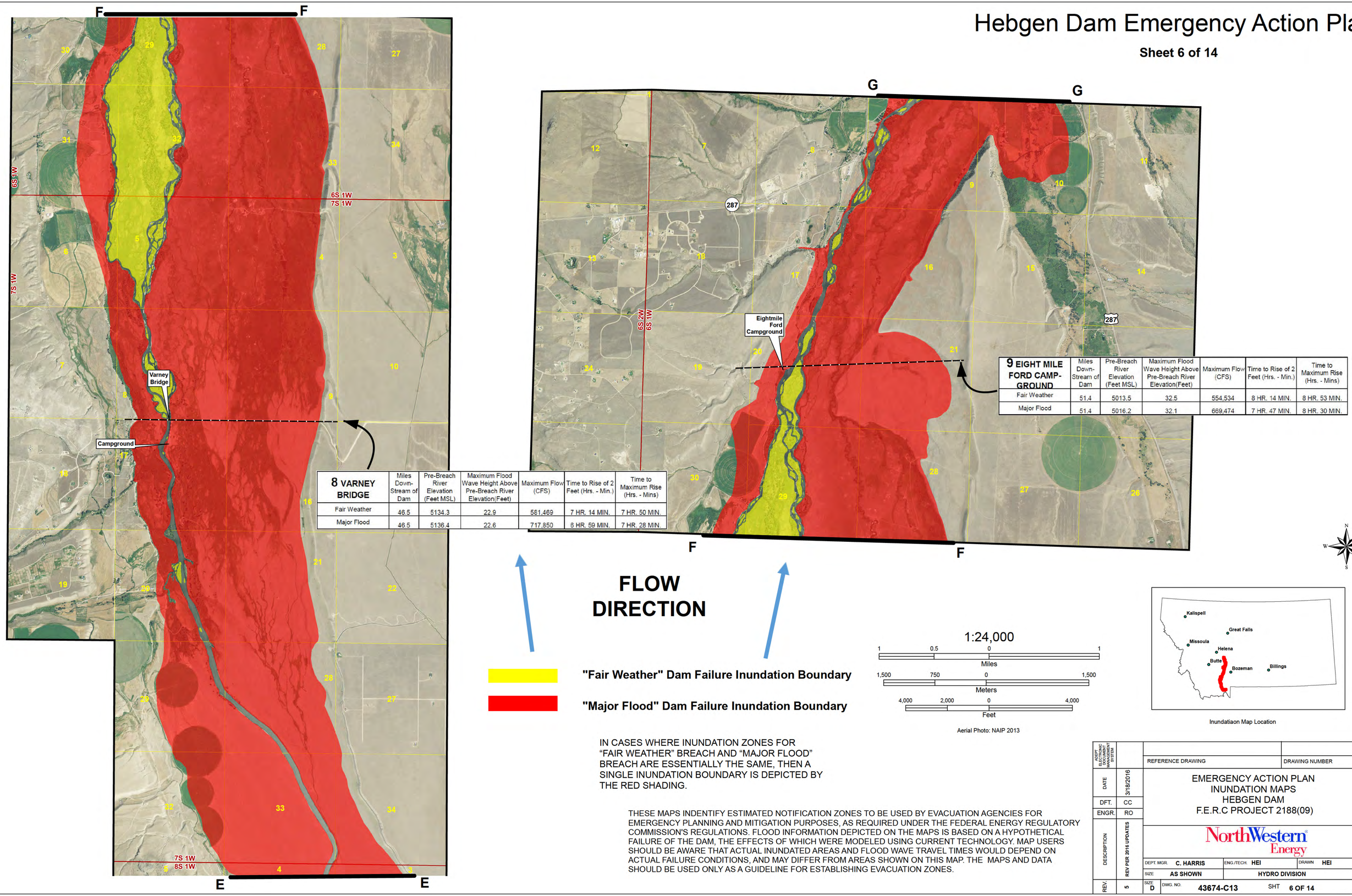
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 5 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 6 of 14



8 VARNEY BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	46.5	5134.3	22.9	581,469	7 HR. 14 MIN.	7 HR. 50 MIN.
Major Flood	46.5	5136.4	22.6	717,850	6 HR. 59 MIN.	7 HR. 28 MIN.

9 EIGHT MILE FORD CAMP-GROUND	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	51.4	5013.5	32.5	554,534	8 HR. 14 MIN.	8 HR. 53 MIN.
Major Flood	51.4	5016.2	32.1	669,474	7 HR. 47 MIN.	8 HR. 30 MIN.

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DATE 3/18/2016
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ENGR. RO
DESCRIPTION REV PER 2016 UPDATES
REV. 5

EMERGENCY ACTION PLAN
INUNDATION MAPS
HEBGEN DAM
F.E.R.C PROJECT 2188(09)

NorthWestern Energy

DEPT. MGR. C. HARRIS | ENG./TECH. HEI | DRAWN HEI
SIZE AS SHOWN | HYDRO DIVISION | REV.
SIZE D | DWG. NO. 43674-C13 | SHT 6 OF 14 | 5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 7 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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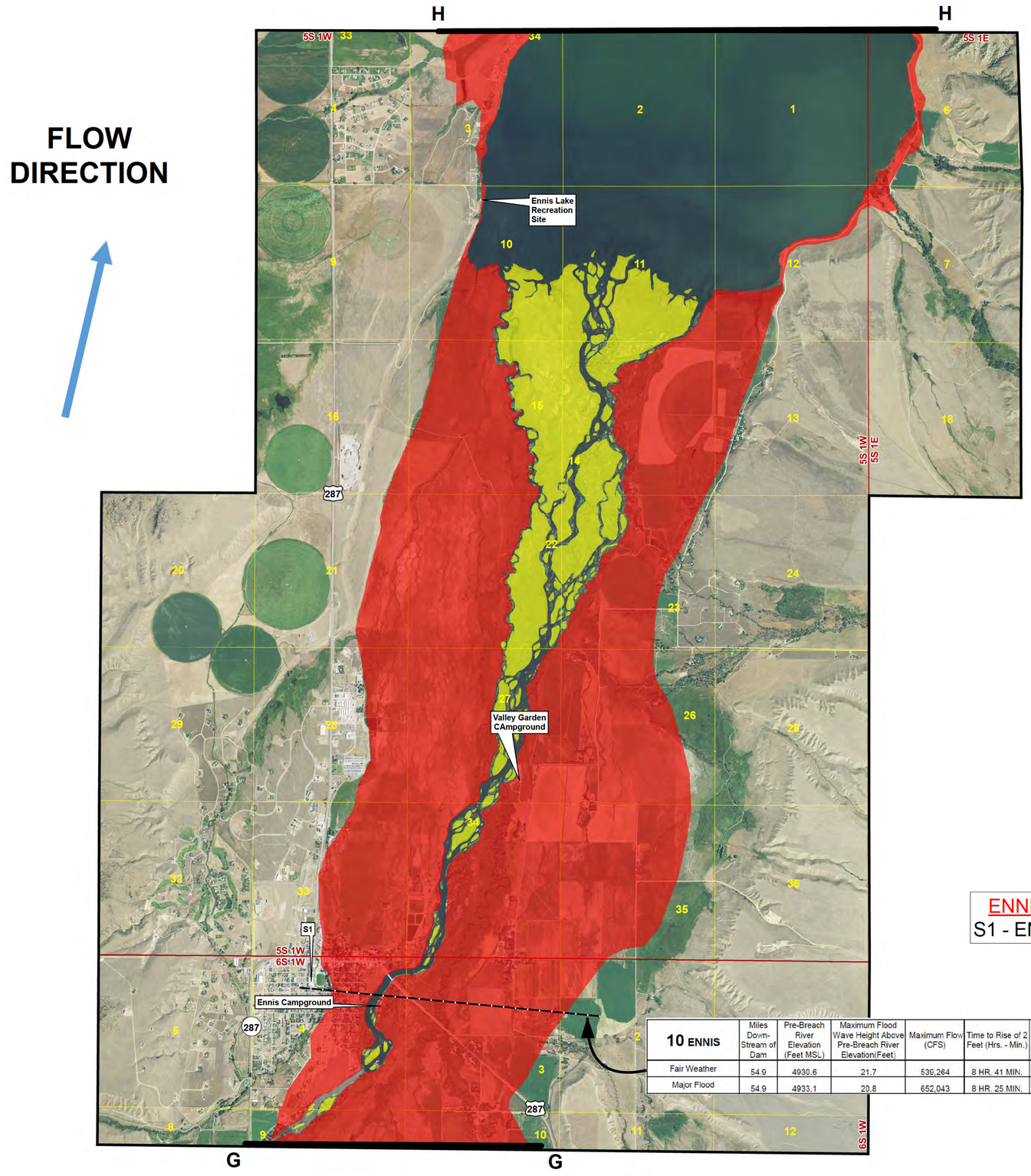

10 ENNIS	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	54.9	4930.6	21.7	539,264	8 HR. 41 MIN.	9 HR. 30 MIN.
Major Flood	54.9	4933.1	20.8	652,043	8 HR. 25 MIN.	9 HOURS

ENNIS EMERGENCY SHELTER LOCATIONS

S1 - ENNIS HIGH SCHOOL, 223 CHARLES AVE.

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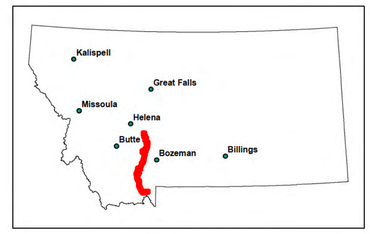
Aerial Photo: NAIP 2013



Inundatiaon Map Location

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ENGR.	RO		
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		DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 7 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 8 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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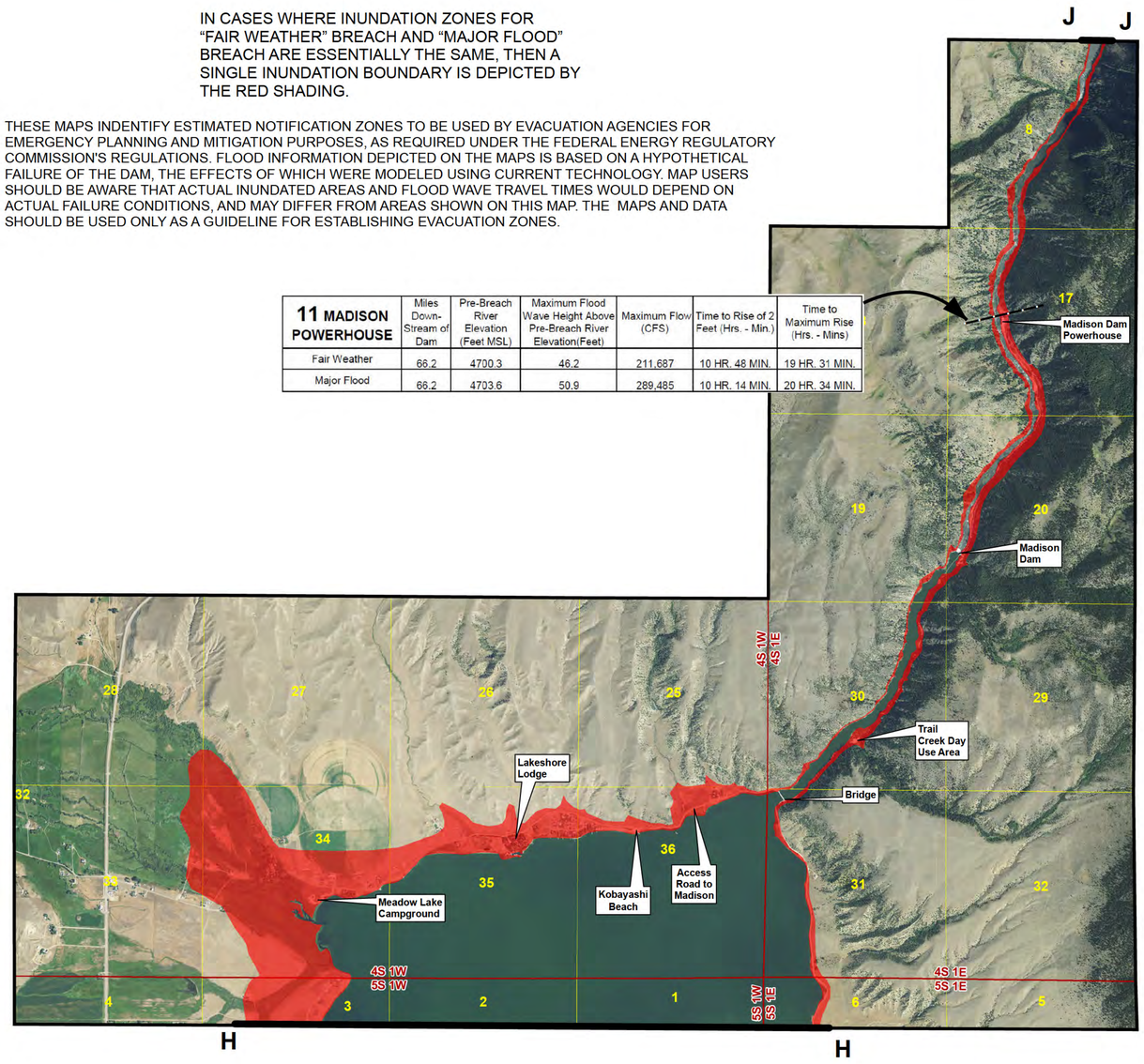
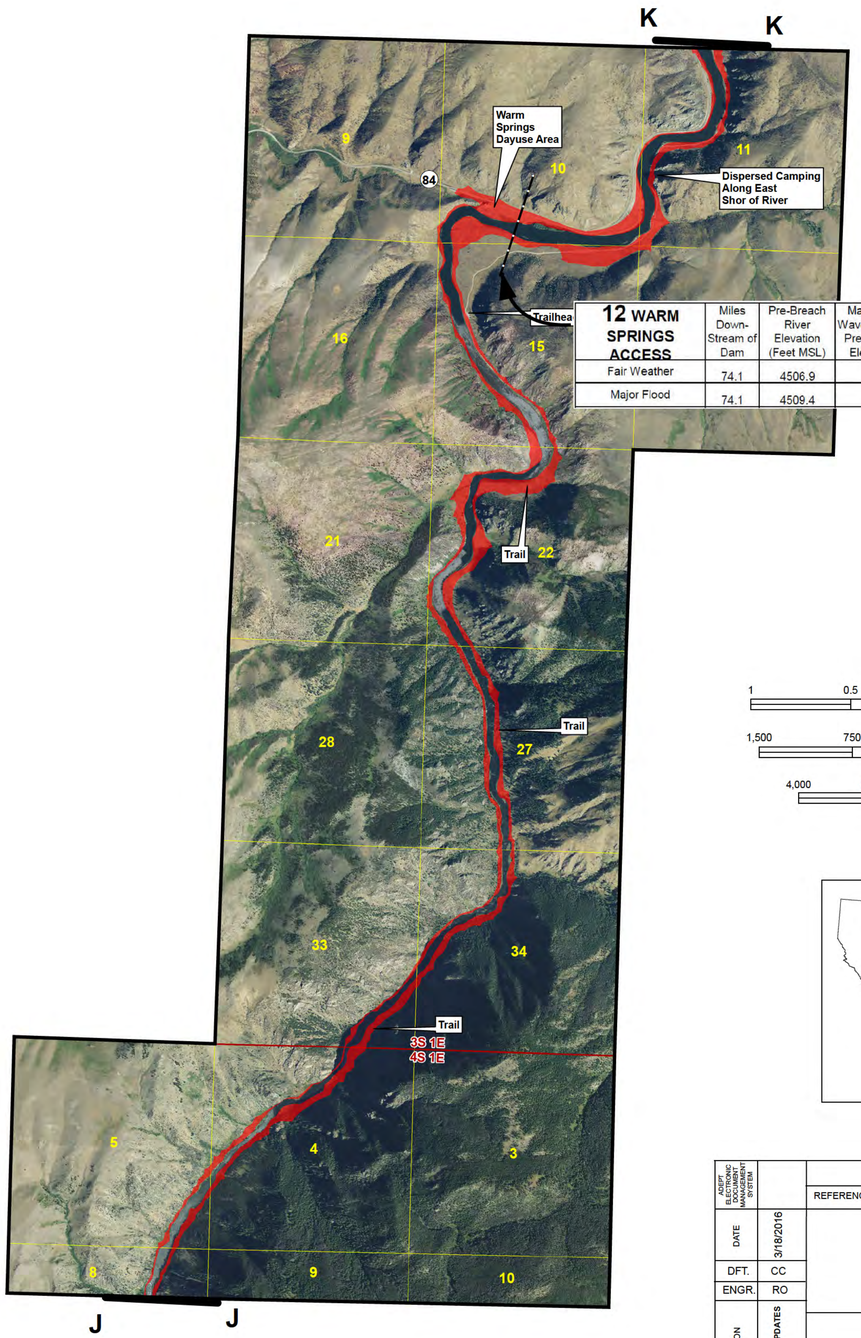
11 MADISON POWERHOUSE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	66.2	4700.3	46.2	211,687	10 HR. 48 MIN.	19 HR. 31 MIN.
Major Flood	66.2	4703.6	50.9	289,485	10 HR. 14 MIN.	20 HR. 34 MIN.



FLOW DIRECTION



12 WARM SPRINGS ACCESS	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	74.1	4506.9	42.1	211,644	11 HR. 55 MIN.	20 HR. 53 MIN.
Major Flood	74.1	4509.4	46.9	289,452	11 HR. 55 MIN.	22 HR. 38 MIN.

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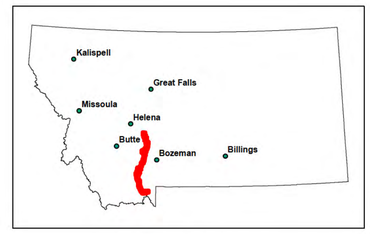
Aerial Photo: NAIP 2013



Inundatiaon Map Location

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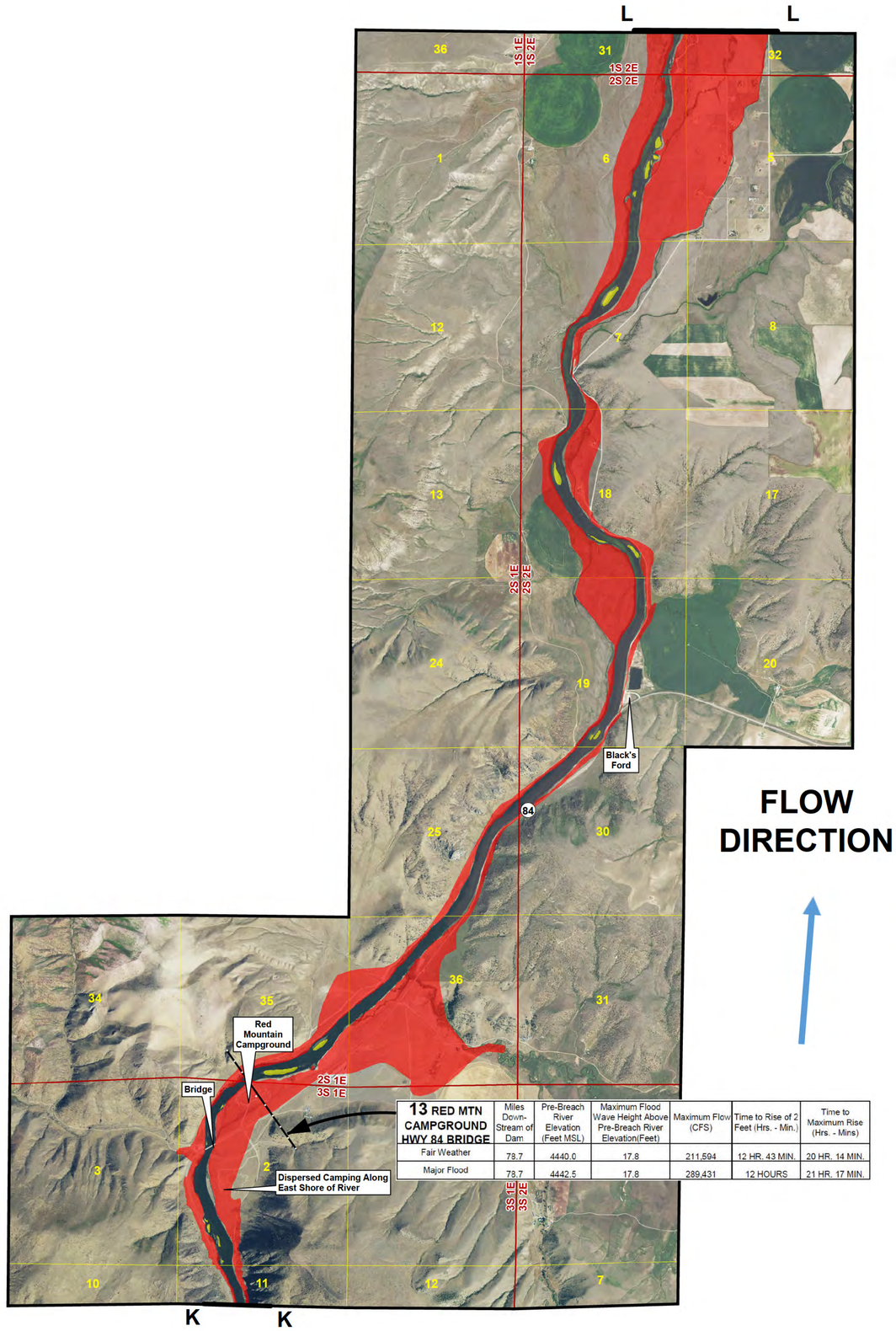
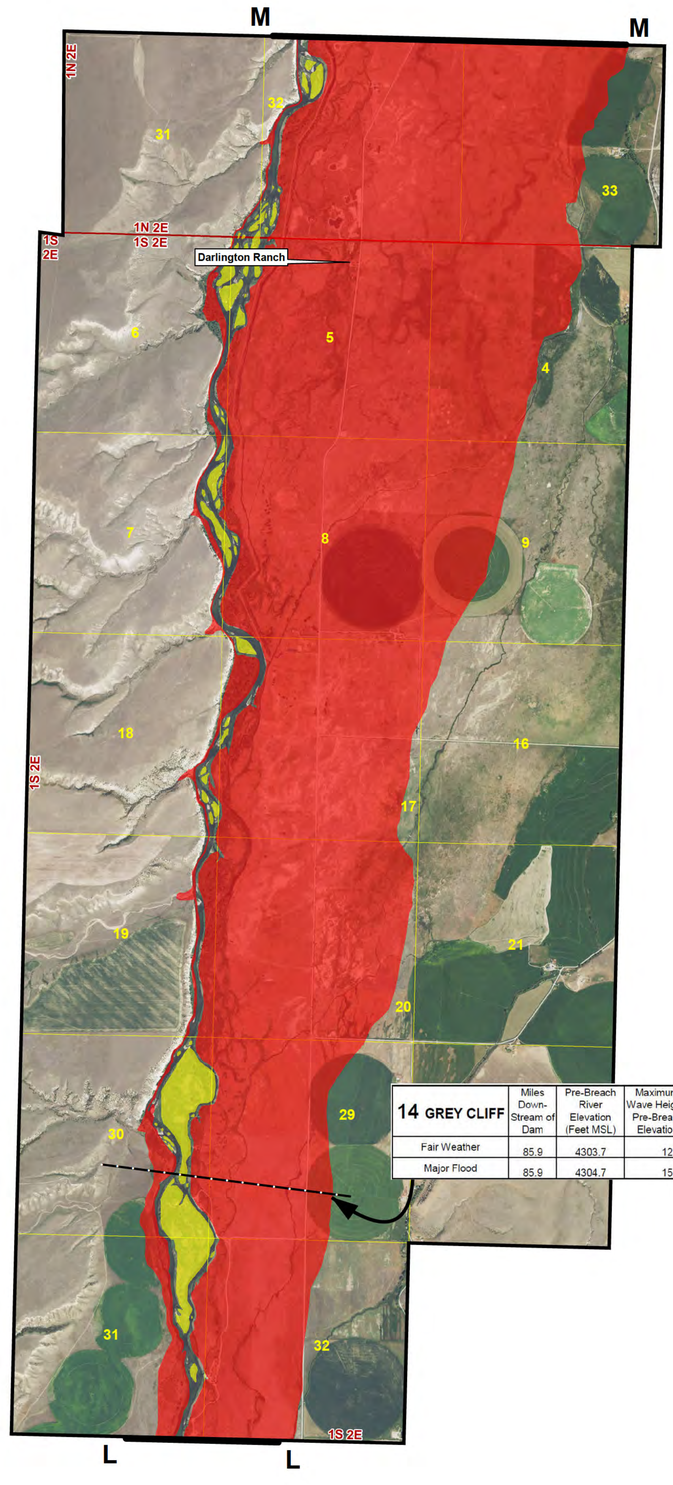
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 8 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 9 of 14





13 RED MTN CAMPGROUND HWY 84 BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	78.7	4440.0	17.8	211,594	12 HR. 43 MIN.	20 HR. 14 MIN.
Major Flood	78.7	4442.5	17.8	289,431	12 HOURS	21 HR. 17 MIN.

14 GREY CLIFF	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	85.9	4303.7	12.0	211,471	14 HR. 38 MIN.	21 HR. 22 MIN.
Major Flood	85.9	4304.7	15.8	289,315	13 HR. 41 MIN.	22 HR. 14 MIN.

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

THESE MAPS INDENTIFY ESTIMATED NOTIFICATION ZONES TO BE USED BY EVACUATION AGENCIES FOR EMERGENCY PLANNING AND MITIGATION PURPOSES, AS REQUIRED UNDER THE FEDERAL ENERGY REGULATORY COMMISSION'S REGULATIONS. FLOOD INFORMATION DEPICTED ON THE MAPS IS BASED ON A HYPOTHETICAL FAILURE OF THE DAM, THE EFFECTS OF WHICH WERE MODELED USING CURRENT TECHNOLOGY. MAP USERS SHOULD BE AWARE THAT ACTUAL INUNDATED AREAS AND FLOOD WAVE TRAVEL TIMES WOULD DEPEND ON ACTUAL FAILURE CONDITIONS, AND MAY DIFFER FROM AREAS SHOWN ON THIS MAP. THE MAPS AND DATA SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.

1:24,000

1 0.5 0 1 Miles

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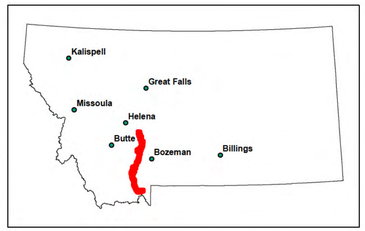
N W E S

Aerial Photo: NAIP 2013



Inundatiaon Map Location

ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM

REFERENCE DRAWING | DRAWING NUMBER

DATE 3/20/2016

DFT. CC

ENGR. RO

DESCRIPTION: REV PER 2016 UPDATES

REV. 5

EMERGENCY ACTION PLAN
INUNDATION MAPS
HEBGEN DAM
F.E.R.C PROJECT 2188(09)

NorthWestern Energy

DEPT. MGR. C. HARRIS | ENG./TECH. HEI | DRAWN HEI

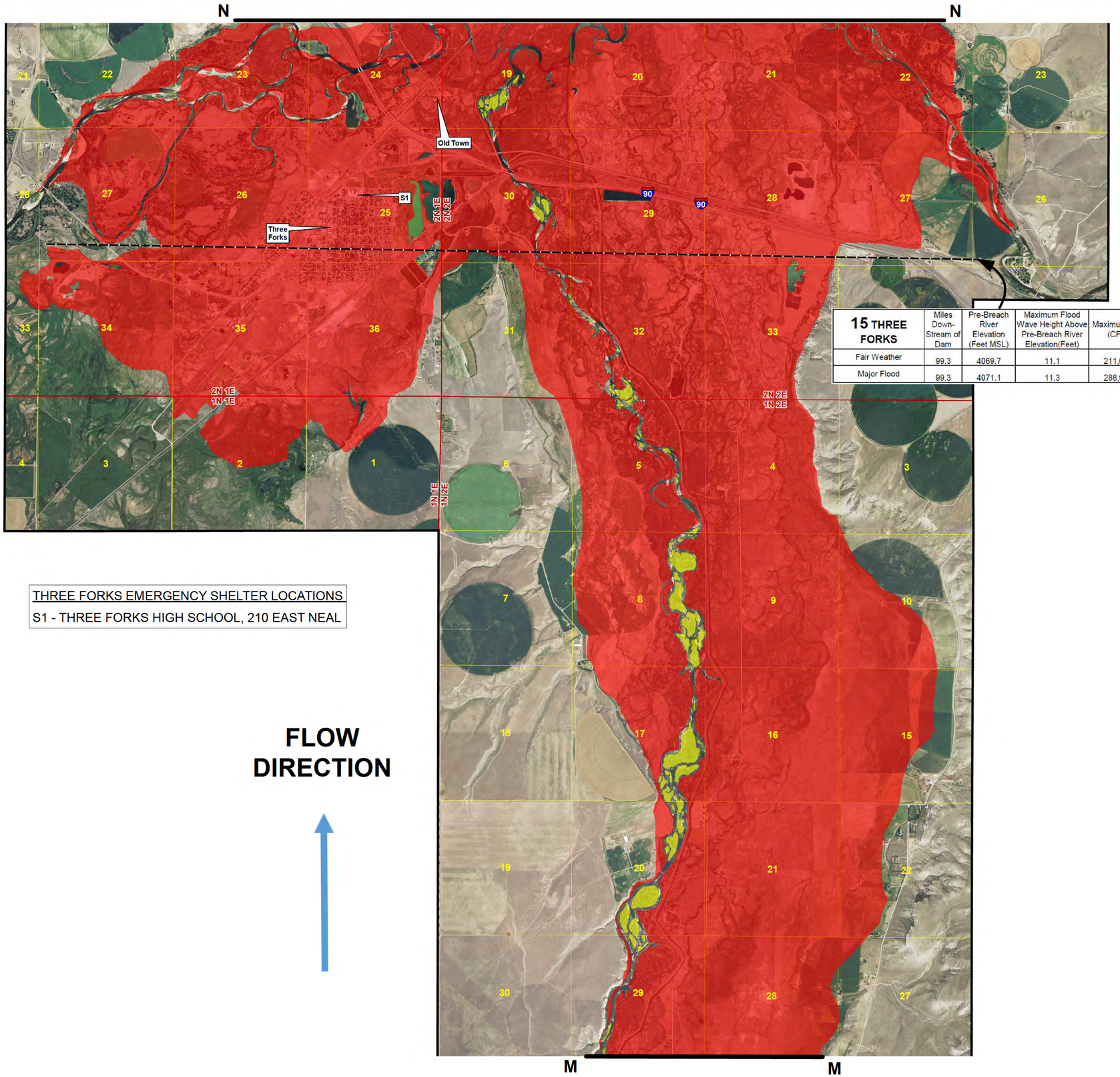
SIZE AS SHOWN | HYDRO DIVISION | REV.

SIZE D | DWG. NO. 43674-C13 | SHT 9 OF 14 | 5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 10 of 14



"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

15 THREE FORKS	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	99.3	4069.7	11.1	211,086	18 HOURS	23 HR. 46 MIN.
Major Flood	99.3	4071.1	11.3	288,981	16 HR. 48 MIN.	24 HR. 24 MIN.

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THREE FORKS EMERGENCY SHELTER LOCATIONS

S1 - THREE FORKS HIGH SCHOOL, 210 EAST NEAL

FLOW DIRECTION

1:24,000

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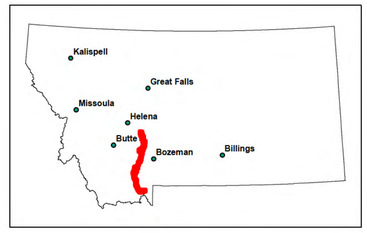
Aerial Photo: NAIP 2013



Inundatiaon Map Location

ADEPT DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/20/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 10 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 11 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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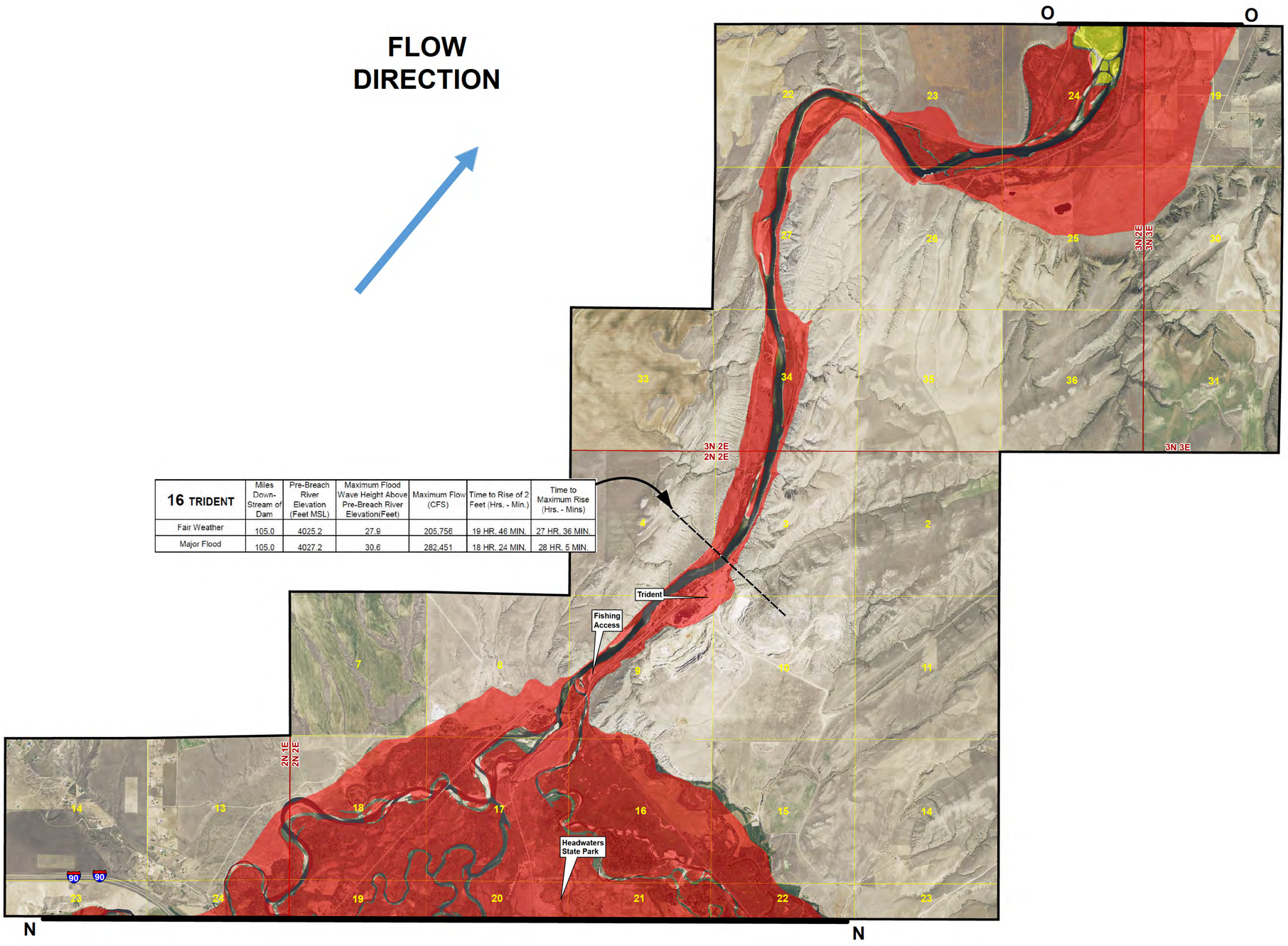
FLOW DIRECTION



16 TRIDENT	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	105.0	4025.2	27.9	205,756	19 HR. 46 MIN.	27 HR. 36 MIN.
Major Flood	105.0	4027.2	30.6	282,451	18 HR. 24 MIN.	28 HR. 5 MIN.

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N W E S

Aerial Photo: NAIP 2013

Inundatiaon Map Location

ADEPT DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
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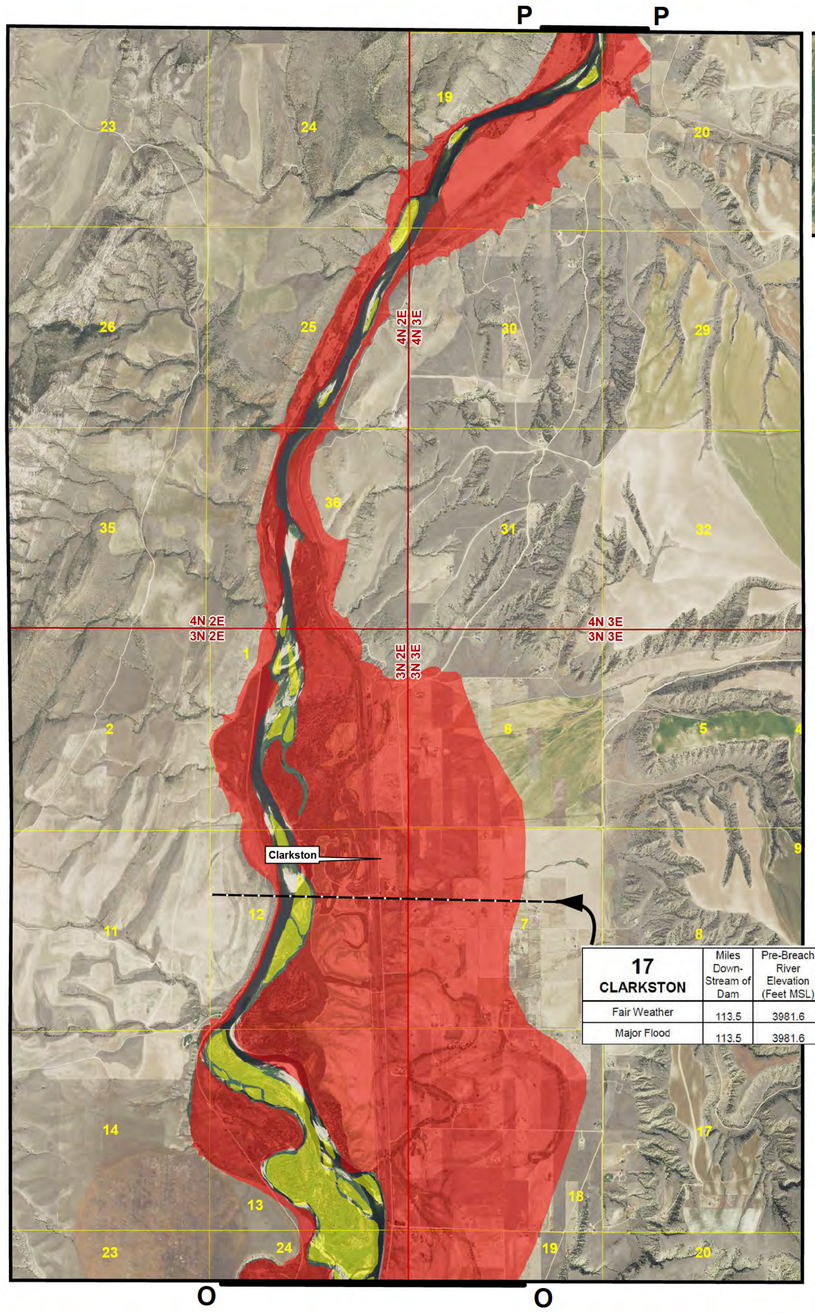
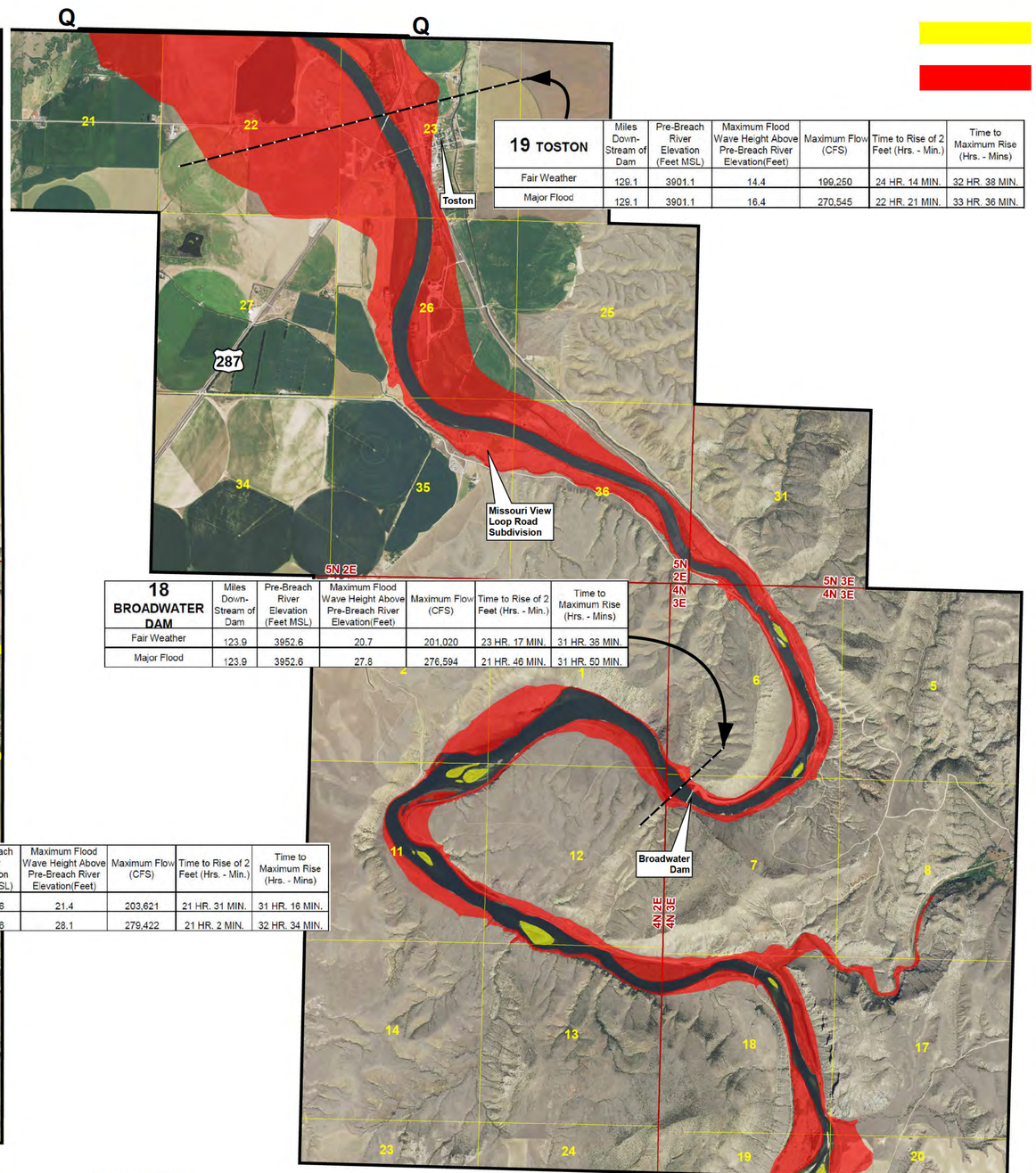
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 11 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 12 of 14





19 TOSTON	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	129.1	3901.1	14.4	199,250	24 HR. 14 MIN.	32 HR. 38 MIN.
Major Flood	129.1	3901.1	16.4	270,545	22 HR. 21 MIN.	33 HR. 36 MIN.

18 BROADWATER DAM	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	123.9	3952.6	20.7	201,020	23 HR. 17 MIN.	31 HR. 38 MIN.
Major Flood	123.9	3952.6	27.8	276,594	21 HR. 46 MIN.	31 HR. 50 MIN.

17 CLARKSTON	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	113.5	3981.6	21.4	203,621	21 HR. 31 MIN.	31 HR. 16 MIN.
Major Flood	113.5	3981.6	28.1	279,422	21 HR. 2 MIN.	32 HR. 34 MIN.

FLOW DIRECTION

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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1:24,000

1 0.5 0 1 Miles

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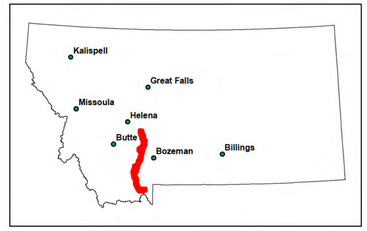
4,000 2,000 0 4,000 Feet

N W E S

Aerial Photo: NAIP 2013



Inundatiaon Map Location

ADEPT DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/20/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO		
DESCRIPTION	REV PER 2016 UPDATES	NorthWestern Energy	
		DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 12 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 13 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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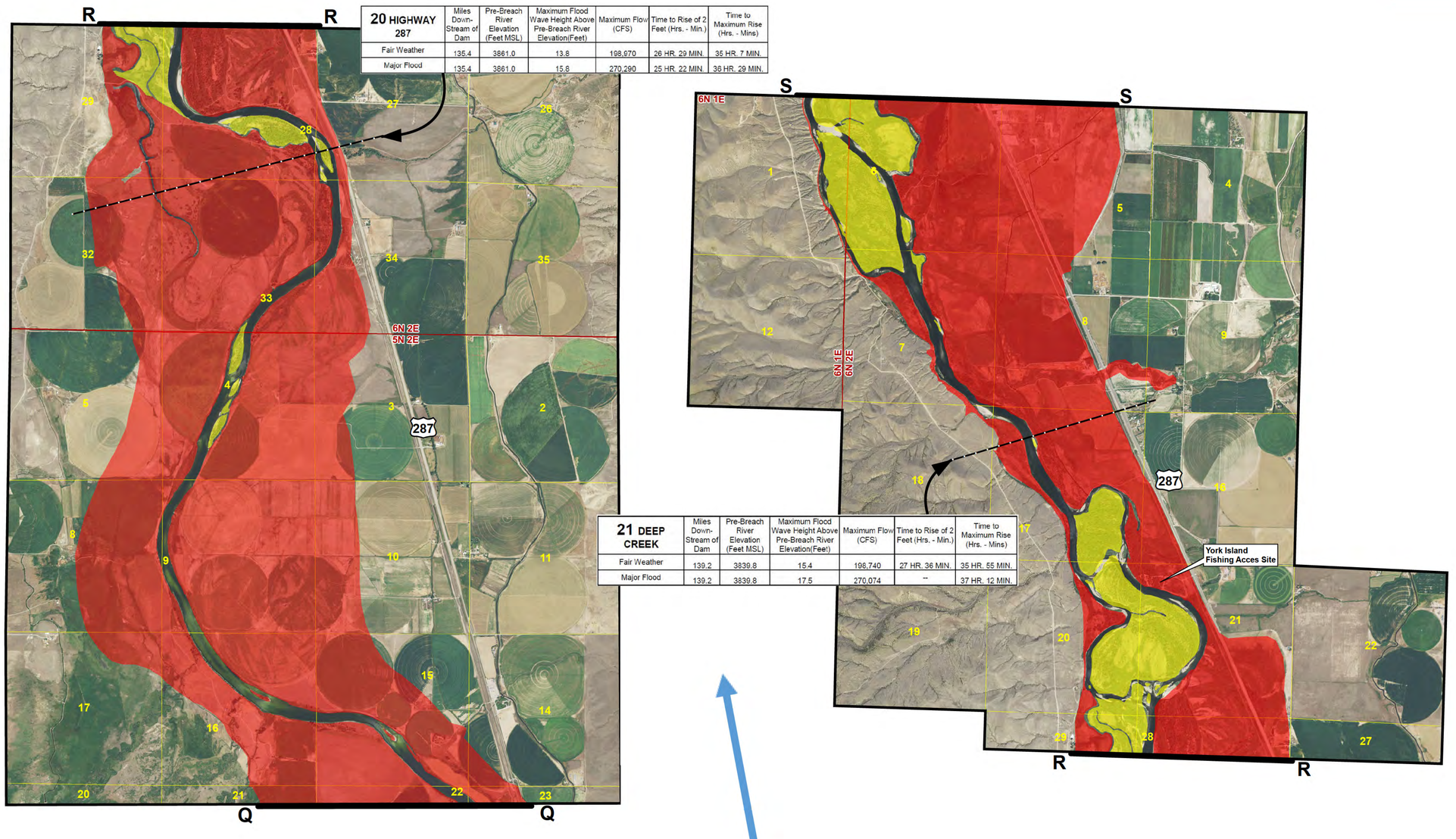
20 HIGHWAY 287	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	135.4	3861.0	13.8	198,970	26 HR. 29 MIN.	35 HR. 7 MIN.
Major Flood	135.4	3861.0	15.8	270,290	25 HR. 22 MIN.	36 HR. 29 MIN.

21 DEEP CREEK	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	139.2	3839.8	15.4	196,740	27 HR. 36 MIN.	35 HR. 55 MIN.
Major Flood	139.2	3839.8	17.5	270,074	--	37 HR. 12 MIN.



FLOW DIRECTION

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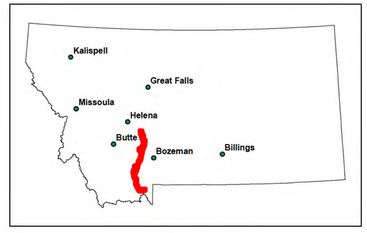
Aerial Photo: NAIP 2013



Inundatiaon Map Location

ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/20/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS; ENG./TECH. HEI; DRAWN HEI	
		SIZE AS SHOWN; HYDRO DIVISION	REV.
REV.	5	SIZE D; DWG. NO. 43674-C13; SHT 13 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 14 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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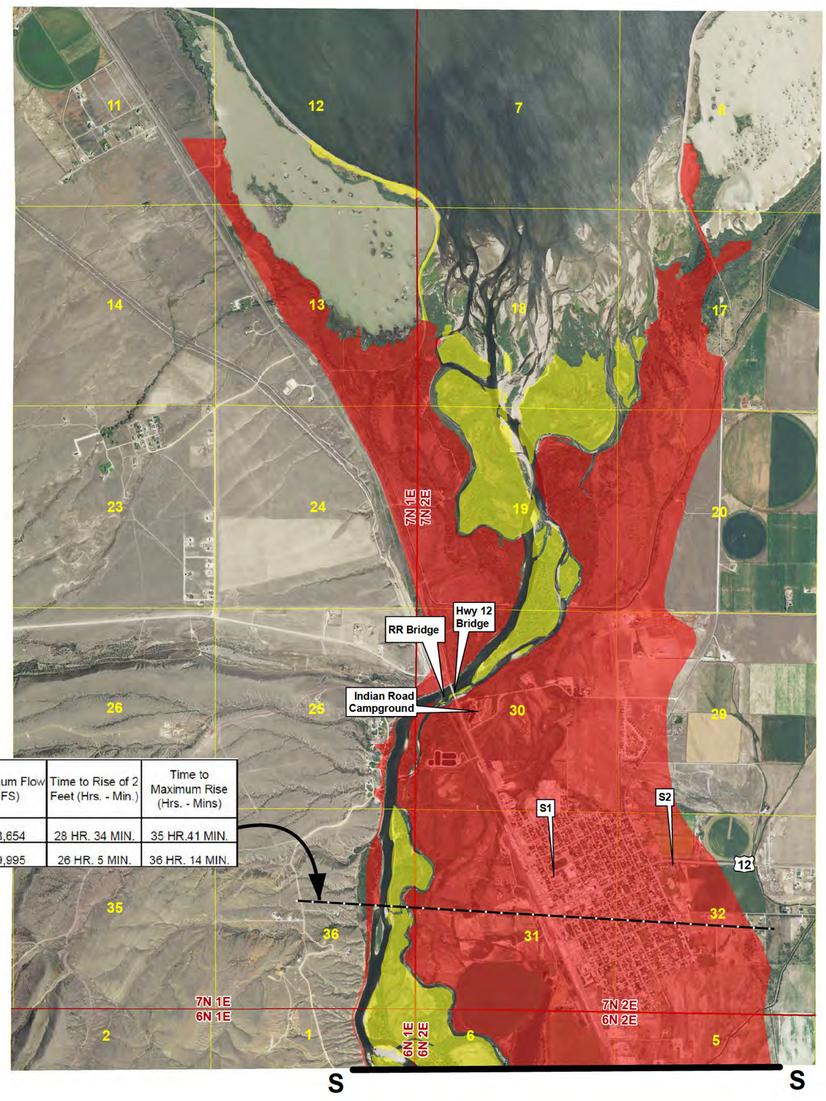

22 TOWNSEND	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	142.4	3814.2	12.2	198,654	28 HR. 34 MIN.	35 HR.41 MIN.
Major Flood	142.4	3814.2	14.1	269,995	26 HR. 5 MIN.	36 HR. 14 MIN.

FLOW DIRECTION

1:24,000

1 0.5 0 1
Miles

1,500 750 0 1,500
Meters

4,000 2,000 0 4,000
Feet

N W E S

Aerial Photo: NAIP 2013

Inundatiaon Map Location

TOWNSEND EMEGENCY SHELTER LOCATIONS

S1 - TOWNSEND HIGH SCHOOL, 210 NORTH SPRUCE
S2 - LDS CHURCH, 916 BROADWAY

ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM			
		REFERENCE DRAWING	DRAWING NUMBER
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DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION / REV.	
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 14 OF 14	5

D 22" x 34"

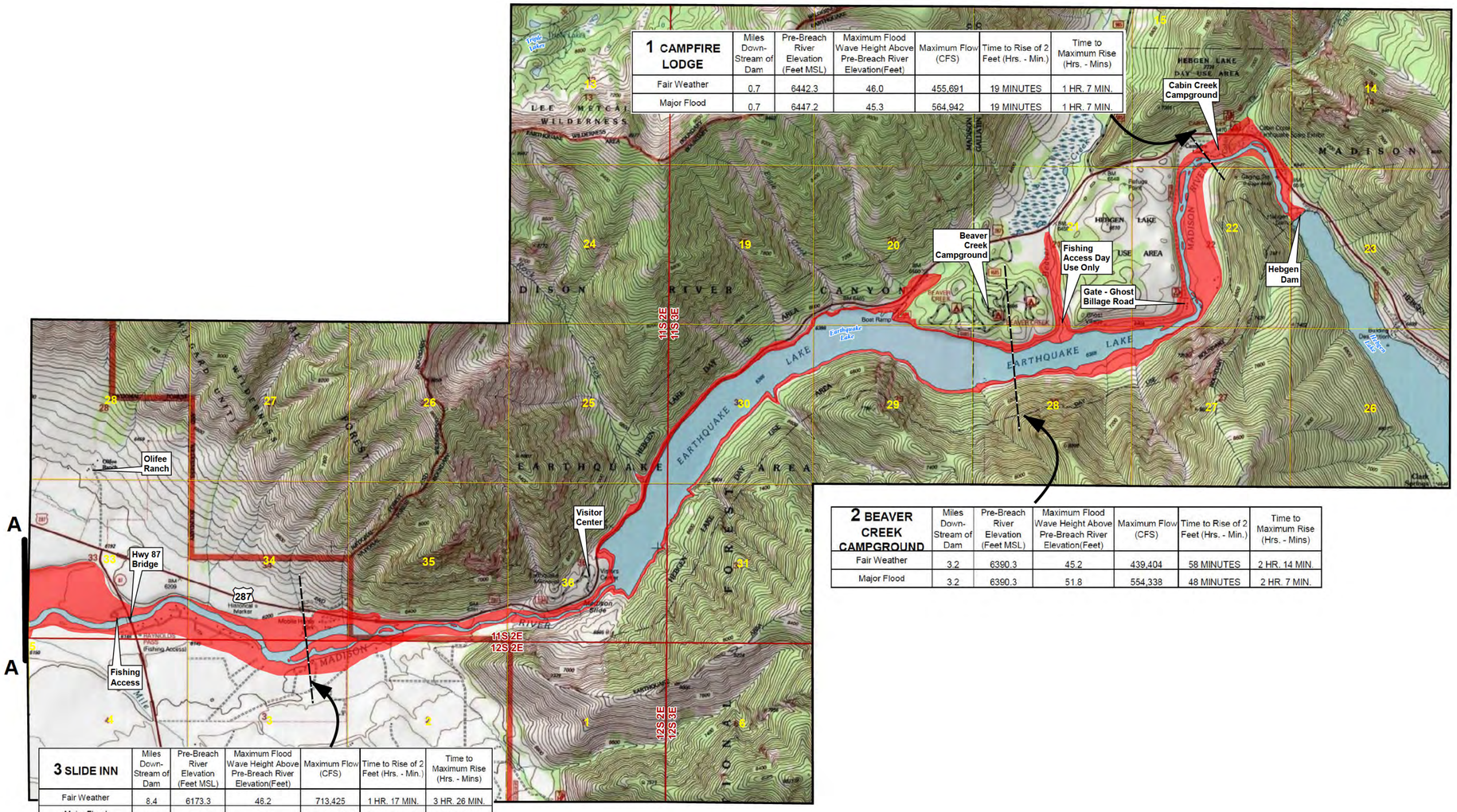
Hebgen Dam Emergency Action Plan

Sheet 2 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.



1 CAMPFIRE LODGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	0.7	6442.3	46.0	455,691	19 MINUTES	1 HR. 7 MIN.
Major Flood	0.7	6447.2	45.3	564,942	19 MINUTES	1 HR. 7 MIN.

2 BEAVER CREEK CAMPGROUND	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	3.2	6390.3	45.2	439,404	58 MINUTES	2 HR. 14 MIN.
Major Flood	3.2	6390.3	51.8	554,338	48 MINUTES	2 HR. 7 MIN.

3 SLIDE INN	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	8.4	6173.3	46.2	713,425	1 HR. 17 MIN.	3 HR. 26 MIN.
Major Flood	8.4	6176.6	46.1	841,408	1 HR. 7 MIN.	3 HR. 19 MIN.

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Miles

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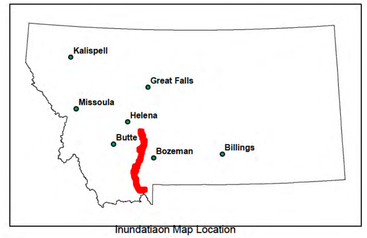
Meters

4,000 2,000 0 4,000
Feet

Aerial Photo: NAIP 2013



Inundation Map Location

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ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM

		REFERENCE DRAWING	DRAWING NUMBER
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DFT.	CC		
ENGR.	RO		
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		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 2 OF 14	5

D 22" x 34"

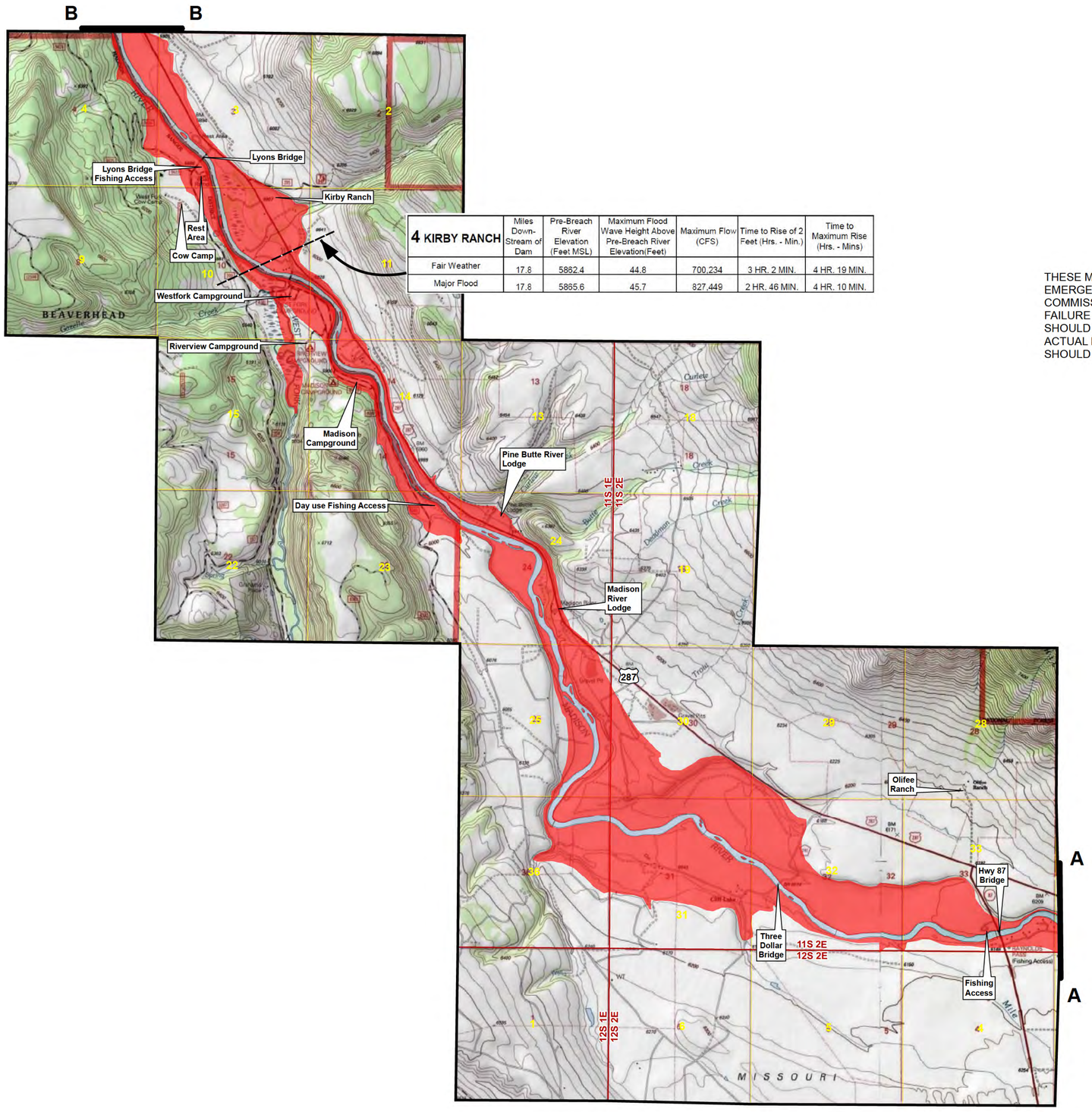
Hebgen Dam Emergency Action Plan

Sheet 3 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.



4 KIRBY RANCH	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	17.8	5862.4	44.8	700,234	3 HR. 2 MIN.	4 HR. 19 MIN.
Major Flood	17.8	5865.6	45.7	827,449	2 HR. 46 MIN.	4 HR. 10 MIN.

THESE MAPS INDENTIFY ESTIMATED NOTIFICATION ZONES TO BE USED BY EVACUATION AGENCIES FOR EMERGENCY PLANNING AND MITIGATION PURPOSES, AS REQUIRED UNDER THE FEDERAL ENERGY REGULATORY COMMISSION'S REGULATIONS. FLOOD INFORMATION DEPICTED ON THE MAPS IS BASED ON A HYPOTHETICAL FAILURE OF THE DAM, THE EFFECTS OF WHICH WERE MODELED USING CURRENT TECHNOLOGY. MAP USERS SHOULD BE AWARE THAT ACTUAL INUNDATED AREAS AND FLOOD WAVE TRAVEL TIMES WOULD DEPEND ON ACTUAL FAILURE CONDITIONS, AND MAY DIFFER FROM AREAS SHOWN ON THIS MAP. THE MAPS AND DATA SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.

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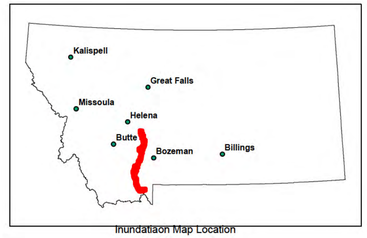
Aerial Photo: NAIP 2013



Inundation Map Location

ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/20/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 3 OF 14	5

D 22" x 34"

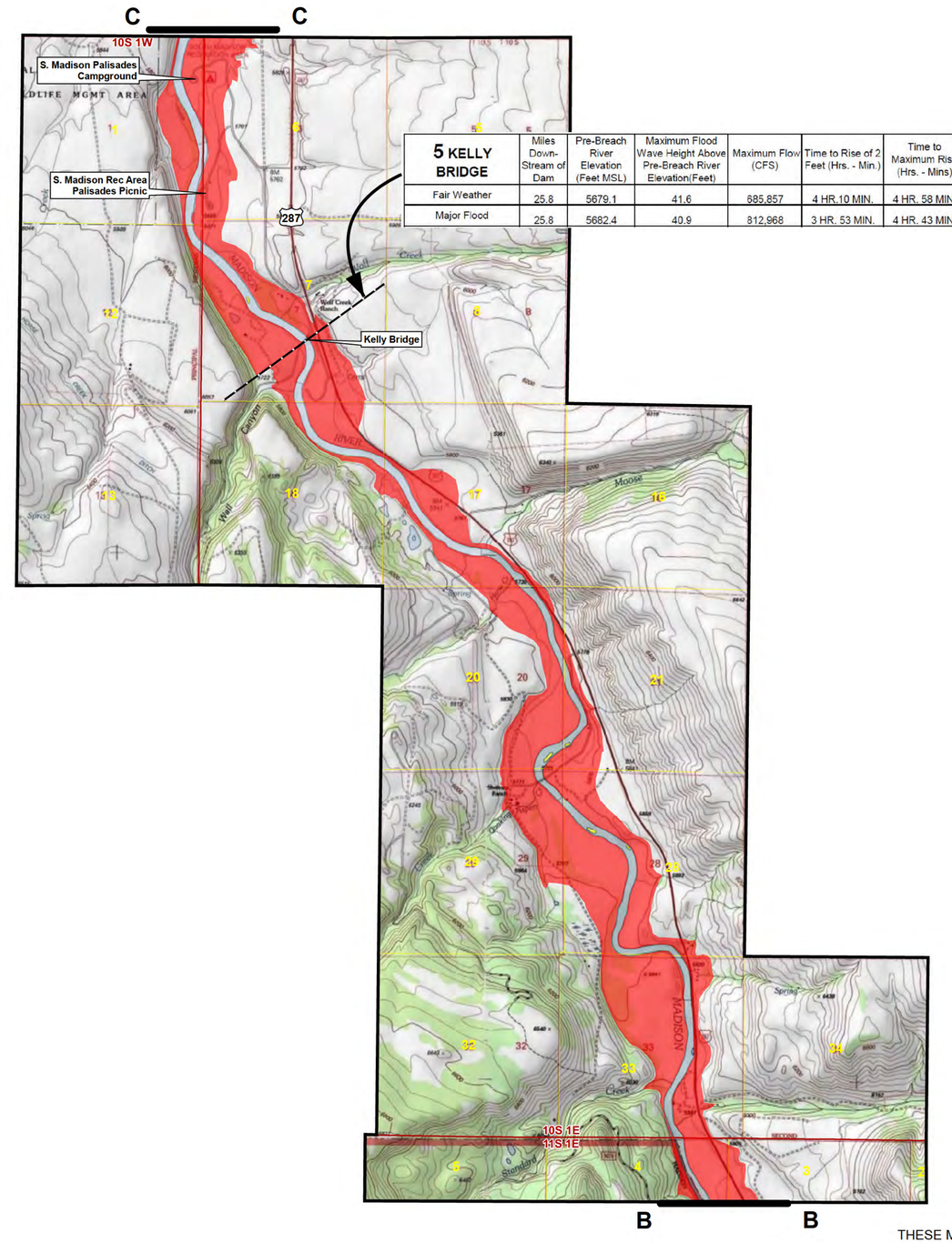
Hebgen Dam Emergency Action Plan

Sheet 4 of 14

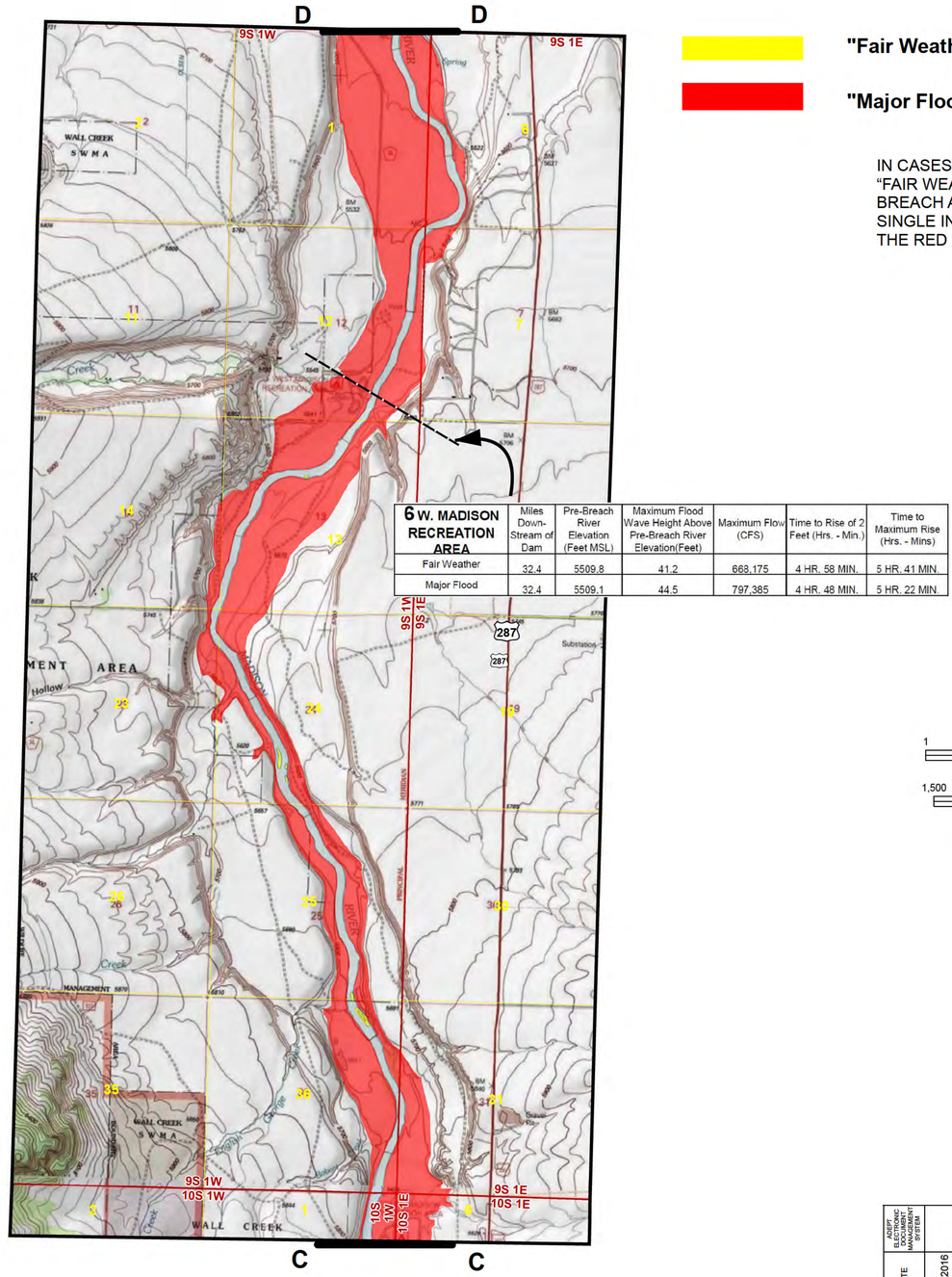
"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.



5 KELLY BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	25.8	5679.1	41.6	685,857	4 HR.10 MIN.	4 HR. 58 MIN.
Major Flood	25.8	5682.4	40.9	812,968	3 HR. 53 MIN.	4 HR. 43 MIN.



6 W. MADISON RECREATION AREA	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	32.4	5509.8	41.2	668,175	4 HR. 58 MIN.	5 HR. 41 MIN.
Major Flood	32.4	5509.1	44.5	797,385	4 HR. 48 MIN.	5 HR. 22 MIN.

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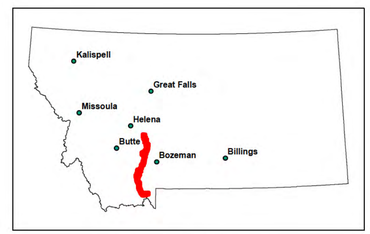
Aerial Photo: NAIP 2013



Inundatiaon Map Location

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ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM

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DATE	3/18/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO		
DESCRIPTION	REV PER 2016 UPDATES	NorthWestern Energy	
		DEPT. MGR. C. HARRIS; ENG./TECH. HEI; DRAWN HEI	
		SIZE AS SHOWN; HYDRO DIVISION	REV.
REV.	5	SIZE D; DWG. NO. 43674-C13; SHT 4 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 5 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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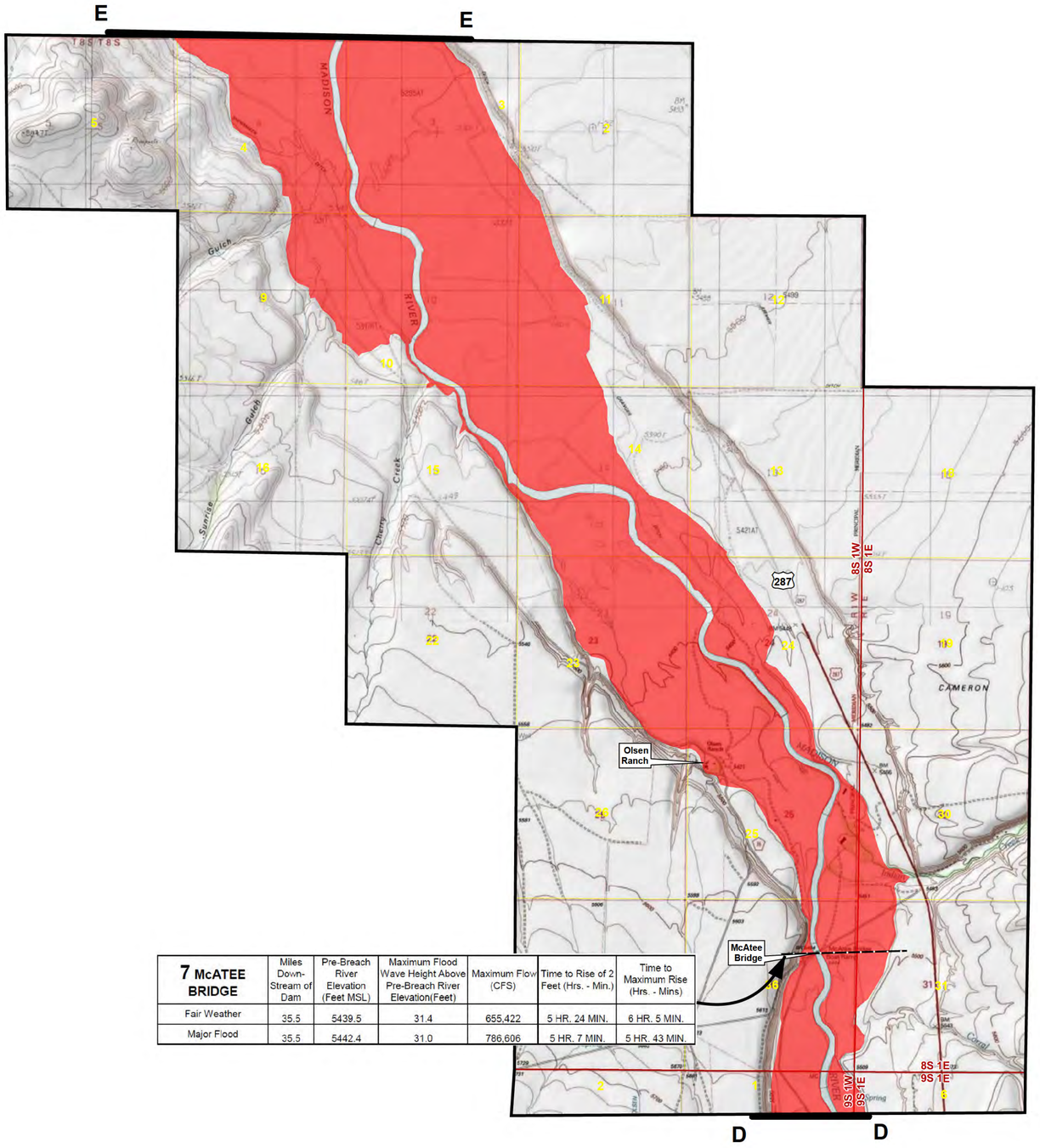

7 McATEE BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	35.5	5439.5	31.4	655,422	5 HR. 24 MIN.	6 HR. 5 MIN.
Major Flood	35.5	5442.4	31.0	786,606	5 HR. 7 MIN.	5 HR. 43 MIN.

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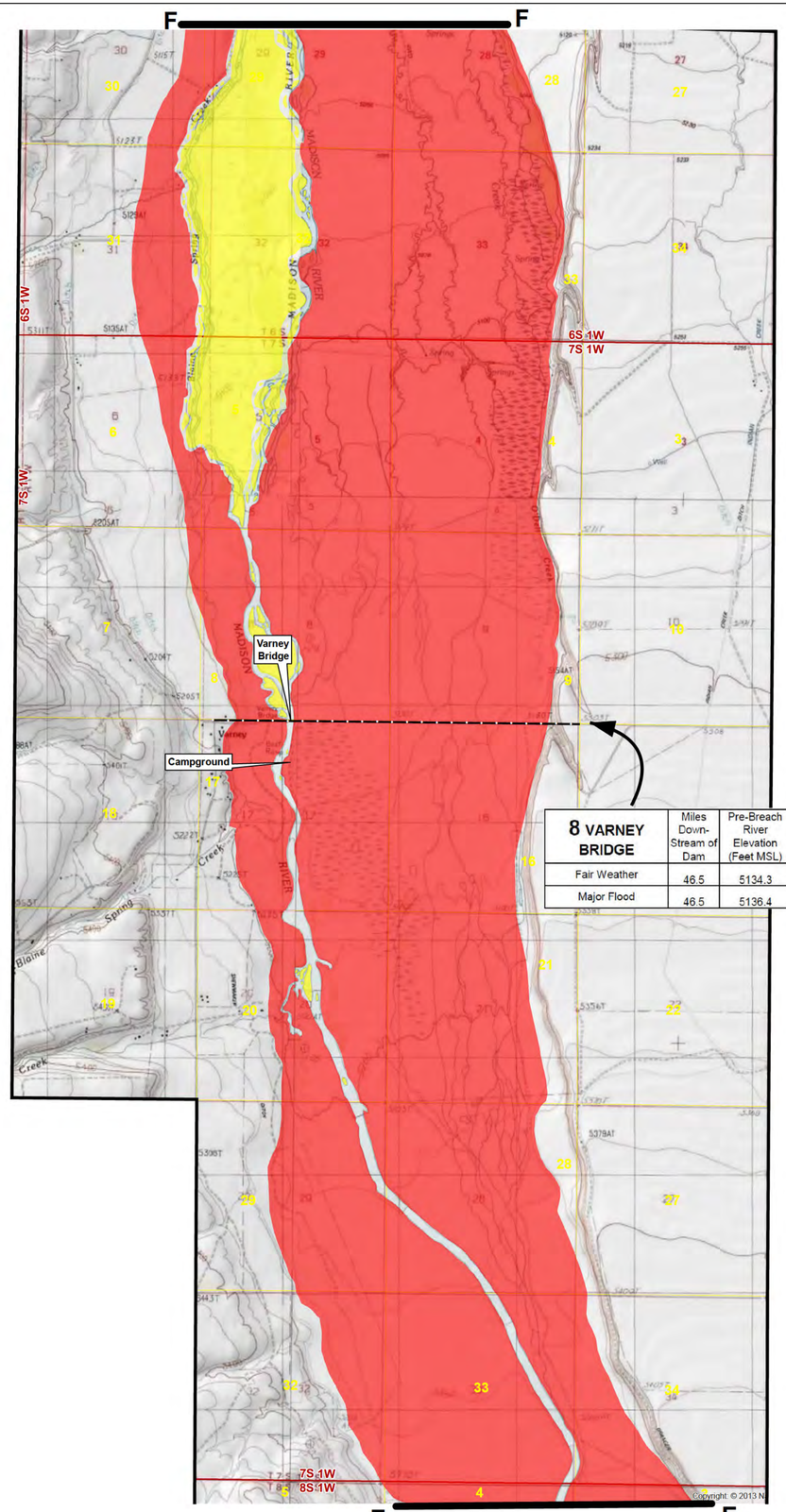
Aerial Photo: NAIP 2013

Inundatiaon Map Location

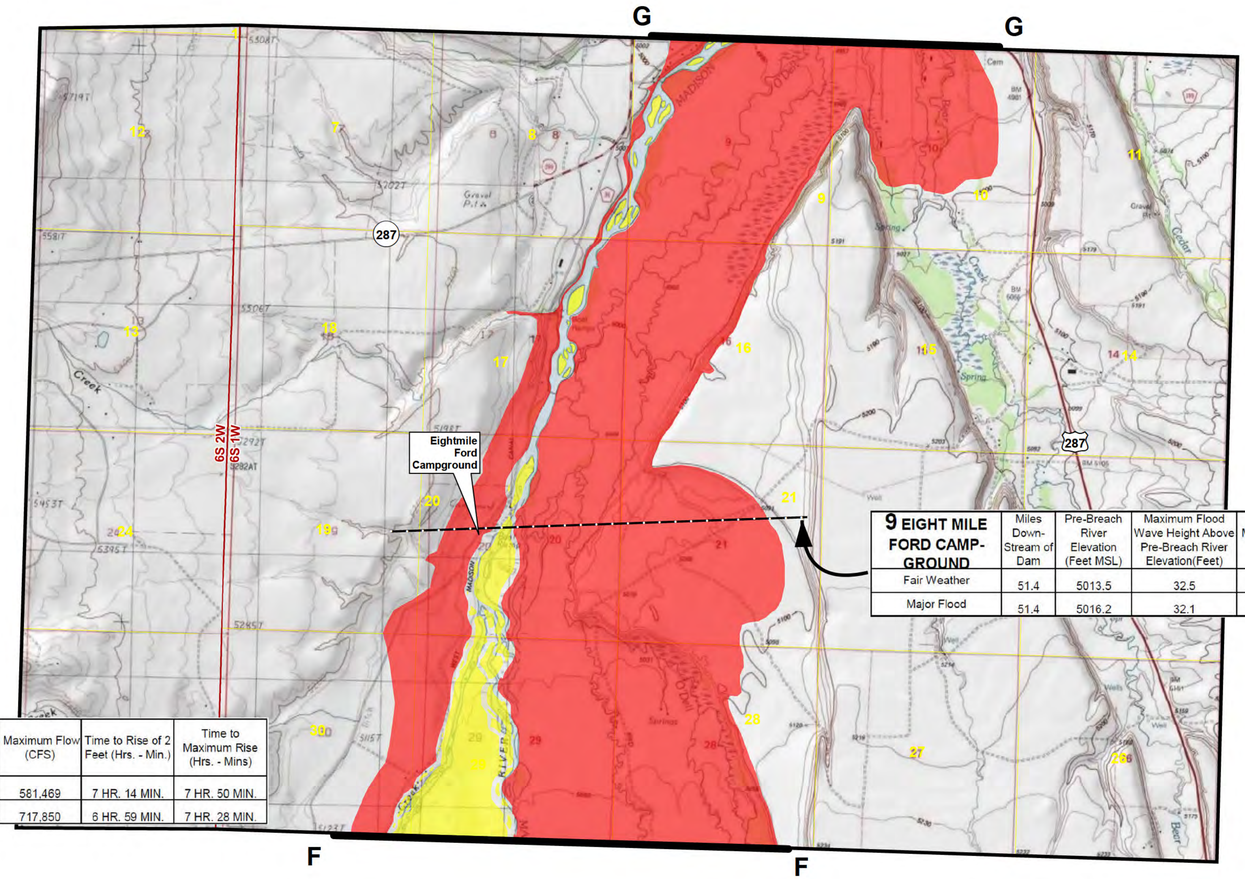
ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/18/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 5 OF 14	5

D 22" x 34"

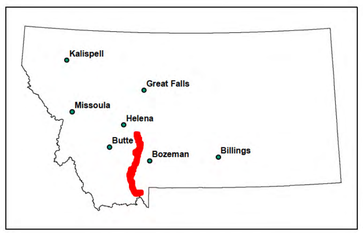
Hebgen Dam Emergency Action Plan



8 VARNEY BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	46.5	5134.3	22.9	581,469	7 HR. 14 MIN.	7 HR. 50 MIN.
Major Flood	46.5	5136.4	22.6	717,850	6 HR. 59 MIN.	7 HR. 28 MIN.



9 EIGHT MILE FORD CAMP-GROUND	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	51.4	5013.5	32.5	554,534	8 HR. 14 MIN.	8 HR. 53 MIN.
Major Flood	51.4	5016.2	32.1	669,474	7 HR. 47 MIN.	8 HR. 30 MIN.



Inundatiaon Map Location

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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Aerial Photo: NAIP 2013

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM

REFERENCE DRAWING | DRAWING NUMBER

DATE 3/18/2016

DFT. CC

ENGR. RO

DESCRIPTION REV PER 2016 UPDATES

REV. 5

EMERGENCY ACTION PLAN
INUNDATION MAPS
HEBGEN DAM
F.E.R.C PROJECT 2188(09)

NorthWestern Energy

DEPT. MGR. C. HARRIS | ENG./TECH. HEI | DRAWN HEI

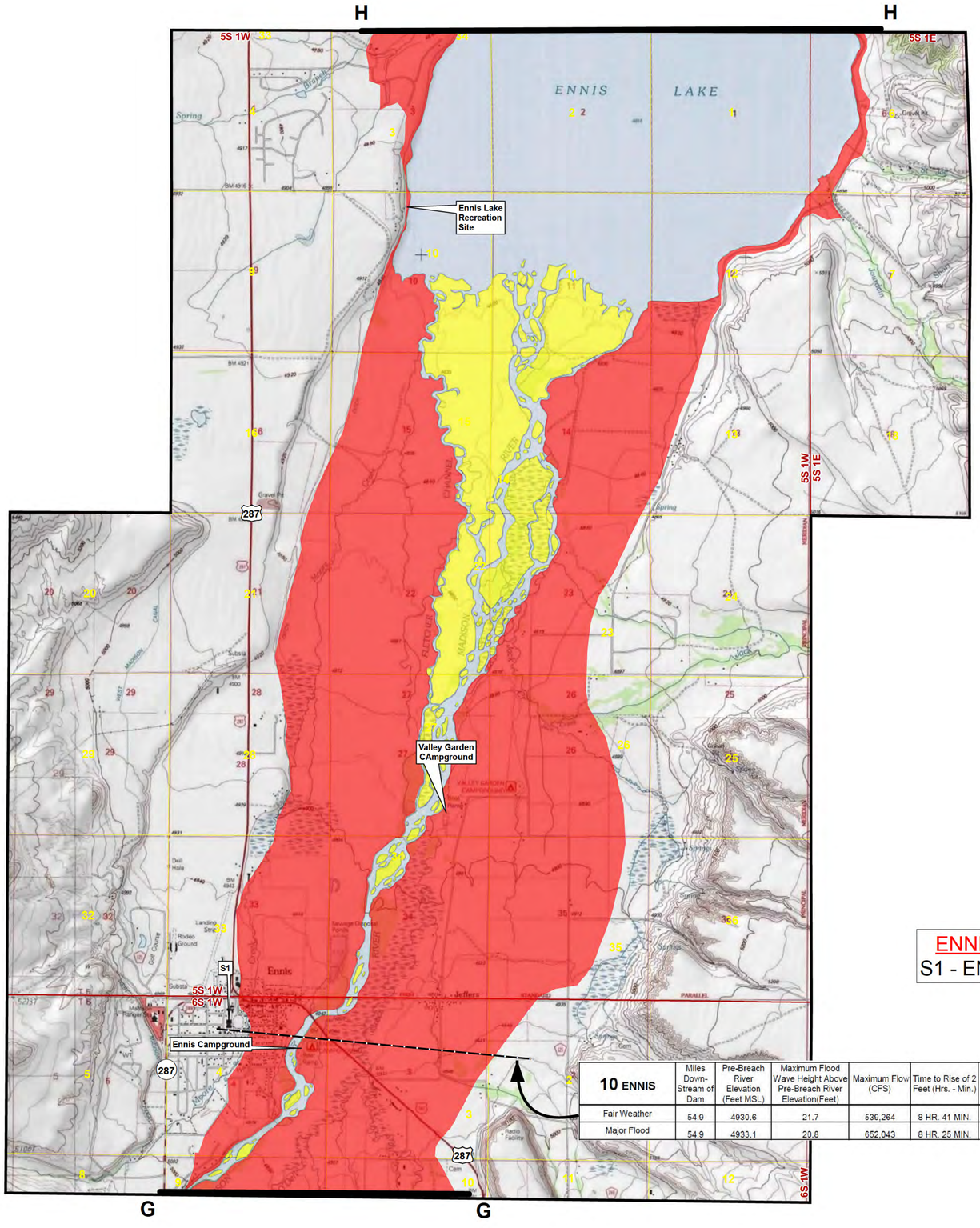
SIZE AS SHOWN | HYDRO DIVISION | REV.

SIZE D | DWG. NO. 43674-C13 | SHT 6 OF 14 | 5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 7 of 14



10 ENNIS	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	54.9	4930.6	21.7	536,264	8 HR. 41 MIN.	9 HR. 30 MIN.
Major Flood	54.9	4933.1	20.8	652,043	8 HR. 25 MIN.	9 HOURS

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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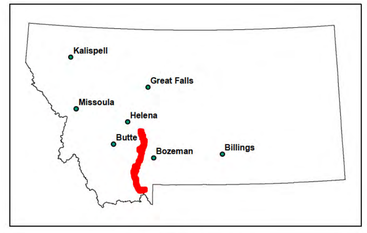
Aerial Photo: NAIP 2013



Inundatiaon Map Location

ENNIS EMERGENCY SHELTER LOCATIONS

S1 - ENNIS HIGH SCHOOL, 223 CHARLES AVE.

ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM			
		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/18/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO		
DESCRIPTION	REV PER 2016 UPDATES	NorthWestern Energy	
		DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 7 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 8 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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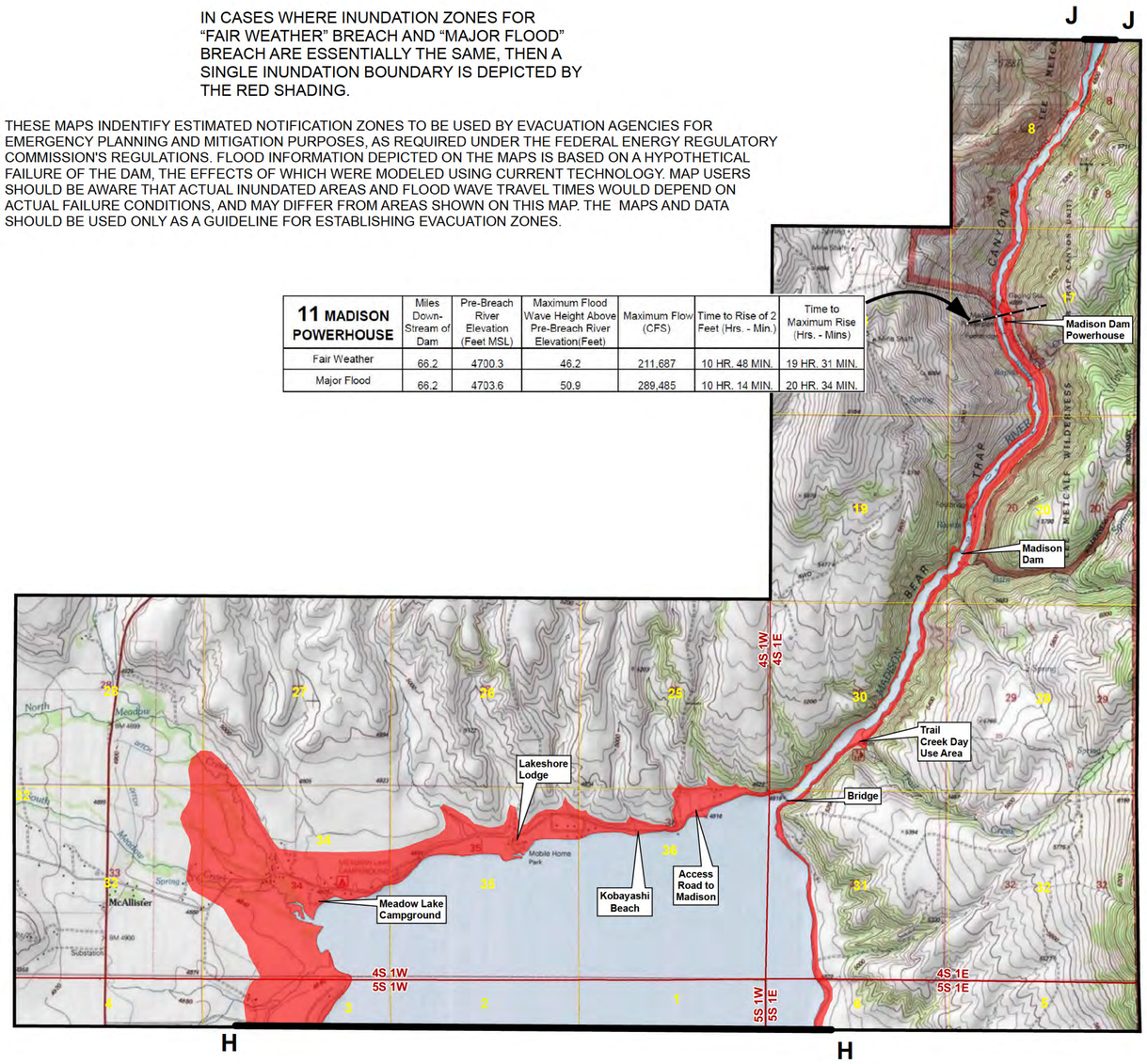
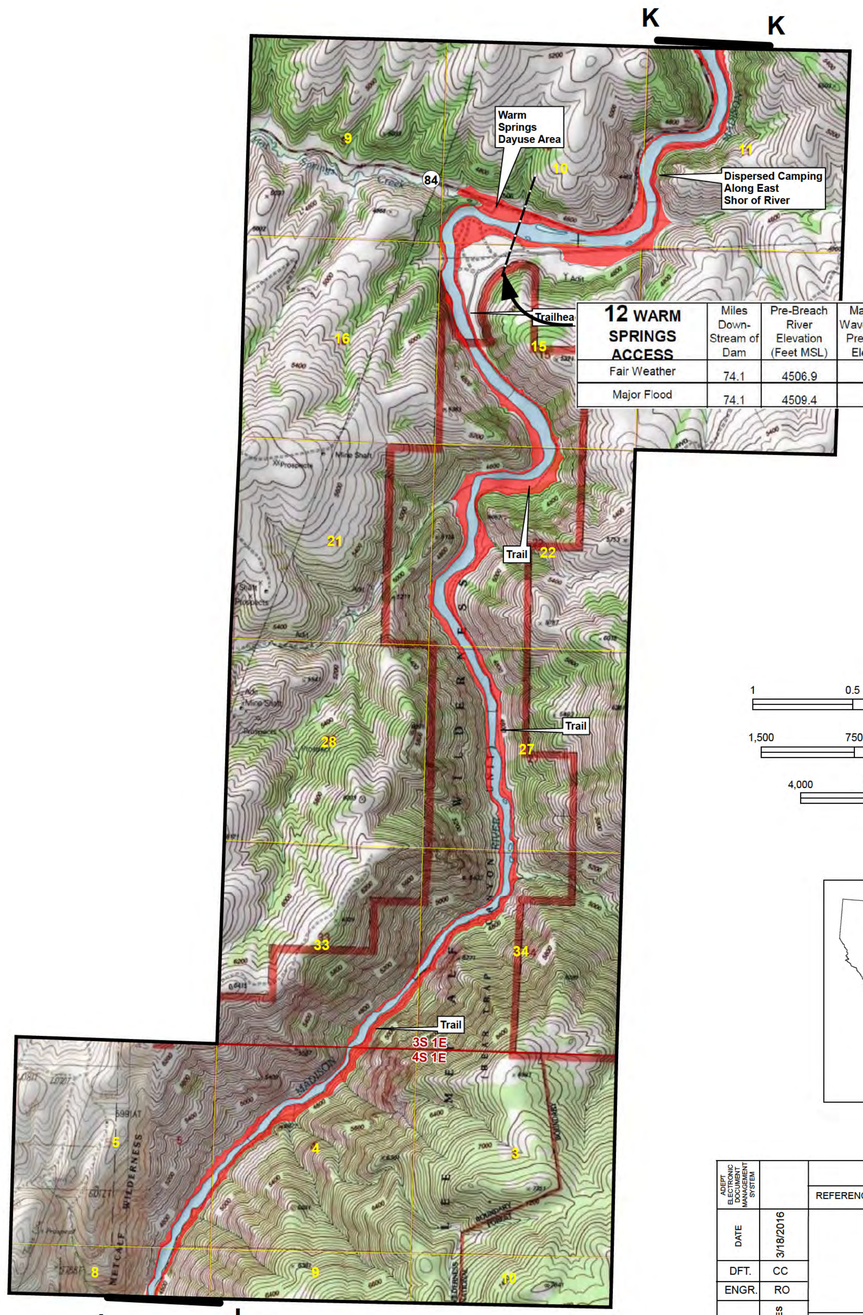
11 MADISON POWERHOUSE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	66.2	4700.3	46.2	211,687	10 HR. 48 MIN.	19 HR. 31 MIN.
Major Flood	66.2	4703.6	50.9	289,485	10 HR. 14 MIN.	20 HR. 34 MIN.



12 WARM SPRINGS ACCESS	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	74.1	4506.9	42.1	211,644	11 HR. 55 MIN.	20 HR. 53 MIN.
Major Flood	74.1	4509.4	46.9	289,452	11 HR. 55 MIN.	22 HR. 38 MIN.



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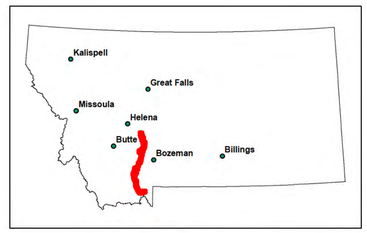
Aerial Photo: NAIP 2013



Inundatiaon Map Location

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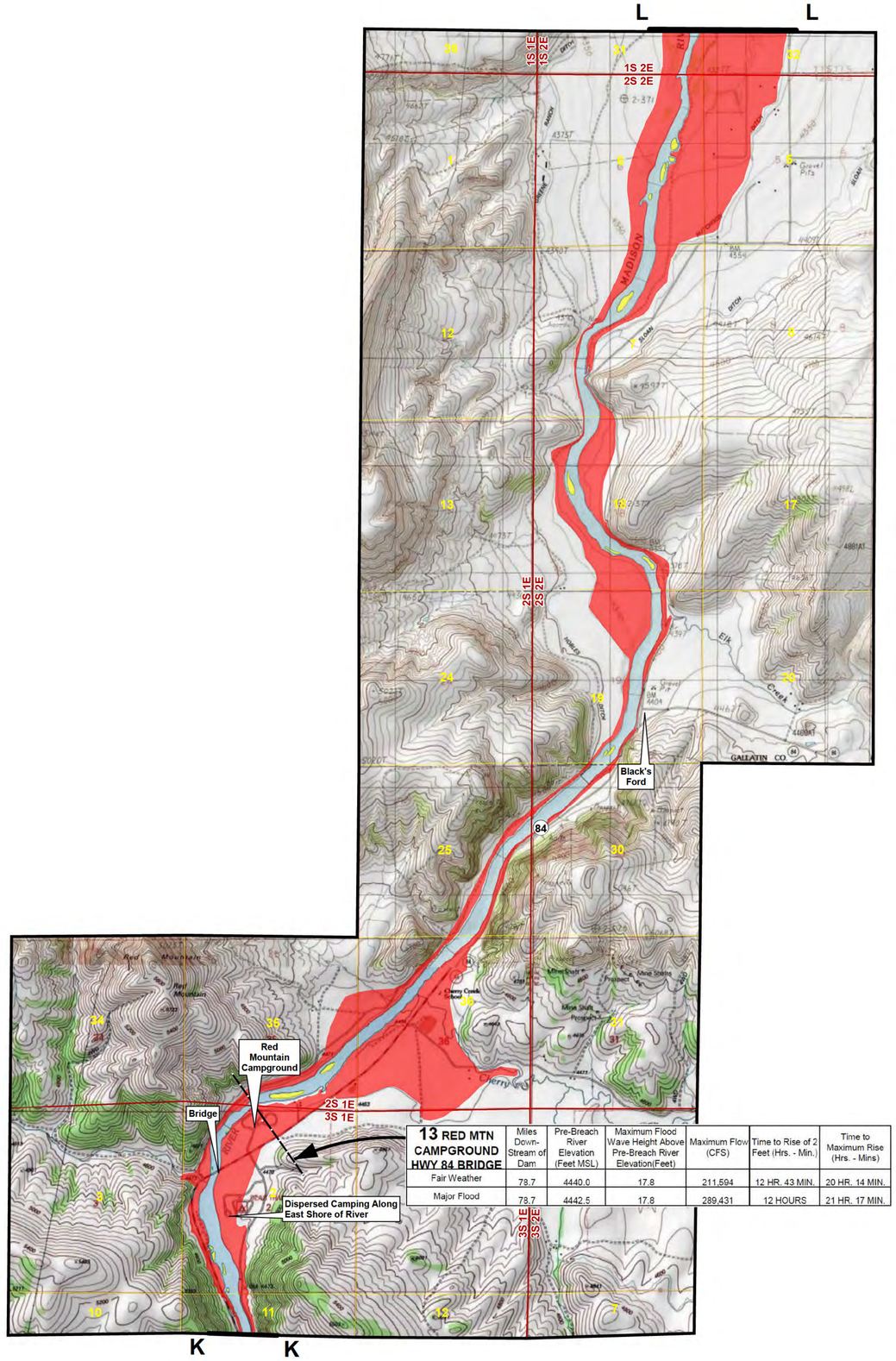
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 8 OF 14	5

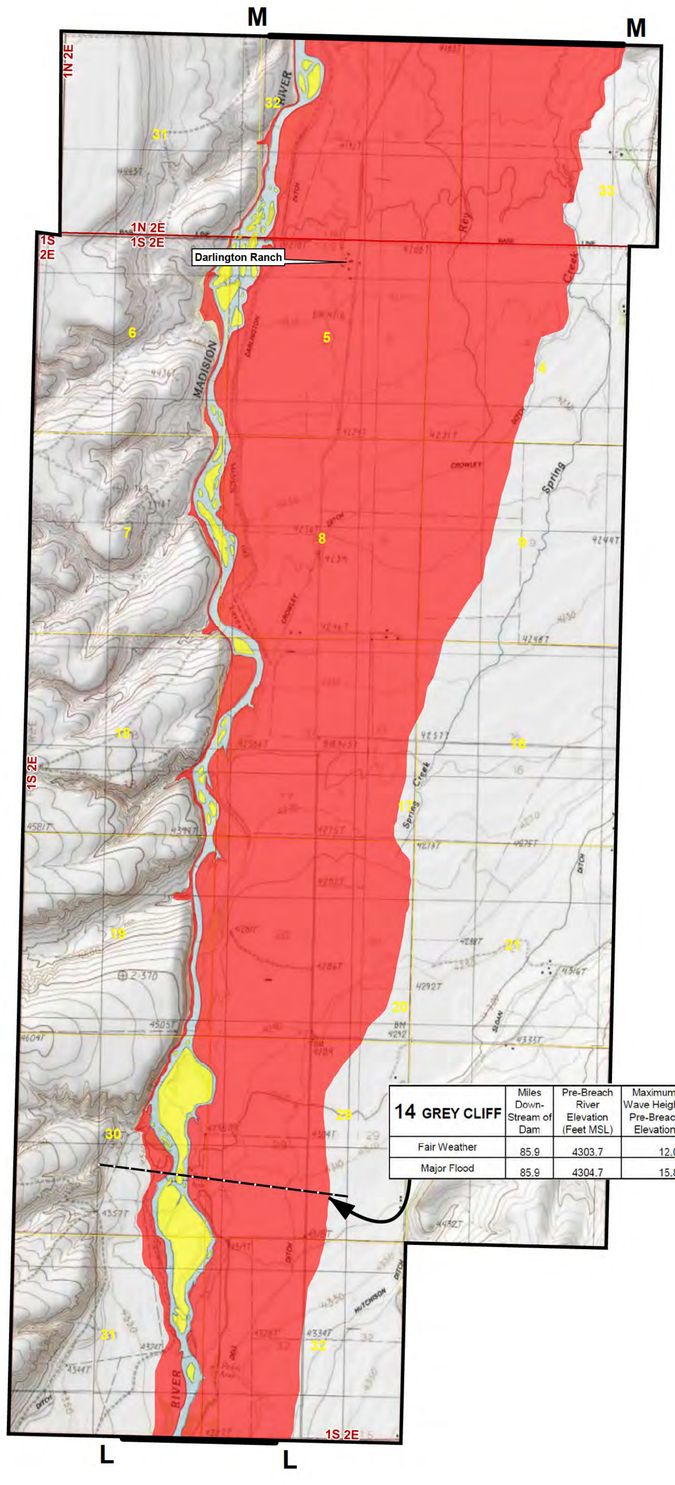
D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 9 of 14



13 RED MTN CAMPGROUND HWY 84 BRIDGE	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	78.7	4440.0	17.8	211,594	12 HR. 43 MIN.	20 HR. 14 MIN.
Major Flood	78.7	4442.5	17.8	289,431	12 HOURS	21 HR. 17 MIN.



14 GREY CLIFF	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	85.9	4303.7	12.0	211,471	14 HR. 38 MIN.	21 HR. 22 MIN.
Major Flood	85.9	4304.7	15.8	289,315	13 HR. 41 MIN.	22 HR. 14 MIN.

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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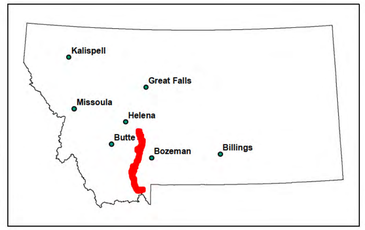
Aerial Photo: NAIP 2013



Inundatiaon Map Location

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		SIZE AS SHOWN / HYDRO DIVISION	REV.
REV.	5	SIZE D / DWG. NO. 43674-C13 / SHT 9 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 10 of 14

N

N

Old Town

Three Forks

S1

2N 1E
1N 1E

2N 2E
1N 2E

RIVER

MADISON

Creek

M

M

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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15 THREE FORKS	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	99.3	4069.7	11.1	211,086	18 HOURS	23 HR. 46 MIN.
Major Flood	99.3	4071.1	11.3	288,981	16 HR. 48 MIN.	24 HR. 24 MIN.

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THREE FORKS EMERGENCY SHELTER LOCATIONS

S1 - THREE FORKS HIGH SCHOOL, 210 EAST NEAL

1:24,000

1 0.5 0 1 Miles

1,500 750 0 1,500 Meters

4,000 2,000 0 4,000 Feet

N W E S

Aerial Photo: NAIP 2013

Inundatiaon Map Location

ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/20/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO		
DESCRIPTION	REV PER 2016 UPDATES	NorthWestern Energy	
		DEPT. MGR. C. HARRIS; ENG./TECH. HEI; DRAWN HEI	
		SIZE AS SHOWN; HYDRO DIVISION; REV.	
REV.	5	SIZE D; DWG. NO. 43674-C13; SHT 10 OF 14	5

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 11 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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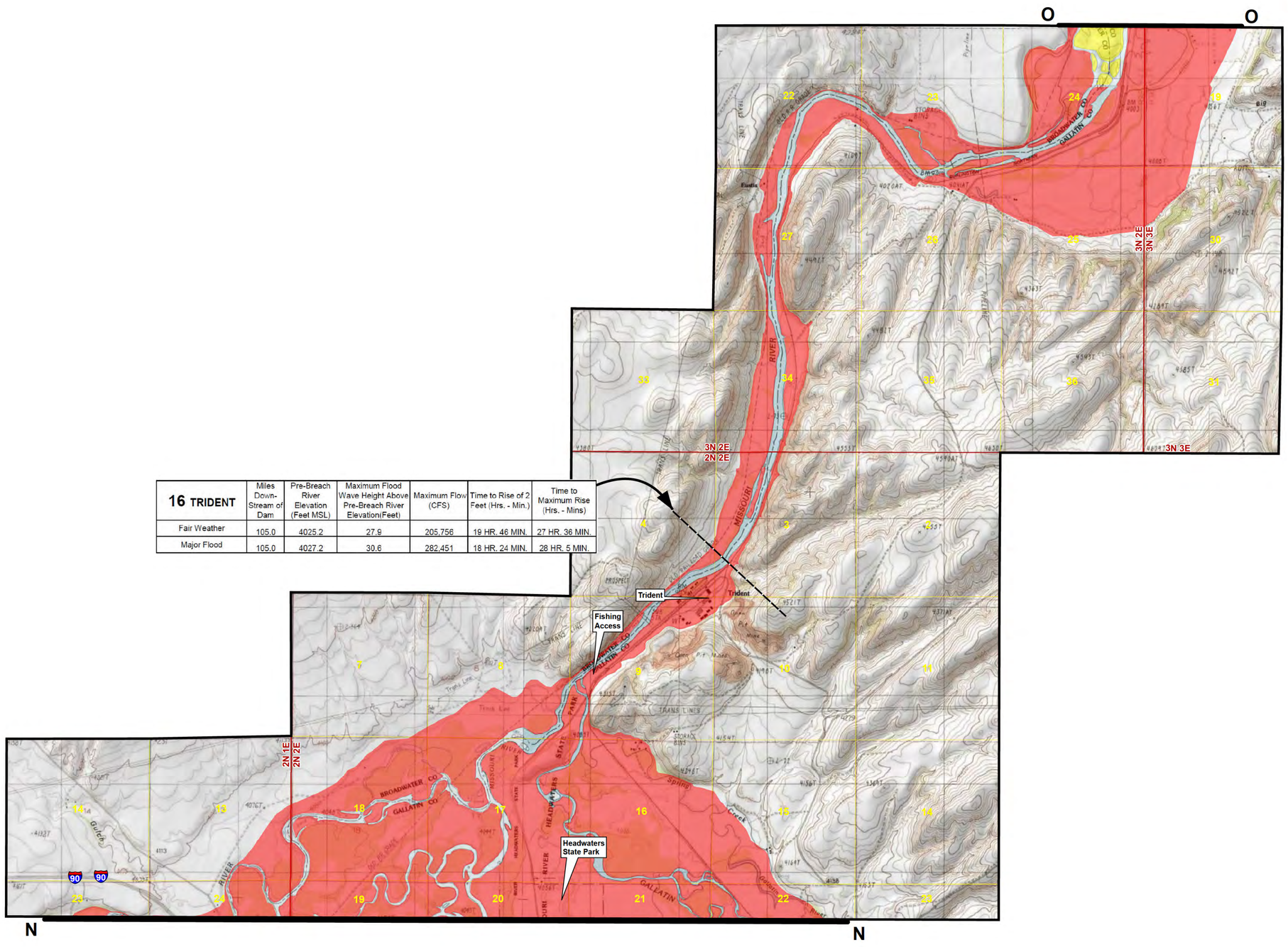

16 TRIDENT	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	105.0	4025.2	27.9	205,756	19 HR. 46 MIN.	27 HR. 36 MIN.
Major Flood	105.0	4027.2	30.6	282,451	18 HR. 24 MIN.	28 HR. 5 MIN.

1:24,000

1 0.5 0 1 Miles

1,500 750 0 1,500 Meters

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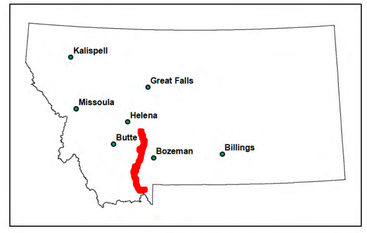
Aerial Photo: NAIP 2013



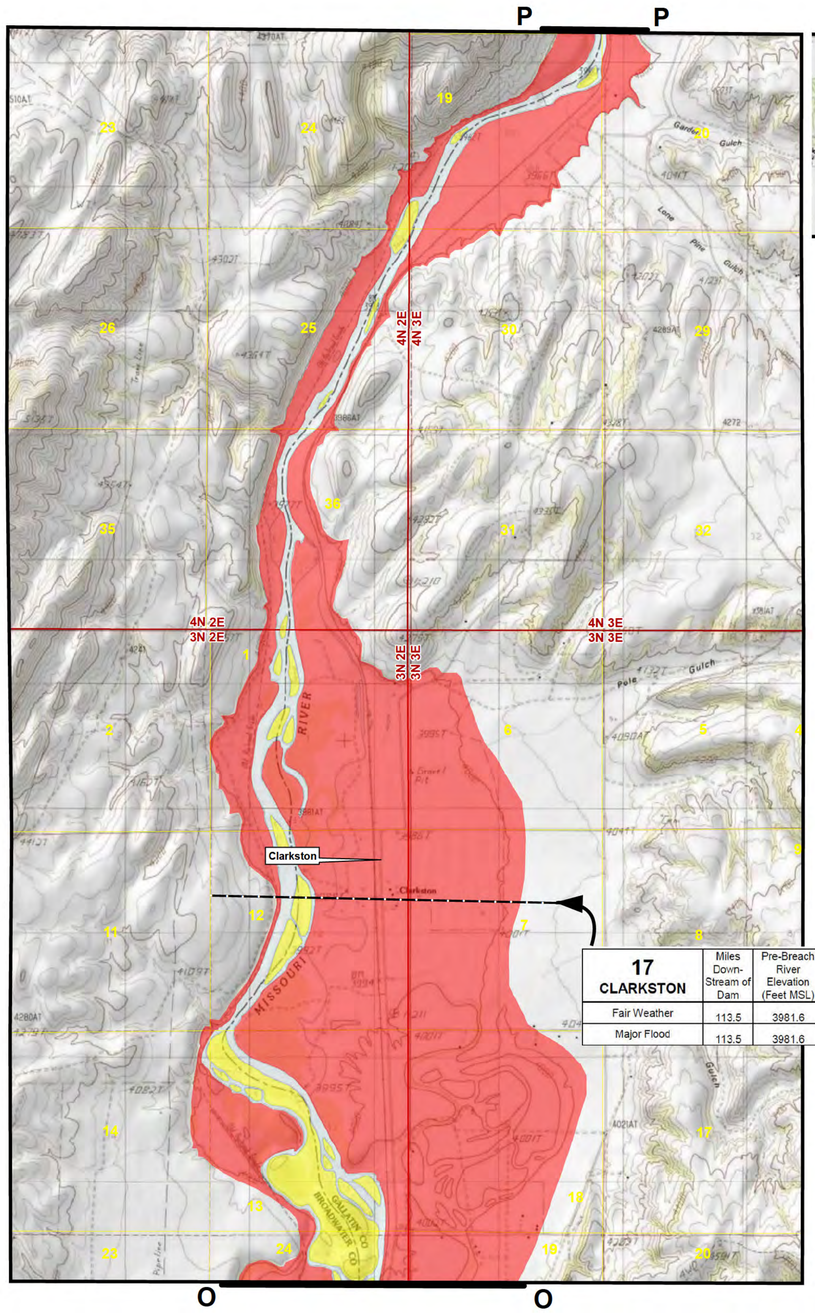
Inundatiaon Map Location

ADEPT ELECTRONIC DOCUMENT MANAGEMENT SYSTEM			
		REFERENCE DRAWING	DRAWING NUMBER
DATE	3/20/2016	EMERGENCY ACTION PLAN INUNDATION MAPS HEBGEN DAM F.E.R.C PROJECT 2188(09)	
DFT.	CC		
ENGR.	RO	NorthWestern Energy	
DESCRIPTION	REV PER 2016 UPDATES	DEPT. MGR. C. HARRIS / ENG./TECH. HEI / DRAWN HEI	
REV.	5	SIZE AS SHOWN / HYDRO DIVISION / REV.	
		SIZE D / DWG. NO. 43674-C13 / SHT 11 OF 14	5

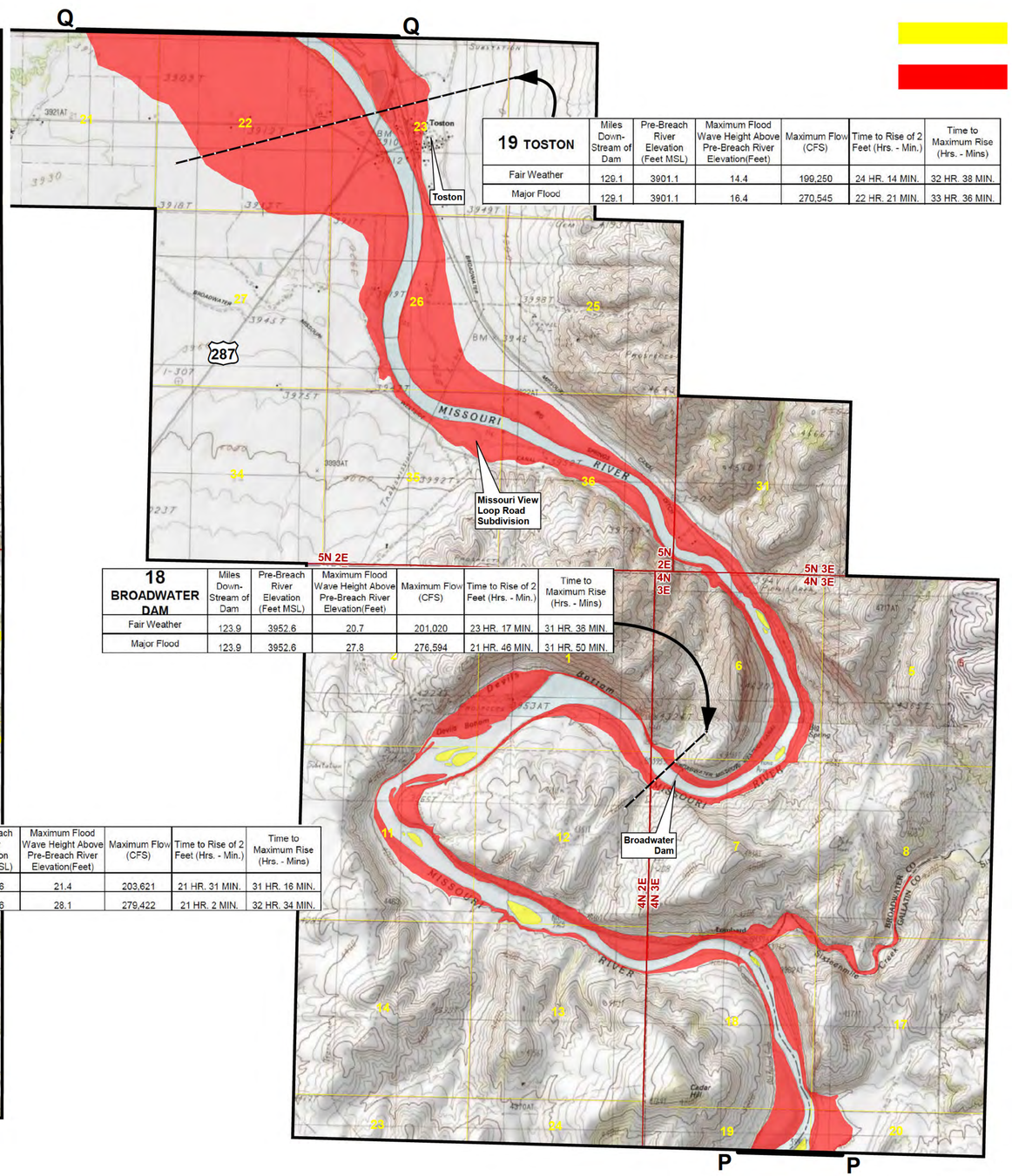
D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 12 of 14



17 CLARKSTON	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	113.5	3981.6	21.4	203,621	21 HR. 31 MIN.	31 HR. 16 MIN.
Major Flood	113.5	3981.6	28.1	279,422	21 HR. 2 MIN.	32 HR. 34 MIN.



18 BROADWATER DAM	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	123.9	3952.6	20.7	201,020	23 HR. 17 MIN.	31 HR. 38 MIN.
Major Flood	123.9	3952.6	27.8	276,594	21 HR. 46 MIN.	31 HR. 50 MIN.

19 TOSTON	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	129.1	3901.1	14.4	199,250	24 HR. 14 MIN.	32 HR. 38 MIN.
Major Flood	129.1	3901.1	16.4	270,545	22 HR. 21 MIN.	33 HR. 36 MIN.

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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1:24,000

1 0.5 0 1 Miles

1,500 750 0 1,500 Meters

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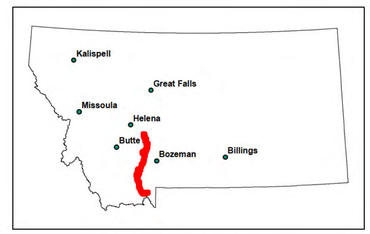
Aerial Photo: NAIP 2013



Inundatiaon Map Location

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DFT.	CC		
ENGR.	RO	NorthWestern Energy	
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REV.	5	SIZE AS SHOWN; HYDRO DIVISION; REV.	
		SIZE D; DWG. NO. 43674-C13; SHT 12 OF 14; 5	

D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 13 of 14

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

IN CASES WHERE INUNDATION ZONES FOR "FAIR WEATHER" BREACH AND "MAJOR FLOOD" BREACH ARE ESSENTIALLY THE SAME, THEN A SINGLE INUNDATION BOUNDARY IS DEPICTED BY THE RED SHADING.

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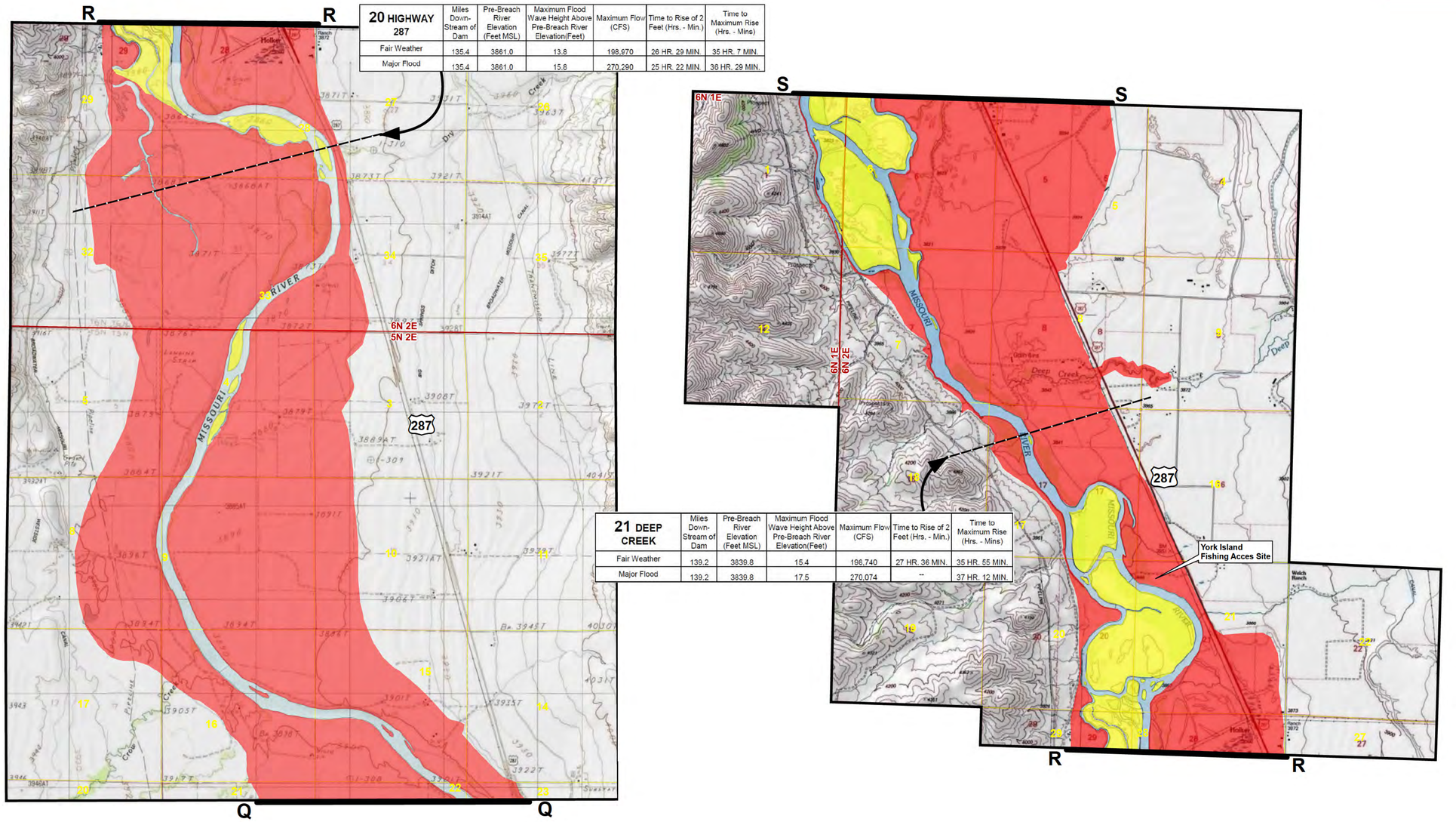
20 HIGHWAY 287	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	135.4	3861.0	13.8	198,970	26 HR. 29 MIN.	35 HR. 7 MIN.
Major Flood	135.4	3861.0	15.8	270,290	25 HR. 22 MIN.	36 HR. 29 MIN.

21 DEEP CREEK	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	139.2	3839.8	15.4	198,740	27 HR. 36 MIN.	35 HR. 55 MIN.
Major Flood	139.2	3839.8	17.5	270,074	--	37 HR. 12 MIN.



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Aerial Photo: NAIP 2013

Inundatiaon Map Location

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ENGR.	RO	NorthWestern Energy	
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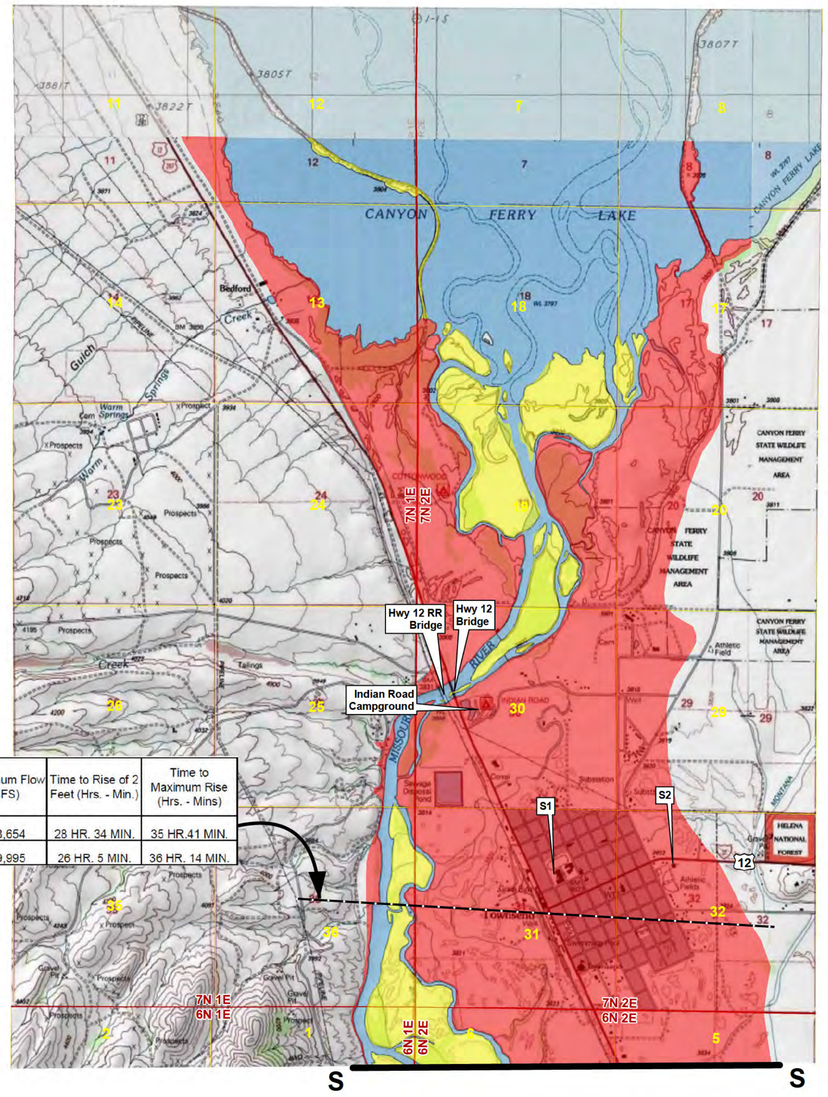
D 22" x 34"

Hebgen Dam Emergency Action Plan

Sheet 14 of 14



22 TOWNSEND	Miles Down-Stream of Dam	Pre-Breach River Elevation (Feet MSL)	Maximum Flood Wave Height Above Pre-Breach River Elevation(Feet)	Maximum Flow (CFS)	Time to Rise of 2 Feet (Hrs. - Min.)	Time to Maximum Rise (Hrs. - Mins)
Fair Weather	142.4	3814.2	12.2	198,654	28 HR. 34 MIN.	35 HR.41 MIN.
Major Flood	142.4	3814.2	14.1	269,995	26 HR. 5 MIN.	36 HR. 14 MIN.

TOWNSEND EMEGENCY SHELTER LOCATIONS

S1 - TOWNSEND HIGH SCHOOL, 210 NORTH SPRUCE
S2 - LDS CHURCH, 916 BROADWAY

"Fair Weather" Dam Failure Inundation Boundary

"Major Flood" Dam Failure Inundation Boundary

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1:24,000

1 0.5 0 1 Miles

1,500 750 0 1,500 Meters

4,000 2,000 0 4,000 Feet

N W E S

Aerial Photo: NAIP 2013

Inundatiaon Map Location

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ENGR.	RO	NorthWestern Energy	
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		SIZE AS SHOWN; HYDRO DIVISION; REV.	
REV.	5	SIZE D; DWG. NO. 43674-C13; SHT 14 OF 14	5

D 22" x 34"