

620 LEVEES—Summary

Maximum credit: 235 points

622 Elements

- a. **Levee maintenance (LM):** Up to 95 points if the levee system is maintained and operated according to a written maintenance plan. There are no credit points for levees that are recognized on the community's adopted Flood Insurance Rate Map (FIRM), although documentation of annual inspection and maintenance is a prerequisite for any credit under this activity.
- b. **Levee failure threat recognition system (LFR):** Up to 30 points for having a system to advise the emergency manager when there is a threat of a levee's failure or overtopping.
- c. **Levee failure warning (LFW):** Up to 50 points for disseminating the warning to the public.
- d. **Levee failure response operations (LFO):** Up to 30 points for response actions to be undertaken to reduce or prevent threats to health, safety, and property.
- e. **Levee failure critical facilities planning (LCF):** Up to 30 points for coordination of actions with operators of critical facilities.

Credit Criteria

Credit criteria for this activity are described in Section 621.b.

- a. Credit is limited to levee systems that were designed and constructed as levee systems and are operated and maintained by a public agency.
- b. The community must submit a map showing the location of each levee and the areas that would be flooded if the levee were to fail or be overtopped.
- c. Annual inspections of the levee system must be conducted according to a written maintenance plan.
- d. The community must implement an annual outreach project to the residents and businesses in the area(s) that would be inundated if a levee were overtopped.
- e. To receive Activity 620 credit for LFR, LFW, LFO, and LCF, the community must receive some LM credit.
- f. To receive Activity 620 credit other than LM credit, the community must receive some credit in all four levee warning and response elements (LFR, LFW, LFO, and LCR), and
 - (1) There must be a levee failure flood warning and response plan that has been adopted by the community's governing body; and
 - (2) There must be an annual exercise of the plan and a lessons-learned report.

Each element has additional criteria specific to that element.

Impact Adjustment

The credits for LM, LFR, LFW, and LFO are adjusted based on the number of buildings affected by each element. There is no impact adjustment for LCF.

Documentation Provided by the Community

Each element has a separate section describing needed documentation.

620 LEVEES

The OBJECTIVE of this activity is to encourage communities to properly inspect and maintain levees and to identify impending levee failures in a timely manner, disseminate warnings to appropriate floodplain occupants, and coordinate emergency response activities to reduce the threat to life and property. This activity focuses on the community's emergency management actions and plans. Therefore, the emergency manager should be the point of contact, and he or she should coordinate with the agency responsible for the levee.

621 Background

The failure or overtopping of a levee poses extreme hazards to buildings, infrastructure, and people on the landward side of the levee.

Flood waters near a levee breach usually move at a much greater velocity than the water within the channel. The combination of high-velocity flows and rapidly rising water makes evacuation and other responses difficult or impossible. Sound emergency response plans for levee failures are critical, especially if evacuation routes would be restricted or severed.

Up to a certain point, a levee usually will prevent flooding to properties on its landward side. However, regardless of the design standard used, levees can and do fail. Someday there will be a flood that exceeds the levee's ability to hold flood waters, and when a levee is overtopped it is far more likely that it will suffer a catastrophic breach or failure as well. Even well-maintained levees can fail for a variety of reasons.

By doing everything possible to reduce the chance of levee failure and by being prepared for an event that could lead to a levee failure, a community can reduce the potential hazards to life, health, and property.

Definition of a Levee

A levee is a structure, usually an earthen embankment, designed and constructed using sound engineering practices, to contain, control, or divert flood waters in accordance with a designated risk reduction level.

See Section 120 (Glossary).

621.a. Activity Description

The maximum credit for Activity 620 is 235 points.

The items credited by this activity include

- Proper maintenance of the levees (credited under LM),
- A system to advise local emergency managers of a potential levee failure or overtopping (credited under LFR),
- A warning system for people on the landward side of the levee (credited under LFW),

- A plan of action to minimize the threat to life and property during the flood (credited under LFO), and
- Coordination with critical facility operators (credited under LCF).

For levee maintenance credit, a community must implement a levee maintenance plan, create and maintain an inventory of levees, identify the vulnerable population and at-risk structures, and conduct an annual outreach project to advise the vulnerable population.

Levee maintenance (LM) credit is a prerequisite for the four emergency preparedness and response elements (LFR, LFW, LFO, and LCF), which are based on the community's adopted levee failure warning and response plan. This activity is not intended to be a model for developing a levee failure warning and response plan or program. As with the rest of the Community Rating System (CRS) activities, its objective is to provide a way to measure a local program's potential impact on life safety, health, and property damage. An effective program needs to be carefully prepared and tailored to the local hazards and the specific needs of the community.

Emergency Action Plans and Levee Failure Warning and Response Plans

A levee EMERGENCY ACTION PLAN is prepared and implemented by the LEVEE OWNER OR OPERATOR. It includes actions such as closing openings and patrolling for problems along the levee. It may have another name, such as a levee operations plan.

A LEVEE FAILURE WARNING AND RESPONSE PLAN is prepared and implemented by the LOCAL EMERGENCY MANAGEMENT AGENCY. It specifies actions to take to protect people and property in the flood-prone area, such as ordering an evacuation.

621.b. Activity Credit Criteria

Credit for this activity is based on levee systems, i.e., the levee structure plus all appurtenant facilities, such as pump stations and flood walls, that are needed to control flood waters. To receive credit under this activity,

- (1) The levee system(s) for which the community requests credit (or qualification for credit) must have been designed and constructed as a levee (see Section 120, Glossary). Structures such as road and railroad embankments that divert flood waters are not considered "levees" for the purposes of this activity unless it can be documented that they were intended to be levees and were designed and constructed accordingly.
- (2) The levee system(s) for which the community requests credit (or qualification for credit) must be operated and maintained by a public agency. This could be a federal or state agency, a levee district, an office or department of the community, or other public entity.
- (3) The community must submit a map showing the location of each levee or levee system and the areas that would be flooded if the levee or levee system were to be overtopped or fail

Non-Levee Structures

Non-levee structures, such as roads and railroad embankments, pose the same hazards as levees and are more likely to fail. Communities are urged to mitigate these hazards by paying special attention to emergency preparedness and response for buildings on the landward side of these structures.

and an inventory of the buildings and critical facilities that would be flooded upon overtopping or failure. For each levee or levee system, the following information must be submitted:

- (a) The elevation at which the levee is expected to be overtopped or the expected breach elevation. Newer levee systems may include extra levee height to ensure overtopping at a predefined location. Older designs often use freeboard, which may vary along the system;
- (b) A map of the levee or levee system and the area(s) affected should the levee(s) fail or be overtopped. If there are no detailed levee breach maps or levee failure studies, then the map would show the area below the expected overtopping elevation. Guidance for this mapping can be found in Section 621.c;
- (c) An inventory of the types of buildings (residential, commercial, etc.) exposed to flooding should the levee(s) be overtopped or fail, with an approximate count of the number of buildings and an inventory of the land use (residential, agricultural, open space, etc.) of developed and undeveloped areas in the area(s) affected should the levee(s) fail or be overtopped; and
- (d) A list of the critical facilities that would be flooded or otherwise affected by a failure or by the overtopping of the levee (see Section 622.e, LCF1).

This credit criterion is a prerequisite for Class 4 communities.

- (4) The community must have a levee maintenance plan that includes annual inspections and an emergency action plan for the levee system(s), and the plans must meet the credit criteria for LM. There are no LM CREDIT POINTS for levees shown on the effective FIRM as providing protection (e.g., accredited levees), or levees owned and operated by a federal agency, but all levees must qualify for LM credit in order for the community to receive credit for the rest of the elements in this activity.

Dear Property Owner:

Your property is located behind a State-Federal project levee. According to our records, your property located at _____ may be exposed to potential flood risk from the _____. Your property may also be at risk for flooding from other sources not identified in this notice, such as creeks and local storm drains.

Visit www.water.ca.gov/myfloodrisk and enter your property address to find the areas subject to flooding if State-Federal project levees should fail, and to get information on the condition of the levees.

Be aware of your flood risk and be prepared. Read this notice for important information about purchasing flood insurance, emergency planning, and protecting your property.

Consider these facts:



Excerpt from the annual outreach project sent by the California Department of Water Resources to residents of leveed areas.

- (5) The community must implement one or more annual outreach projects to the residents and businesses in the area(s) expected to be inundated by a flood that overtops a levee. The project(s) must tell people about their risk of flooding, how they will be warned of a levee-failure flood, the safety measures they should take during a flood (e.g., evacuation procedures and routes), and the benefits of purchasing flood insurance. This can be done by using one or more of the following approaches:
- (a) Sending an outreach project (e.g., a letter, brochure, or newsletter) each year to all properties with insurable buildings in the area(s) subject to a flood that overtops the levee, or
 - (b) Developing an appropriate approach as part of a Program for Public Information credited Activity 330 (Outreach Projects).
- (6) To receive credit beyond LM credit, the community must obtain some credit in all four levee failure warning and response elements (LFR, LFW, LFO, and LCF).
- (7) The community must have a levee failure flood warning and response plan that has been adopted by the community's governing body to receive LFR, LFW, LFO and LCF credit. The levee failure flood warning and response plan should be part of, and must meet the same criteria as, the community's flood warning and response plan described in Section 611.b(4).
- (8) There must be at least one exercise or drill of the levee failure warning and response plan each year. This can be an exercise for a flood, levee failure, dam failure, or hurricane. This criterion can be met if the plan is implemented in response to an actual flood or threat of a levee failure. In either case, there must be an evaluation of the performance of the plan and recommended changes that may be needed, as is usually done in an after-action report.

Annual Warning and Response Exercise

Activities 610 (Flood Warning and Response), 620 (Levees), and 630 (Dams) require an annual exercise or drill of the warning and response plan. A flood, levee failure, dam failure, or hurricane exercise qualifies as an exercise for all three activities.

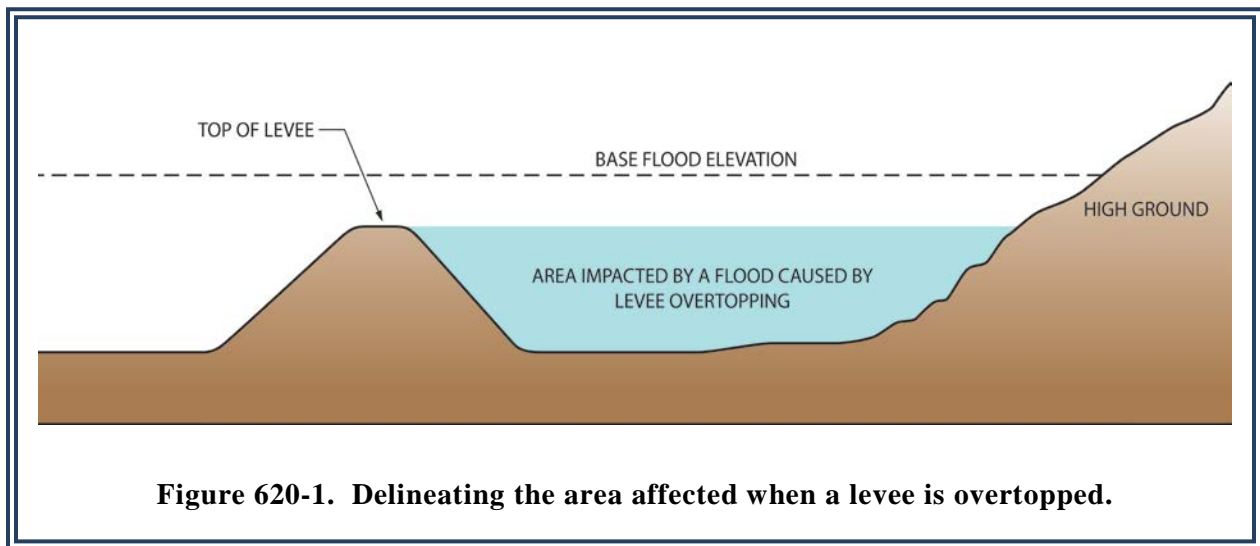
An evaluation of the performance of the warning and response plan must include

- A description of the exercise;
- An evaluation of the
 - Threat recognition procedures,
 - Warning dissemination, and
 - Response operations; and
- Recommended changes to the plan.

The exercise requirement can also be met if the community responds to an actual flood or an actual threat of a levee or dam failure, provided that the items listed above are discussed in an after-action (or similar) report.

621.c. Map of the Affected Area

Credit criterion Section 621.(b)(3)(b) calls for a map that is used to identify the area affected should the levee fail, be breached, or be overtopped. This map is central to CRS credit for this activity. It can help determine the building inventory (Section 621.(b)(3)(c)), the addresses that get the outreach project (Section 621.b(5)), and the impact adjustment factors (Section 623).



This map is not necessarily the map (or series of maps) the community uses in its flood warning and response plan, which is credited in Sections 622(b)–(d). A community should develop a warning and response plan based on different flood level scenarios, including levee breaks at elevations lower than the overtopping level.

The criteria for an affected area map is the same for levees that have been accredited and those that have not been recognized on a Flood Insurance Rate Map (FIRM). There are two ways the map can be prepared:

- (1) If the community or levee agency has an engineering study that identified the area affected by a levee breach or overtopping, that map can be used. Note that such studies often have more than one scenario. The total area flooded by all the scenarios should be used for the affected-area map.
- (2) In the absence of an engineering study on areas that would be flooded by a levee failure or levee overtopping, the affected area is all land below the elevation of the top of the levee. Figure 620-1 identifies such an area where the top of the levee is lower than the base flood elevation. Where the top of the levee is higher than the base flood elevation, the same approach is used and the affected area would be larger than the Special Flood Hazard Area.

Communities that have levee breach analyses are encouraged to use the larger levee overtopping area to determine the addresses for the outreach project. It is a safer standard for identifying the properties potentially affected by a worst case/deepest flooding situation.

622 Elements

622.a. Levee maintenance (LM)

The maximum credit for this element is 95 points.

LM credit is provided for the levee system's maintenance program and emergency action plans.

A levee system (the levee structure plus all appurtenant facilities) is only as good as its weakest part. An operations and maintenance plan needs to include an inspection process that identifies openings or potential weak points in the levee. Equipment to close these openings needs to be checked and tested and instructions that define roles and responsibilities need to be put in place before the levee is threatened by a flood. All of these items are vital to good maintenance and are credited in this element.

LM credit is provided in two ways:

- (1) LM1 credit is provided for the annual inspection and maintenance of the levee system to identify and correct problems as required in a maintenance plan; and
- (2) LM2 credit is provided for the levee agency's emergency action plan. This credit is for having a written operations plan or manual that describes what must be done when a flood occurs by the agency that owns the levee. The plan may be in the same document as the LM1 maintenance plan.

Levees that are shown by the Federal Emergency Management Agency (FEMA) on the effective FIRM as providing protection to the base flood (e.g., accredited levees) are not eligible for CREDIT POINTS under LM, because they are already required to have an adequate maintenance program as a condition of being shown on the FIRM as providing protection. There are no LM credit points for a levee owned or operated by a federal agency. However, communities can receive credit points for their levee failure warning and response plans (LFR, LFW, LFO, and LCF credit) for the areas protected by accredited or federally owned or operated levees.

To receive credit points for a levee failure warning and response plan, the levee must be shown to "qualify" for LM credit. All levees must "qualify," but the credit points for LM are limited to non-accredited and non-federal levees.

Credit Criteria for LM

- (1) The activity credit criteria in Section 621.b must be met.
- (2) The community must receive some credit for both LM1 and LM2 to receive any LM credit.
- (3) To qualify for LM1 credit, the levee system maintenance must
 - (a) Ensure that the levee system's stability, height, and overall integrity are maintained. Encroachments must be controlled to ensure that they do not compromise the levee's

integrity, hinder operations and maintenance, and/or diminish the ability to engage in flood fighting activities. Maintenance programs must correct problems posed by existing encroachments.

- (b) Provide written operations and maintenance procedures that include
 - (i) Annual inspections of the condition of the levee system (i.e., the levee structure, pump stations, closure devices, etc.);
 - (ii) The maintenance activities to be performed;
 - (iii) The frequency of their performance; and
 - (iv) The person responsible for their performance (by name or title).
- (c) Perform and document annual inspections and needed maintenance of levees and floodwalls, as well as pumps, interior drainage systems, closures, penetrations, and transitions that provide for system integrity.
- (4) To qualify for LM2 credit, the emergency action plan must have a written operations plan or manual that describes what must be done by the agency that owns the levee when a flood occurs. It must include
 - (a) A list of all actions that need to be taken at different flood levels, including
 - (1) Procedures to notify the local emergency managers of a potential problem,
 - (2) All openings and closures that need to be closed and the location of the equipment and materials to effect the closure, and
 - (3) Periodic patrols of the levee to detect problems such as erosion and seepage;
 - (b) The person or office responsible for their performance (by name or title);
 - (c) Annual inspections of all equipment and material needed for the plan, such as vehicles and stockpiled sandbags; and
 - (d) Annual tests of all closures, pumps, and other equipment needed to implement the emergency action plan. Any equipment that is used routinely throughout the year, such as vehicles and drainage pumps, do not need testing records for CRS credit.

The plan may be in the same document as the LM1 maintenance plan.

- (5) The community's levee maintenance program must be compliant with applicable federal environmental and historic preservation laws and executive orders (see Section 507). The community and/or levee owners must complete CC-620EHP, Certification of Compliance with Environmental and Historic Preservation Requirements for Levee Maintenance, which can be found in Appendix F of downloaded

Environmental Protection and Historic Preservation

Because it is a FEMA program, the CRS must ensure that activities for which it provides credit are compliant with applicable federal environmental and historic preservation laws and executive orders. Section 507 expands on this requirement and presents a summary of FEMA's policy. Figure 500-5 lists the federal programs that should be considered during project development.

from www.CRSresources.org/200. Credit is not provided if levee maintenance procedures are not compliant with applicable federal laws and executive orders.

Credit Points for LM

$$LM = LM1 + LM2$$

LM1 = up to 50 points, for the levee system maintenance;

LM2 = up to 45 points, for the levee system emergency action plans.

Impact Adjustment for LM

The impact adjustment for the activity is described in Section 623.

Documentation for LM Provided by the Community

(1) At each verification visit,

- (a) The needed documentation for this activity is assembled by the ISO/CRS Specialist and provided to the technical reviewer. There is a checklist to help the emergency manager identify all needed documentation available at www.CRSresources.org/600.
- (b) The map and inventory of buildings described in credit criterion (3) in Section 621.b.
- (c) The LM1 maintenance procedures described in credit criterion (3)(b) in Section 622.a, or documentation that the procedures have been approved by FEMA as meeting PM 63 requirements or approved by the U.S. Army Corps of Engineers.
- (d) The LM2 emergency action plan described in credit criterion (4) in Section 622.a, or documentation the plan has been approved by FEMA as meeting PM 63 requirements or approved by the Corps of Engineers.
- (e) Completed Community Certifications of Compliance with Environmental and Historic Preservation Requirements for Levee Maintenance (CC-620EHP) from all levee owners, which can be found in Appendix F.

(2) At each verification visit and with the annual recertification,

- (a) Documentation that all levees to be credited have been inspected during the previous year and are being maintained in accordance with the procedures and standards of the LM1 maintenance plan (credit criterion (3)(c) in Section 622.a).
- (b) Records showing the most recent annual inspection of all equipment and material needed for the LM2 emergency action plan (credit criterion (4)(c) in Section 622.a).
- (c) Records showing the most recent annual test of all closures, pumps, and other equipment needed to implement the LM2 emergency action plan (credit criterion (4)(d) in Section 622.a).

- (d) A copy of the outreach materials used to advise people of the levee failure hazard and ways to protect themselves from flooding (credit criterion (5) in Section 621.b). If the outreach material is also credited under Activity 330 (Outreach Projects), a separate submittal is not needed, provided that the other document (including a PPI, if used) is annotated to show where the Activity 620 outreach topics are covered.

***NOTE:** There is a checklist to help the emergency manager identify all needed documentation, available at www.CRSresources.org/600.*

622.b. Levee failure threat recognition system (LFR)

The maximum credit for this element is 30 points.

LFR credit is provided for monitoring flood conditions near the levee. LFR credit is separate from flood threat recognition credit in Activity 610 (FTR), but the levee failure threat recognition system should be closely coordinated with the FTR system.

The more lead time that a community has, the more that can be done to reduce hazards associated with a flood. Although a levee may fail suddenly, overtopping is more predictable. There may be some advance indications of a potential levee failure, such as seepage and sand boils. Therefore, there are two key aspects of a levee failure threat recognition system that would provide the early notification needed by emergency managers to issue timely warnings and implement their flood response operations.

- (1) Monitoring flood conditions (LFR1): When flood levels reach (or are predicted to reach) certain heights, specific actions should be initiated, such as mobilizing patrols or opening the emergency operations center.
- (2) Monitoring levee conditions (LFR2): This is done with patrols (on the ground or from the air) and checking known problem sites during a flood.

Credit Criteria for LFR

- (1) The activity credit criteria in Section 621.b must be met.
- (2) The threat recognition procedures must be in the levee failure warning and response plan or a related document (credit criterion (7) in Section 621.b).
- (3) To receive LFR credit, some credit points must be obtained under both LFR1 and LFR2.
- (4) For monitoring flood conditions and LFR1 credit:
 - (a) The community and the levee owner must have a flood threat recognition system that monitors conditions. This would be a system that provides early notification of rising waters that may threaten the levee's integrity. The system must meet the credit criteria of FTR in Activity 610 (Flood Warning and Response). A National Weather Service flood potential outlook or flood watch would also be sufficient.
 - (b) Additional credit is provided for redundant or backup monitoring systems along a levee that send a signal to the emergency manager if water is rising on the landward side of

the levee. This system could use automated flood alarms or automated flood warning systems, or it could rely on trained spotters.

- (c) The equipment used for the flood monitoring must be tested at least annually. For CRS credit, testing records are not needed for equipment that is used routinely throughout the year, such as radios and vehicles.
- (5) For LFR2 credit, the community and/or the levee owner must initiate the monitoring of levee conditions when certain, pre-defined flood conditions are present, and
 - (a) The monitoring procedures must cover
 - Levee patrol staffing and assigned sections of the levee system,
 - How and when the patrol teams are activated,
 - What the patrols are to look for in the different sections,
 - Methods and frequency for reporting, and
 - How the community's emergency managers are kept posted on the situation.
 - (b) The procedures for monitoring levee conditions must be exercised at least once each year, in accordance with credit criterion (8) in Section 621.b.

Credit Points for LFR

LFR = the total of LFR1 and LFR2, up to the maximum of 30 points

LFR1 = the sum of

- (a) 10 points, for monitoring flood conditions, and
- (b) 5 points, for monitoring flood conditions along the levee

LFR2 = up to 15 points, for monitoring levee conditions

Impact Adjustment for LFR

The impact adjustment for the activity is described in Section 623.

Documentation for LFR Provided by the Community

- (1) At each verification visit,
 - (a) The levee failure warning and response plan or related document that describes the threat recognition procedures (credit criterion (2) in Section 622.b) and credit criterion (7) in Section 621.b. The plan or related document must be marked to show where the credited items appear.
 - (b) An impact adjustment map showing the area(s) affected by each element and documentation showing how the numbers of buildings used in the calculations were

determined (credit criteria (3)(b) and (3)(c) in Section 621.b and Section 623 impact adjustment).

(2) At each verification visit and with the annual recertification,

- (a) Records showing the most recent annual test of all equipment and material needed for the system (credit criterion (4)(c) in Section 622.b).
- (b) A description of the exercise, drill, or response to an actual emergency or disaster conducted during the previous year (credit criterion (8) in Section 621.b). The exercise must include the procedures for monitoring levee conditions, if they are credited.

***NOTE:** There is a checklist to help the emergency manager identify all needed documentation, available at www.CRSresources.org/600.*

622.c. Levee failure warning (LFW)

The maximum credit for this element is 50 points.

LFW credit is provided for disseminating warnings of a potential levee failure to the public. The warning program for LFW credit should be closely coordinated with the flood warning dissemination activities credited in Section 612.b (EWD).

Once the levee failure flood threat recognition system tells local emergency managers what will be flooded and when, warnings should be issued to the affected populations. The messages that need to be conveyed and the timing for delivering them should be thought out in advance, as part of the levee failure warning and response plan.

The messages should state when flooding is predicted to occur, its expected severity, and appropriate response actions (e.g., evacuation routes, safe shelters, protective actions). The messages should be drafted in coordination with the messages and projects credited under flood response preparations (FRP) under Activity 330 (Outreach Projects).

Special warning arrangements for schools, nursing homes, and other critical facilities are also credited under LCF.

In general, this warning and protective action notification process (using pre-scripted message templates) falls into three time periods:

- (a) **Warning delay time** is the period between the time at which a threat is first detected or an emergency manager is first notified of the threat and the time at which the first alert/warning is issued.
- (b) **Warning diffusion time** is the period between the issuance of the first alert/warning and the time at which people receive the alert/warning.
- (c) **Protective action initiation time** is the period after people receive the first alert/warning up to the point at which they begin protective action. During this period, most people take a range of actions to prepare to implement a protective action and may receive subsequent warning messages.

Credit Criteria for LFW

- (1) The activity credit criteria in Section 621.b must be met.
- (2) The warning procedures must be included the levee failure warning and response plan or a related document (credit criterion (7) in Section 621.b).
- (3) The warning must reach people in a timely manner, especially because there may not be much lead time between a sudden levee failure and the moment when water reaches homes and businesses. For example, television or radio announcements are not credited if they are the only approach used because the failure may occur during the night.
- (4) For those warning systems requiring specialized equipment, such as sirens, the equipment and procedures must be tested at least annually. Equipment that is used routinely throughout the year, such as television notices and message boards, does not need testing records for CRS credit.

Credit Points for LFW

LFW = the total of the following, up to the maximum of 50 points

LFW1 = 5 points, if the plan includes pre-scripted messages and guidance for staff to quickly issue appropriate warnings keyed to specific triggers, such as when the river reaches a certain level, or when sand boils appear

LFW2 = 5 points, if the public messages include information on the expected elevation of the flood waters and instructions on when to evacuate

LFW3 = 10 points if an outdoor voice-sound system or fixed siren system is used

LFW 4 = EITHER

(a) 2 points if the plan identifies the primary and support agencies responsible for door-to-door or mobile public address warning, OR

(b) 10 points, if the plan identifies the routes, procedures, staff, and equipment necessary for door-to-door or mobile public address warning

LFW 5 = 10 points, if the Emergency Alert System through all channels/stations with pre-scripted draft messages is used

LFW 6 = 10 points, if telephone warnings to residents and businesses are used

LFW 7 = 10 points, if all schools, hospitals, nursing homes,

prisons, and similar facilities that need flood warning have NOAA Weather Radio receivers and at least one other automated backup system for receiving flood warnings, provided that the community has coordinated with NOAA and there are arrangements for issuing warnings about levee failures

Impact Adjustment for LFW

The impact adjustment for the activity is described in Section 623.

Documentation for LFW Provided by the Community

(1) At each verification visit,

- (a) The levee failure warning and response plan or related document that describes the emergency warning procedures (credit criterion (2) in Section 622.c and credit criterion (7) in Section 621.b). The plan or related document must be marked to show where the credited items appear.

(2) At each verification visit and with the annual recertification,

- (a) Records showing the most recent annual test of all equipment and material needed for the system (credit criterion (4) in Section 622.c).
- (b) A description of the exercise, drill, or response to an actual emergency or disaster conducted during the previous year (credit criterion (8) in Section 621.b). The exercise must include the procedures for warning people credited under this element.

***NOTE:** There is a checklist to help the emergency manager identify all needed documentation, available at www.CRSresources.org/600.*

622.d. Levee failure response operations (LFO)

The maximum credit for this element is 30 points.

LFO credit is provided for the development of levee failure response operations that identify flood response scenarios, responsibilities, special need populations, and necessary resources. The operations should be closely coordinated with the flood response operations credited in Section 611.c (FRO).

The National Incident Management System (NIMS) requires local governments to validate the inventory of response assets using FEMA Resources Typing Standards. Department heads and other emergency response team members should know what kinds of resources they have available. This should be compared with the resources needed. Shortfalls may require negotiating agreements with private suppliers or other jurisdictions.

Levee failure response operations need to be spelled out in the levee failure warning and response plan. They include appropriate actions to be implemented when flooding due to the

levee failure threatens or actually occurs. The actions are conducted by the community and other cooperating agencies and organizations.

Developing scenarios can help this process. Scenarios are produced by thinking through what will happen in the community if a levee fails or is overtopped. For example, where will the water go? who will get flooded? who will lose access because of high water? and which critical facilities will be affected? These sorts of questions, and the scenarios developed by thinking about them, help with the design of the response operations to minimize the threats to life and property at those flood levels.

Two types of operations should be in the plan.

- (1) Levee protection operations: These are actions taken to prevent or limit a levee's failure due to flood waters and/or from overtopping. The levee agency is usually the lead on levee protection operations, but the community likely will need to provide resources and support. These actions are often called "flood fighting" and can include
 - Sandbagging the top of the levee,
 - Sandbagging and other measures to restrict sand boils, and
 - Measures taken to limit erosion on the toe of the levee.
- (2) Community protection operations: These are actions to minimize the loss of life and property damage in the area flooded when the levee fails or is overtopped. They should be similar to, and even a part of, the flood response operations credited in Section 612.c (FRO). They can include
 - Ordering an evacuation of the threatened area,
 - Controlling traffic in and out of the flooded area, and
 - Opening evacuation shelters.

Credit Criteria for LFO

- (1) The activity credit criteria in Section 621.b must be met.
- (2) The levee failure response operations actions must be in the levee failure warning and response plan or a related document (credit criterion (7) in Section 621.b).
- (3) Levee protection operations actions must be closely coordinated with the levee emergency action plan credited under Section 622.a (LM2).
- (4) Credit is based on the extent and level of detail that the levee failure warning and response plan provides for the response operations. General statements or an assignment of responsibilities with no specifics about what is done are not credited. For full credit for LFO, the plan needs to
 - (a) Describe the actions to be taken,
 - (b) Identify the office or official responsible for the action,

- (c) Define the time needed to carry out the activity, and
 - (d) Contain other critical information that designated agencies and organizations need in order to perform their assigned responsibilities.
- (5) LFO4 credit is provided if there is a list of the personnel, equipment, facilities, supplies, and other resources needed to complete each task. For full credit, the list must identify what is available within the community and what is needed from private suppliers or other jurisdictions.

Credit Points for LFO

LFO = the total of the following, up to the maximum of 30 points

LFO1 = 10 points, if the community has developed scenarios that review what could happen if the levee were to fail or be overtopped by a flood

LFO2 = 10 points, if the plan identifies response tasks and responsible community staff and other public and private organizations with responsibilities related to the response tasks in the plan

LFO3 = 5 points, for maintaining a data base of people with special needs who require evacuation assistance when a levee failure warning is issued and for having a plan to provide transportation to secure locations

LFO4 = the sum of the following:

- (a) 5 points, if the plan includes a summary of estimated staff, equipment, supplies, and time required for each response task, and
 - (b) 5 points, for identification of the sources of necessary resources
-

Impact Adjustment for LFO

The impact adjustment for the activity is described in Section 623.

Documentation for LFO Provided by the Community

- (1) At each verification visit,
 - (a) The levee failure warning and response plan or related document that describes the operations and actions credited above (credit criterion (2) in Section 622.d) and credit criterion (7) in Section 621.b). The plan or related document must be marked to show where the credited items appear.

- (2) At each verification visit and with the annual recertification,
- (a) A description of the exercise, drill, or response to an actual emergency or disaster conducted during the previous year (credit criterion (8) in Section 621.b). The exercise must include the actions credited under this element.

***NOTE:** There is a checklist to help the emergency manager identify all needed documentation, available at www.CRSresources.org/600.*

622.e. Levee failure critical facilities planning (LCF)

The maximum credit for this element is 30 points.

LCF credit and planning should be closely tied to the critical facilities coordination done under Section 612.d (CFP).

LCF1 credit is provided for having information in the community's levee failure response plan about all critical facilities that could be affected by a levee failure. In general, facilities not subject to flooding during a levee failure do not need to be addressed, although in some cases loss of access can cause a critical situation. There may also be facilities in flood-free sites that are needed to support the flood response effort.

Additional credit is provided in LCF2 if levee failure warning and response plans for individual critical facilities have been developed, reviewed, or accepted by the community.

Credit Criteria for LCF

- (1) The activity credit criteria in Section 621.b must be met.
- (2) LCF1 is a prerequisite for any LCF credit.
- (3) For LCF1 credit, the community's levee failure response plan must list the facilities considered critical in a levee failure emergency. The community must contact the facilities to determine whether they need any special warning arrangements. The community does not need to provide a special warning to all critical facilities, only to those identified in the levee warning and response plan as needing one.

There is no impact adjustment for LCF1. The community must include all critical facilities affected by a levee failure on its list.

- (4) For LCF2 credit, levee failure warning and response plans must have been developed, reviewed, or accepted by the community for individual critical facilities.

Credit Points for LCF

LCF = the total of the following

LCF1 = up to 15 points, if the adopted plan includes

- (a) a list of the facilities considered critical in a levee failure emergency (5 points)
- (b) contact information, including the names and phone numbers of the operators of all public and private critical facilities affected by levee failure (5 points)
- (c) arrangements for issuing special warnings or early notifications directly to those critical facilities that need advance warning (5 points)

LCF2 = up to 15 points, if critical facilities listed under LCF1 have their own levee failure response plans that have been developed, reviewed, or accepted by the community. The credit is prorated based on the percentage of affected critical facilities that have creditable plans

Impact Adjustment for LCF

There is no impact adjustment for LCF.

Documentation for LCF Provided by the Community

(1) At each verification visit,

- (a) A list of all public and private critical facilities that would be affected by levee failure or that would need to be operational during a levee-failure flood.
- (b) Contact information (names and phone numbers) of the operators of the facilities on the above ((1)(a)) list.
- (c) The above ((1)(a)) list of critical facilities, marked to identify those needing special warning or advance notification.
- (d) [For LCF2 credit] The above ((1)(a)) list of critical facilities, marked to identify those that have developed their own flood warning and response plans that have been reviewed and accepted by the community. The ISO/CRS Specialist will ask for samples of the plans for review.

NOTE: *There is a checklist to help the emergency manager identify all needed documentation, available at www.CRSresources.org/600.*

(2) With the annual CRS recertification,

- (a) A page from the latest list of the critical facilities provided for LCF1, which must be updated at least annually.
- (b) A copy of the annual exercise of the plan and a lessons-learned report.

623 Impact Adjustment

There is no impact adjustment for LCF. The community must include all critical facilities affected by a levee failure on its list.

The credit points for LM, LFR, LFW, and LFO are adjusted based on the number of buildings affected by the element. Determining these adjustments requires identifying the area affected and then counting the buildings within that area. Identifying the affected area is described in Section 621.c, Map of the Affected Area.

Counting buildings for an impact adjustment is discussed in Section 302.

$$(1) rLM = \frac{bLM}{bLF}$$

$$(2) rLFR = \frac{bLFR}{bLF}$$

$$(3) rLFW = \frac{bLFW}{bLF}$$

$$(4) rLFO = \frac{bLFO}{bLF}, \text{ where}$$

bLM = the number of buildings in the area affected by a flood resulting from a failure of the levee being maintained,

$bLFR$ = the number of buildings that benefit from the levee failure threat recognition system,

$bLFW$ = the number of buildings that benefit from the levee failure flood warnings,

$bLFO$ = the number of buildings in the area covered by the levee failure response operations actions, and

bLF = the total number of buildings in the community affected by levee failure as shown on the affected-area map (Section 621.c)

$bLFO$ cannot be greater than $bLFW$
 $bLFW$ cannot be greater than $bLFR$

bLFR cannot be greater than bLM
rLM cannot be greater than 1.0

624 Credit Calculation

$$c620 = (LM \times rLM) + (LFR \times rLFR) + (LFW \times rLFW) \\ + (LFO \times rLFO) + LCF1 + LCF2$$

625 For More Information

- a. Additional information, documentation checklists, reference materials, and examples can be found at www.CRSresources.org/600.
- b. Levee mapping and public information materials are available on FEMA's website, <http://www.fema.gov/living-levees-its-shared-responsibility>.
- c. Each district of the Corps of Engineers has expertise in levee construction, maintenance, and flood fighting. See www.usace.army.mil/Locations.aspx.
- d. The California Department of Water Resources has special programs for leveed areas in the Central Valley, including an outreach project. www.water.ca.gov/myfloodrisk.
- e. The American Society of Civil Engineers (ASCE) has a booklet for residents in leveed areas, "So, You Live Behind a Levee!" it is available at <http://ascelibrary.org/doi/book/10.1061/9780784410837>.

626 Related Activities under the Community Rating System

- A community that develops an appropriate approach to the outreach to residents required in Section 621.b(5) as part of a Program for Public Information can be credited under Activity 330.
- LFR is similar to element FTR under Activity 610 and to element DFR under Activity 630. It credits a system that provides the community with the earliest possible notification that a flood is imminent. The three threat recognition systems should be closely coordinated.
- LFW is similar to element EWD under Activity 610 and element DFW under Activity 630. It credits a flood warning dissemination system that provides a critical linkage between the recognition of an impending flood and the community's response to the emergency. The three warning dissemination systems should be closely coordinated.

- LFO is similar to element FRO under Activity 610 and element DFO under Activity 630. It identifies opportunities to prevent loss of life and property damage during a flood. The three response operations plans should be closely coordinated.
- LCF is similar to credits under Activity 610 and 630 because it requires the maintenance of a current list of critical facilities in potential levee inundation areas, the maintenance of up-to-date contact information for each critical facility, and having plans for warning each critical facility in a timely manner.
- Documentation of the annual exercise is a prerequisite for Activities 610, 620, and 630. One exercise can meet the requirements for all three activities.