

## CRS Credit for Floodplain Mapping

If your community has contributed to, improved upon, or added to the floodplain map and data provided by FEMA, you could receive Community Rating System credit under Activity 410, Additional Flood Data. Follow these seven steps to determine the credit.

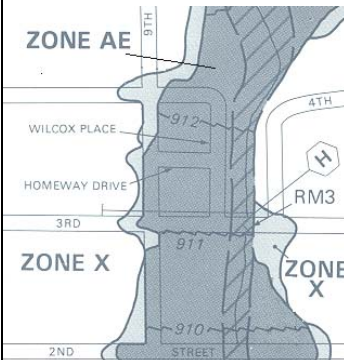
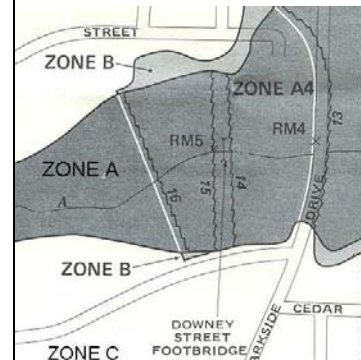
**Step 1. Creditable activities.** If you can answer “yes” to any of these questions, you should receive credit for your program.

**1. Did your community contribute to the study or mapping that you use to regulate floodplain development?** For any portion of your FIRM or regulatory floodplain map:

- Did you contribute to the cost of one or more studies?
- Did you prepare the hydrology or do part of a study?
- Did you contribute topographical mapping?
- Did you submit a study to FEMA for a map revision or LOMR?
- If so, you should get credit under New Study (NS) and Leverage (LEV).

**2. Did anyone besides FEMA contribute to the study or mapping?** It doesn't have to be your city or county in order to receive CRS credit. Credit is for any agency or organization other than FEMA, including your state, a regional district, a private developer, or a federal agency, such as the Corps of Engineers or the Tennessee Valley Authority. However, you do need to double check that the mapping agency was not under contract with FEMA.

- If so, you should get credit under New Study (NS) and Leverage (LEV).

<b>FEMA Mapping Terminology</b>		
<p style="text-align: center;"><b>FEMA Mapping Terms</b></p> <p>BFE Base Flood Elevation            CRS Community Rating System            CTP Cooperating Technical Partner            FIRM Flood Insurance Rate Map            FIS Flood Insurance Study            LOMR Letter of Map Revision            NFIP National Flood Insurance Program            SFHA Special Flood Hazard Area            Zone A SFHA for inland areas            Zone B 500-year floodplain            Zone C Areas outside the A or B Zones            Zone V Coastal high hazard SFHA            Zone X Areas outside the mapped SFHA</p> <p style="text-align: center;"><b>CRS Acronyms</b></p> <p>AFD Additional Flood Data            FWS Floodway Standard            HSS Higher Study Standard            LEV Leverage            NS New Study</p>	 <p>A FIRM with a detailed flood study shows the SFHA as Zone AE or VE. The map includes base flood elevations and, usually, a floodway (shown with the slanted lines). Areas outside the SFHA are designated Zone X. The 500-year floodplain is the “shaded” Zone X.</p>	 <p>On FIRMS prepared before 1986, A and V Zones with BFEs show numbers (e.g., A4). A and V Zones without numbers or other letters mean the FIRM does not include BFEs. BFEs are not provided by FEMA in B, C, D, or X Zones.</p>
<p>See also Section 130 and the Index of the <i>CRS Coordinator's Manual</i></p>		

- 3. Did your new study raise the base flood elevation shown on your earlier FIRM?** If yes, you should get credit under New Study (NS). There is no CRS credit for studies that lower the FIRM's BFE because that would duplicate the benefit of reduced flood insurance premium rates for the properties that are taken out of the SFHA. If the BFE is raised in some areas and lowered in other areas, the credit can be pro-rated.
- 4. Do you require builders and developers to provide regulatory flood data as a condition of a floodplain development permit?** Many communities require permit applicants in approximate A or V Zones or B, C, or X Zones to calculate a BFE, floodway boundary, or other data needed to ensure their project will be protected from the base flood. Note that there are some minimum requirements of the NFIP in approximate A or V Zones that do not receive CRS credit:
- Larger projects (greater than five acres or 50 lots) in the SFHA must calculate a BFE, so there is no CRS credit unless the requirement is for smaller projects (e.g., a single family home) or developments in B, C, or X Zones, outside the SFHA.
  - All projects in a riverine floodplain must determine whether the cumulative effect of a proposed development will increase the water surface elevation of the base flood.
  - If your community requires regulatory flood data where it is not required by the NFIP, you should get credit under New Study (NS).
- 5. Were your regulatory flood studies conducted using standards higher than FEMA's?** FEMA's criteria are spelled out in *Guidelines and Specifications for Flood Hazard Mapping Partners*, found at [www.fema.gov/library/viewRecord.do?id=2206](http://www.fema.gov/library/viewRecord.do?id=2206). Sometimes, a regular FEMA Flood Insurance Study is done to a higher standard, such as under a CTP agreement that includes a higher standard, or when an existing study with a higher standard is incorporated into a FEMA map. The more common higher standards are:
- A study reviewed and approved by a qualified state review program may qualify for the New Study (NS) "with review" credit. Your ISO/CRS Specialist can tell you whether your state has or had such a program and when it was in effect.
  - A study that used a base map that has topographic data better than what is available from the U.S. Geological Survey may qualify for Higher Study Standard (HSS).
  - A study that used future conditions hydrology may qualify for HSS credit.
  - A map that shows 500-year flood elevations and the boundaries of the 500-year floodplain where the FIRM only shows an A Zone may qualify for HSS credit.
  - If you mapped and are regulating one of the designated special flood related hazards (alluvial fans, moveable bed streams, closed basin lakes, ice jams, land subsidence, mudflows, coastal erosion, and tsunamis), the study may qualify for Additional Flood Data for Special Hazards. These hazards and credits are explained in separate publications and are not covered in this paper.

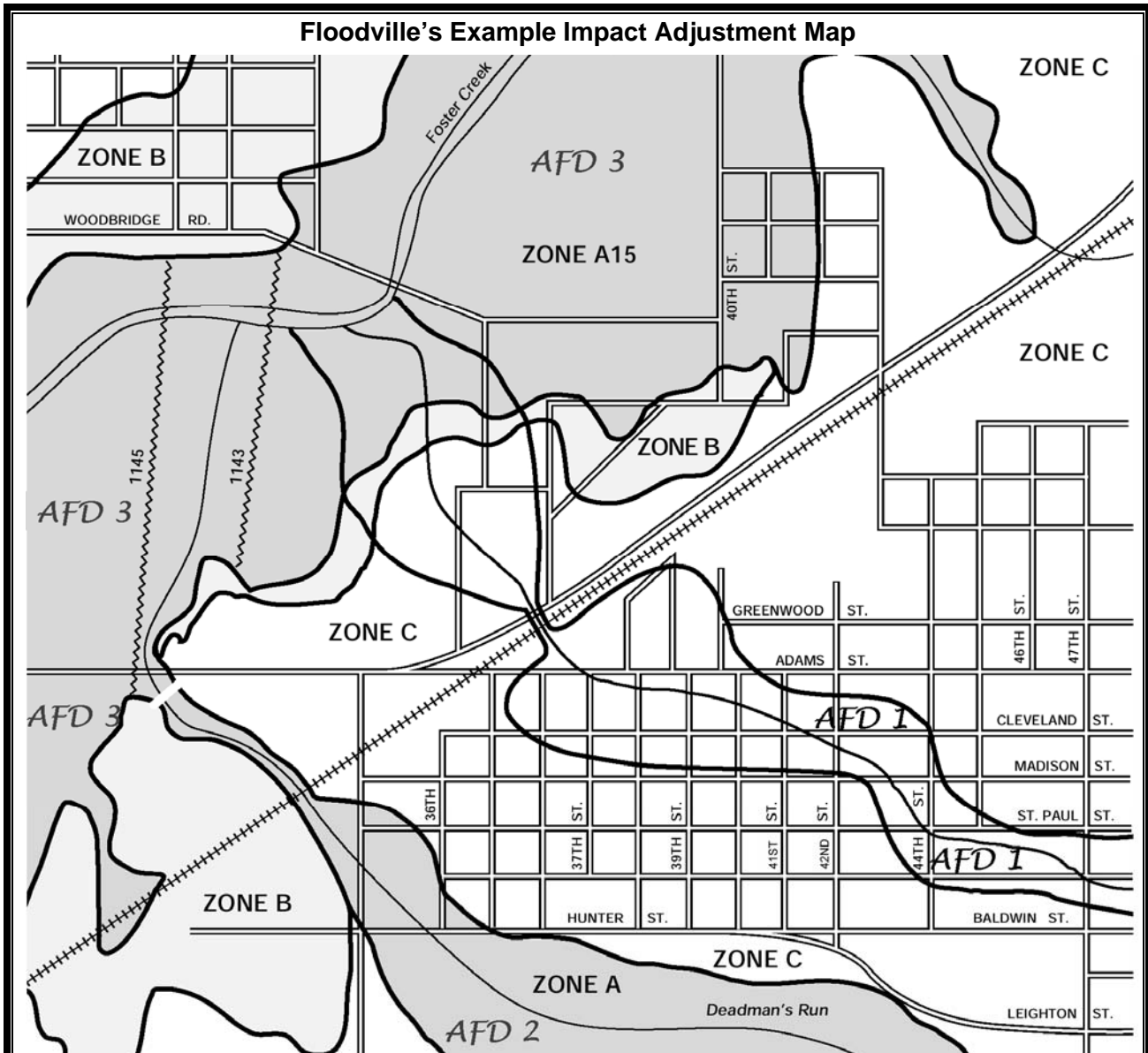
- 6. Is your floodway map based on a more restrictive standard than a one foot surcharge?** Check the “Increase” column in your FIS’ Floodway Data Table. If all the numbers are 0.5 or smaller, you might qualify for this credit. The standard used is spelled out in the text of your Flood Insurance Study, usually in section 4.2. If your floodway map was based on a more restrictive standard, you should get credit under Floodway Standard (FWS).

Note that credit for FWS should not be confused with the minimum NFIP requirement that new development in the floodway may not result in any increase in flood heights. The FWS credit is for using less than a one foot surcharge to delineate the floodway.

**Step 2. Prerequisites.** If you can answer “yes” to all of the following questions for each study or map, they should qualify for credit. These prerequisites are spelled out on pages 410-5 – 410-6 of the *CRS Coordinator’s Manual*.

- 1. Do you use the study or map data when you regulate new development?** The CRS does not credit studies conducted for drainage improvements or the design of a flood control project if they are not also used for regulatory purposes. Your floodplain regulations must either be amended to adopt the new study or authorize a local official, such as your engineer, to approve new base flood elevations, floodways and velocity zones in unstudied areas. If the latter, there must be a record showing that the new study has been approved by the official.
- 2. Is the study incorporated into the FIRM?** Is the study or map part of the official FIRM or was it added later through the LOMR process? This is a prerequisite for a study that affects a length of stream or shoreline. If the study has not been incorporated in the official FEMA map, it must be submitted to FEMA with a request to revise your FIRM. This prerequisite is not met if FEMA denies the submittal because the study was not prepared in accordance with FEMA mapping standards. However, the prerequisite is met even if FEMA does not immediately publish the map revision, as long as it does not deny the request.
- 3. Are site-specific studies done in accordance with FEMA mapping criteria?** Site-specific studies do not have to meet prerequisite 2, above. If your regulations require that a study be conducted for a single site at the time of development, the study technique must meet FEMA criteria, but the results do not have to be submitted to FEMA. An engineer’s statement that the technique used meets the criteria in *Guidelines and Specifications for Flood Hazard Mapping Partners* is acceptable. If your site-specific study standards are not in *Guidelines and Specifications*, you may still receive credit if your FEMA Regional Office states that it accepts the technique for CRS purposes.
- 4. Are you willing to conduct an assessment of your credited floodplain maps every five years?** This is done to help determine if your community would benefit from a revised or updated map that reflects current conditions or better data. Your engineer must agree to write a memo that states whether the floodplain maps and related data that receive New Study (NS) credit reflect current conditions. This is done as part of your cycle verification process, every 5 years (every 3 years for Class 5 or better communities). The details of this statement are spelled out on page 410-30 of the *CRS Coordinator’s Manual*.

**Step 3. Identify the areas.** Mark up a map to show each study or mapping activity that you think may deserve CRS credit. This is called an impact adjustment map. Mark each area as “AFD1,” “AFD2,” etc. If more than one area was mapped using the same criteria (e.g., three streams were studied by the same contractor using the same study standards), mark them all with the same number. Below is an example impact adjustment map for Floodville.



Floodville has three areas that qualify for CRS credit:

**AFD1:** The City paid a consulting firm to prepare a new detailed study as part of a plan to reduce flooding along a small ditch that was not mapped as SFHA on its FIRM. area. The study produced base flood elevations, a floodway delineation, and a map.

**AFD2:** This area was mapped by FEMA as an approximate A Zone. Because there are few buildings and because there is no development expected, the City decided not to finance a detailed study. Instead, its floodplain management ordinance requires that an applicant for a development permit in the Deadman's Run A Zone determine a base flood elevation for the proposed development site.

**AFD3:** FEMA's FIS mapped the Foster Creek floodplain with BFEs. The floodway delineation was based on a state required 0.5 foot allowable surcharge.

**Note:** Now that you know what studies deserve CRS credit, you can stop at this point and let your ISO/CRS Specialist calculate the credit points. The following discussion explains how this is done, using the Floodville example.

**Step 4. Calculate the points.** This step reviews how to score five of the six elements in Activity 410. The credits for special hazards are covered in separate publications. More details on these first four are provided in Sections 411.a – d in the *CRS Coordinator’s Manual*.

**1. New Study (NS – Section 411.a).**

- a. See your answers to Step 1, items 1 – 4, to see which studies qualify under NS.
- b. In the first column in the table below, identify the study’s scope.
- c. Identify your FIRM’s original zone designation for the area studied.
- d. Assume “without review” credit unless your ISO/CRS Specialist tells you otherwise.
- e. Match the study scope with the appropriate column to determine the points.

Study scope	Original FIRM Zone					
	B, C, D, or X		A or V		AE, VE, A#	
	Without review	With review	Without review	With review	Without review	With review
1. Delineation of an approximate A Zone	50	–	25	–	–	–
2. Flood elevations for a site at time of development	100	150	75	115	–	–
3. New profile or length of shoreline, base flood elevations/depths in AH and AO zones.	200	300	150	225	125	190
4. New profile with floodway, length of shoreline with coastal velocity zone delineation, or converting coastal A Zones to V Zones	240	360	180	270	150	225
5. If the study includes new data for repetitive loss area(s) (add to the score for 1–4)	50	50	25	25	25	25

- f. If the study includes one or more of your community’s repetitive loss areas (see Section 502 of the *CRS Coordinator’s Manual*), add the credit in line 5 in the table.
- g. Floodville example:
  - AFD1: New profile with floodway in an X Zone: 240 points. Because this area is also one of Floodville’s repetitive loss areas, the study warrants 50 more points.  
NS1 = 240 + 50 = 290 points.
  - AFD2: Flood elevations for a site at time of development in an approximate A Zone:  
NS2 = 75 points.
  - AFD3: Not a New Study credit. The floodway standard is credited under FWS.

**2. Leverage (LEV – Section 411.b).**

- a. See your answers to Step 1, items 1 and 2. If your community or any agency or entity other than FEMA paid 100% of the cost of the study, LEV = 1.0. This includes flood studies and site specific studies done by permit applicants. Proceed to item 3.
- b. If FEMA paid for part of the cost of the study, calculate a ratio based on the non-FEMA share divided by the entire cost of the study.
- c. If you can't obtain study costs, use 0.25 if a better topographic map was contributed to the study effort and 0.15 if other contributions were made to the study effort.
- d. Floodville example:
  - AFD1: The City paid 100% of the cost: LEV1 = 1.0
  - AFD2: Developers pay 100% of the cost: LEV2 = 1.0
  - AFD3: Not related to LEV credit. The floodway standard is credited under FWS.

**3. Higher Study Standard (HSS – Section 411.c).**

- a. See your answers to Step 1, item 5, to see which studies qualify for HSS credit. Note that you may submit additional higher study standards to see if they warrant credit for HSS.
- b. In the first column in the table below, identify the study's scope.
- c. Match this with your FIRM's original zone designation for the area studied.
- d. If you have more than one higher standard for a study, add them up, but do not exceed the "max per study" points.

Study scope	Original FIRM Zone			Max per Study
	B, C, D, or X	A or V	AE, VE, A#, V#	
1. Delineation of an approximate A Zone	20	10	-	40
2. Flood elevations for a site at time of development	40	30	-	80
3. New profile or length of shoreline	80	60	50	160

- e. Floodville example:
  - AFD1: The study was done using future conditions hydrology: HSS1 = 80 points
  - AFD2: Developers must use future conditions hydrology: HSS2 = 30 points
  - AFD3: Not an HSS credit. The floodway standard is credited under FWS.

#### 4. Floodway Standard (FWS – Section 411.d).

- a. See your answers to Step 1, item 6. If you qualify for FWS, determine the official surcharge used in the floodway study. In most cases, this will be 0.5 or 0.1 feet.
  - If the allowable rise was from 0.01 to 0.2 feet, FWS = 150
  - If the allowable rise was from 0.21 to 0.5 feet, FWS = 100
- b. Floodville example:
  - AFD1: The study used the state required floodway standard of 0.5’ FWS1 = 100
  - AFD2: A floodway delineation is not required. There is no FWS credit.
  - AFD3: The FIS used the state required floodway standard of 0.5’ FWS3 = 100

**Step 5. Impact adjustment.** The credit for each study or AFD is adjusted according to how much of your SFHA is affected. This is called the impact adjustment. It is in the form of a ratio from 0.25 to 1.5. In the formulas, it appears as “rAFD” for each area you marked and labeled on your map. There are three ways this can be done:

1. **Option 1:** If the study or standard affects your entire SFHA, you can use an impact adjustment of 1.0. This may be the case in a smaller community with one stream or where the floodway standard applies to all streams in the community.
2. **Option 2:** If the study or standard affects less than 25% of the SFHA, you can use the “default” option that gives you a minimum of 0.25. Some communities use this approach to save themselves the trouble of calculating areas. However, you can only use Option 2 for one study or AFD marked on your map. *If you want credit for more than one AFD, you will need to use Option 3 for all your studies.*
3. **Option 3:** If the study or standard affects more than 25% of the SFHA, this option gives you a higher score than Option 2. Here’s how to use Option 3.
  - a. Calculate the areas of each AFD. If your maps are digitized, this can be done by GIS. If you have only paper versions of your maps, you can use a planimeter or the grid square method. Instructions on the grid square method can be obtained from your ISO/CRS Specialist. The result is an area or “aAFD” for each study, e.g., aAFD1, aAFD2, etc..
  - b. Calculate the area of your SFHA. Use the same units that you used for the AFDs, either acres or square miles. This is labeled “aSFHA” in the formulas.
  - c. Calculate the ratio for each area. This is the area of the AFD divided by the area of the SFHA. The result is “rAFD” for each area:

$$rAFD1 = \frac{aAFD1}{aSFHA} \quad rAFD2 = \frac{aAFD2}{aSFHA} \quad rAFD3 = \frac{aAFD3}{aSFHA} \quad \dots \text{etc.}$$

- d. The total of all your ratio(s) can be greater than 1.0 if you have new studies outside the SFHA.

#### 4. Floodville example:

- aAFD1: 71 acres for the newly mapped problem ditch (C Zone)
- aAFD2: 58 acres for the Deadman’s Run floodplain (A Zone)
- aAFD3: 267 acres for the Foster Creek floodplain (A15 Zone)
- aSFHA: 325 acres for the entire SFHA (the A plus the A15 Zones)

$$rAFD1 = \frac{71}{325} = 0.22 \quad rAFD2 = \frac{58}{325} = 0.18 \quad rAFD3 = \frac{267}{325} = 0.82$$

**Step 6. CTP credit.** There are three ways to credit involvement in FEMA’s Cooperating Technical Partnership program. More information on the CTP program can be found at [www.fema.gov/plan/prevent/fhm/ctp\\_main.shtm](http://www.fema.gov/plan/prevent/fhm/ctp_main.shtm).

1. **CTP community:** If your community has signed a Cooperating Technical Partner agreement with FEMA that identifies shared mapping responsibilities and costs, you can receive 10 points (CTP1). You do not receive this credit if there has not yet been an agreement to conduct a specific study in your community.
2. **CTP state or region:** Another 10 points are available if one of your community’s flood problem areas is being studied under a CTP agreement with your state or a regional agency, such as a water management district. Again, you do not receive this credit if there has not yet been an agreement to conduct a specific study in your community. However, the credit for a community and a state CTP study is cumulative (the max for CTP1 is 20 points).
3. **CTP study:** Once a study under a CTP agreement is completed, it can be credited and scored as discussed earlier in this paper. Under the CTP2 credit, you will receive a 10% bonus on top of the score because the study was done pursuant to a CTP agreement.

**Step 7. Total the points.** The last step in calculating CRS credit for mapping is to add up all the credit points. This can be done by the ISO/CRS Specialist at the verification visit or you can do it. For help, you can use the activity worksheets or the CRS calculation software. Both are free (see Appendix E of the CRS Coordinator's Manual or the “Resources” page on the CRS Resource Center website, <http://training.fema.gov/EMIWeb/CRS/>).

1. **Score each study:** For each AFD you marked on the map (AFD1, AFD2, etc.), multiply its New Study (NS) score times its Leverage (LEV) score. Then add its points for Higher Study Standard (HSS) and Floodway Standard (FWS). The following formula can help:

$$AFD = (NS \times LEV) + HSS + FWS$$



Floodville example (see step 4, items 1.g, 2.d, 3.e, and 4.b)

- $AFD1 = (290 \times 1.0) + 80 + 100 = 470$
- $AFD2 = (75 \times 1.0) + 30 + 0 = 105$
- $AFD3 = (0 \times 0) + 0 + 100 = 100$

- 2. Impact adjustment:** Multiply each study's score times the impact adjustment ratio calculated in step 5.

Floodville example (see step 5, item 4)

- $AFD1: 470 \times 0.22 = 103.4$
- $AFD2: 105 \times 0.18 = 18.9$
- $AFD3: 100 \times 0.82 = 82.0$

- 3. Add the CTP credit:** Multiply each study times any CTP2 bonus it receives and add the CTP1 credit for the community, state, or regional agency CTP agreement. This produces the credit for each study, shown in the formulas as the little "c" before the AFD.

Floodville example (neither Floodville nor its state are CTPs):

- $cAFD1 = 103.4 + 0 = 103.4$
- $cAFD2 = 18.9 + 0 = 18.9$
- $cAFD3 = 82.0 + 0 = 82.0$

- 4. Total the points:** Add up the credit for each study. Include any special hazards study credits that are calculated separately. The result is the total credit for Activity 410, shown as "c410" in the formulas.

Floodville example:

$$c410 = cAFD1 + cAFD2 + cAFD3 = 103.4 + 18.9 + 82.0 = 204.3$$