National Flood Insurance Program
Community Rating System

CRS Credit for Habitat Protection

2023

FEMA

A community interested in more information on obtaining flood insurance premium credits through the Community Rating System (CRS) should go to the FEMA website.

More detailed information on specific CRS activities and credits can be found at the CRS Resources website.

A community interested in more information on the Endangered Species Act (ESA) should go to the U.S. Fish and Wildlife Service website or the National Oceanic and Atmospheric Administration's (NOAA) Fisheries website.

Cover: A wildlife refuge in the floodplain of the Nisqually River estuary, Washington. Photo by French Wetmore.

Contents

Acknowledgements

As part of its continuing effort to improve floodplain management practices and help communities meet the requirements of the Endangered Species Act, Region 10 of the Federal Emergency Management Agency originally developed this guidance document. It was updated in 2018 to reflect changes in CRS policy, to offer a national perspective, and to provide guidance to communities across the nation that wish to participate in the CRS.

This 2023 edition incorporates the activities that were modified in the 2021 *Addendum to the 2017 CRS Coordinator's Manual* plus new credit under Activity 510 (Floodplain Management Planning) Section 512.c for a floodplain species assessment and a floodplain species plan.

Introduction

Floodplains are often viewed by floodplain managers as problem areas, subject to periodic flooding that endangers lives and damages property. On the other hand, floodplains can be vital habitat for rare and endangered species and are seen by others as areas needing protection. Although these may appear at first glance to be conflicting or contrary interests, in fact proponents of each perspective can help each other reach their goals.

The purpose of this guide is to familiarize both parties on ways to manage floodplains and their use to further both flood loss reduction and the conservation and recovery of threatened and endangered species. In addition, a community that implements such measures can receive reduced flood insurance premiums for its residents.

After an overview of the National Flood Insurance Program (NFIP), the Community Rating System (CRS), and the Endangered Species Act (ESA), this guidebook reviews the types of habitats that are found in floodplains. Next it summarizes ways in which development may adversely affect these habitats, with examples for three species that currently are threatened.

The balance of this guidebook identifies numerous floodplain management best practices that can both protect habitat and reduce and prevent flood damage. Each section identifies how CRS credit can be provided to communities that implement these practices.

The National Flood Insurance Program

The NFIP was created in 1968 as a way to offer an alternative to disaster assistance for properties subject to flood damage. Since 1979, the program has been administered by the Federal Emergency Management Agency (FEMA).

The NFIP sets minimum development criteria that participating communities must adopt and apply to all new development and redevelopment. In return, the community's residents and property owners receive access to federally backed flood insurance.

The NFIP has proven very effective in shifting the cost of flood damage from taxpayers to insurance policy holders. As an insurance-driven program, the NFIP is funded by insurance premiums, not tax dollars. The program is focused on protecting all new and substantially improved buildings. It sets minimum development standards that protect new buildings and prevent development from increasing flood damage on other properties. As a result, buildings in the Special Flood Hazard Area (SFHA) that meet the NFIP standards suffer 80% less flood damage than buildings constructed before the requirements went into effect.

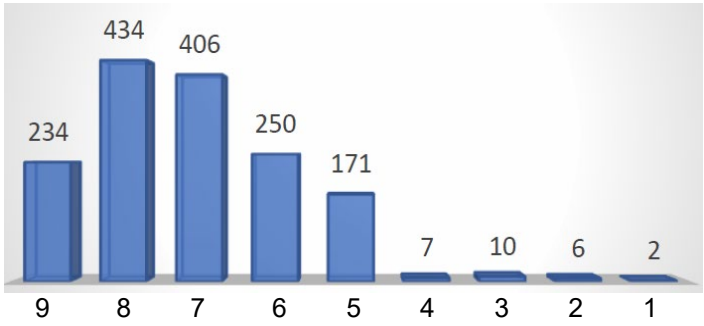
FEMA recognizes that the NFIP cannot mandate floodplain management practices that go beyond the scope of its statutory purpose and legal authority. Because of this, FEMA has always stated that the NFIP criteria are minimums. The NFIP regulations state:

> Any community may exceed the minimum criteria under this Part by adopting more comprehensive flood plain management regulations. . . . Therefore, any flood plain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part ARE ENCOURAGED AND SHALL TAKE PRECEDENCE (44 *CFR* 60.1.d, emphasis added).

FEMA also recognizes that communities that implement higher regulatory standards, such as those that provide more protection for threatened and endangered plant and animal species, and also undertake other activities that exceed the NFIP minimum criteria will have better floodplain management programs and fewer flood losses. FEMA created the CRS to provide an insurance premium benefit for those communities that do this.

The Community Rating System

The CRS is modeled on the fire rating system that the insurance industry has used for over 100 years—the better the community's program, the lower the insurance premiums. Like the fire rating system, the CRS has 10 classes. Class 1 requires the most credit points and gives the largest premium reduction. In the CRS, Class 1 provides up to 45% off a flood insurance policy's premium, and Class 10 receives no premium reduction. Both the fire rating system and the CRS have been shown to be effective incentives to improve and maintain local fire and flood protection programs, respectively.



Number of communities in each CRS class
(as of April 2022)

A community receives a CRS classification based upon the credit points it receives for its activities. It can undertake any mix of activities that reduce flood losses through better mapping, regulations, public information, flood damage reduction, and flood warning and preparedness programs.

Many communities around the country are receiving CRS credit for preserving natural areas from development and for enforcing regulations that are primarily aimed at protecting natural functions but also have secondary flood protection benefits. For example, requiring construction sites to set up erosion control measures reduces water pollution, but it also keeps sediment from running into streams and reducing a channel's flood carrying capacity and destroying spawning beds.

The Endangered Species Act

The CRS's recognition of requirements that exceed the minimum standards of the NFIP includes requirements from federal agencies other than FEMA. The Endangered Species Act of 1973 is one such example. The ESA was enacted to protect plant and animal species from extinction by preserving the ecosystems in which they survive and by establishing programs for their conservation.

The ESA classifies certain species as either "endangered" or "threatened." Combined, these species are referred to as "listed" species. The ESA defines an endangered species as one "in danger of extinction throughout all or a significant portion of its range." A threatened species is one that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

Many listed plant and animal species live or breed in rivers or the adjacent riparian areas that are found in floodplains. The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) are charged with administering the ESA.

The ESA directly affects local floodplain management programs in two ways.

First, Section 9 of the ESA prohibits the "take" of endangered and threatened fish and wildlife species. "Take" is defined in Section 3 as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct." "Harm" is further defined by regulation to include significant habitat modification or degradation that kills or injures fish or wildlife by significantly impairing essential behavioral patterns.

Non-federal activities, such as private development in the floodplain that is not carried out, authorized, or funded by a federal agency, that would result in taking listed species must get an "incidental take permit" from NMFS and/or FWS. A local government often can reduce some of the workload of the permit process by preparing a habitat conservation plan.

The second impact on local floodplain management traces its origin to Section 7(a)(1) of the ESA. This section charges Federal agencies to "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species." Accordingly, FEMA, with help from the Services, reviewed the NFIP to see how to incorporate provisions that furthered the purposes of the ESA. Three initiatives have been implemented as part of the NFIP ESA Section 7(a)(1) Conservation Program:

(1) Added the Floodplains and Wildlife Conservation pages to FEMA's website to provide more information on the ESA and to describe measures communities can take to help threatened and endangered species.

(2) Developed a new geographic information system (GIS) platform called the Flood Risk and Endangered Species Habitat mapping tool (FRESH). FRESH provides maps of the range and critical habitat of species listed by the Services as threatened or endangered.

(3) Provided new credit under the CRS to recognize and encourage community actions that support the conservation and recovery of threatened and endangered species.

The third initiative is the primary topic of this guidebook.

Terms Used in this Guide

Endangered species—A species that is in danger of extinction throughout all or a significant portion of its range.

Threatened species—A species that is likely to become endangered within the foreseeable future.

Listed species—Any species of fish, wildlife or plant which has been determined to be endangered or threatened under Section 4 of the ESA. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened.

Proposed species—Any species of fish, wildlife or plant that is proposed in the *Federal Register* to be listed pursuant to Section 4 of the ESA (16 *U.S.C.* §1533). For the purposes of this document, the term "listed species" includes both species listed under Section 4 and species proposed for listing.

Range—The general geographical area within which a species can be found at the time either FWS or NMFS makes a status determination. The range includes those areas used throughout all or part of the species' life cycle.

Habitat—The natural components of an ecosystem that are essential for a species' survival, including food and water. As used in this guidance, "habitat" is used to mean all such areas needed by species in general.

Critical habitat—Specific areas within the geographical area occupied by the species at the time of listing that contain physical and biological features essential to the conservation of a listed species and that may require special management considerations or protection. Critical habitat may also include areas that are outside the area occupied by the species at the time of listing but that are determined to be essential for the conservation of the species.

Recovery—Improvement in the status of a listed species to the point at which listing is no longer appropriate under the criteria set out in Section 4 of the ESA. Recovery plans describe the steps needed to restore a species to ecological health.

Habitat

> Floodplains may contain the only suitable environment for growth of some species of vegetation and for the breeding/spawning of many species of fish and wildlife. Riparian habitats are among the most important vegetative communities for western wildlife species (Task Force on the Natural and Beneficial Functions of Floodplains, 2002, pp. 2–7).

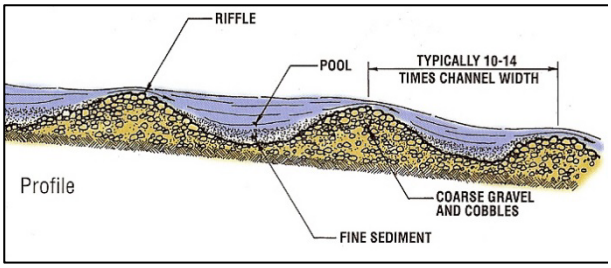
Aquatic and Riparian Habitat

A "habitat" is a specific area or environment in which a particular type of plant or animal lives. Different species have developed over the years in different habitats and they cannot survive for long if their habitats are destroyed or significantly altered. While some species adapt to change and can live with human development, others cannot.

Coastal areas contain salt and brackish waters. Their adjacent floodplains host habitats that are vital to estuarine and marine animals, including fish, shellfish, waterfowl, and mammals. These habitats are dependent on the quality and temperature of the water, salinity levels, and the availability of food.

Freshwater floodplains have two major types of habitat that are not found anywhere else: aquatic and riparian habitats. Freshwater aquatic habitats include rivers, streams, ponds, lakes, and reservoirs that are above the influence of tides and are relatively free of salt water.

The quality of freshwater aquatic habitats is also dependent on the quality and temperature of the water and availability of food sources. In addition, riverine habitat needs pools and riffles. These are, in turn, dependent on rock and woody debris that form the pools and riffles and the vegetation and woody debris that offer refuge for small animals and food for others.



Pools and riffles

Water-rich riparian habitat

Source: Washington Department of Ecology

A riparian habitat area is defined by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as "lands that occur along watercourses and water bodies. Typical examples include floodplains and streambanks. They are distinctly different from surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by the presence of water" (Natural Resources Conservation Service, 1996). The NRCS also notes,

> The kinds and amounts of vegetation differ from adjacent upland vegetation because more water is supplied to plants from the associated watercourse or water body." The term "riparian habitat" is interchangeable with the commonly used term "riparian ecosystem.

In addition, the NRCS states that

> In the western United States, riparian areas comprise less than 1% of the land area, but they are among the most productive and valuable natural resources. There is a significant difference between the water-rich riparian areas and the arid uplands. Riparian areas are the major providers of habitat for endangered and threatened species in the western desert areas. In the humid east, the riparian areas are more similar to the uplands. In many areas, the separation of the riparian zone from the upland is not distinct (Natural Resources Conservation Service 1996).

Arid riparian habitat along the Middle Fork of the Gila River, New Mexico
Source: New Mexico Fish and Wildlife; photo by Ginny Seamster

No clear line separates saltwater, freshwater, aquatic, and riparian habitats because they are interdependent. Vegetation near and along streambanks slows and filters stormwater runoff that enters the stream. Streams carry freshwater to estuaries, replenishing the supply of brackish water. Riparian trees and bushes are dependent on the water provided by the stream. They, in turn, shade the pools and eventually become the woody debris that creates the pools. Their roots stabilize streambanks, reducing erosion and sedimentation. Aquatic habitats nurture flora and fauna that are eaten by the residents of the riparian habitats, and the insects and other wildlife that grow on land are eaten by the fish and frogs that live in the water, which are in turn eaten by waterfowl that nest on the land.

Riparian areas serve as key habitat for a number of threatened or endangered species of wildlife. A naturally vegetated riparian area is also considered appropriate for wildlife habitat protection even if no rare species inhabit the area.

Alteration of Habitat

Habitats change as rivers, shorelines, and floodplains change. The alterations listed below are some of those that can have significant impacts on habitat:

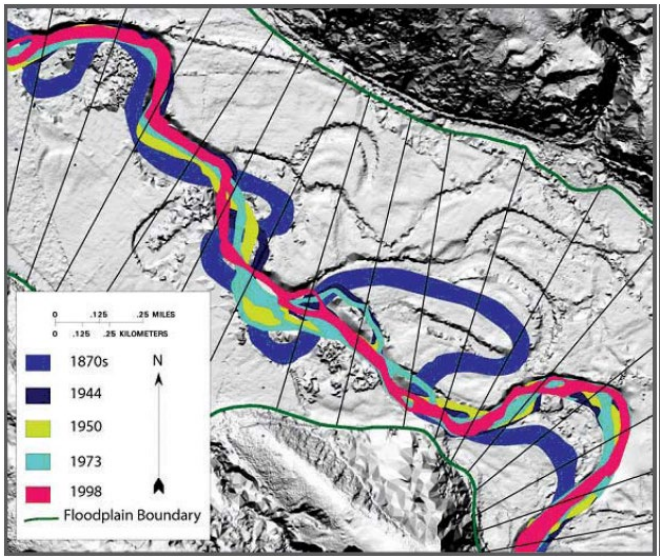
- Relocating channels,
- Dredging,
- Destroying pools and riffles,
- Disrupting the continuity of the habitat along a stream,
- Removing natural debris and rock that form instream shelters,
- Erecting dams or other barriers to flow and fish passage,
- Constructing levees to prevent channel migration or seawalls to stop erosion,
- Reducing stream flow,
- Filling or depositing sediment on areas that periodically get wet,

- Clearing banks or removing tree canopy,
- Disturbing rooted plants on the banks,
- Armoring banks and shorelines,
- Increasing stream flow,
- Nourishing beaches and dunes, and
- Increasing sediment in the water.

Some of these changes can be caused by natural events, such as a flood. Other changes are caused by people. Although both forces can change habitats, there is a difference between natural and human-caused alterations and in how each species reacts to the changes.

Natural Alteration

Rivers and streams build, erode, and modify the landscape. Floodplains are not static features. As seen in the map to the right, they are always changing. (Some changes are more obvious after a flood.) These changes are wrought by the erosion of channel banks and bottoms by fast-moving water and by deposition of rock, sediment, and debris by slower moving water. These materials come from runoff and from scouring of the banks, i.e., the riparian areas.



Historical channel migration paths of the Quinault River
Source: Deschu and Walker 2007, p. 31

The results of these forces include new pools, sand bars, and undercut banks. The most impressive of these changes is channel migration, i.e., when a river channel moves into a new path.

Even if some features are destroyed or moved, they usually reappear elsewhere and new habitat often emerges in the new location. Natural alterations of streams and riparian areas do not permanently destroy habitat, they just change its location as the forces of nature continue to work.

Human Alteration

Human activity, such as land development, can also cause the alterations described above. Some typical examples are listed below.

- Forestry practices may result in clear-cut riparian areas, increased erosion and resulting sedimentation, and reduced supplies of large woody debris that is needed for aquatic and riparian habitats.
- Farming may cause a demand for levees and other flood control barriers to reduce flooding on productive fields. Runoff from farm fields carries sediment and chemicals into streams.

- Roads and railroads obstruct natural drainage patterns, bridges can become dams at higher levels of flow, and stormwater contributes to water pollution when it runs off pavement.
- Urban development has cleared floodplains and resulted in the call for levees, dams, and channel-straightening projects to protect homes and businesses.
- Shorelines and trees may be cleared to gain access to a waterfront or to erect a levee, disturbing rooted plants on the banks.
- Dams built for flood control, water storage, transportation, or power generation may obstruct fish passage, reduce water flows, and upset seasonal flow conditions.
- Channels may be relocated or straightened to increase their flood-carrying capacity or to get them out of the way of development (see the example to the right). Such projects destroy pools and riffles and remove debris and rock that used to form in-stream shelters, and sometimes even replace a natural stream bottom with concrete.

Compare what humans did to the Puyallup River in Washington State with the map of what rivers do naturally on the previous page. Note that in spite of the channel straightening project, the river still flooded.
Source: Washington State Department of Transportation

- Urban development in a watershed brings impervious areas, such as rooftops and roads, and filling of wetlands and floodplains. The result is more rain water running off, fewer places to store it, and, therefore, higher and faster flows in the channels.
- Higher flows mean more bank erosion and scouring of streambeds, which result in sedimentation, turbidity in the water, and changes in the form of the stream channel.
- Urban development that changes stormwater runoff patterns may also change the natural seasonality of stream flows. In the West, urbanization results in lower and warmer flows during the summer and early fall.
- Urban runoff picks up sediment that is subsequently dropped in pools and other areas of lower velocity. With the sediment comes pollutants, such as road oil and trash, that degrade water quality.
- Increased stormwater runoff means more water leaves the watershed instead of percolating into soils and recharging groundwater levels. With less groundwater, there are lower flows in streams during dry periods.
- Elevating a property to reduce flood damage may be done by placing fill to raise the elevation of the ground above the base flood elevation. This can kill the natural vegetation, reduce floodplain storage capacity (which increases velocities), and change stream alignments.

- Because debris in a channel may be viewed as a potential dam, maintenance crews may remove fallen trees and rootwads that are needed for aquatic habitat. Channelization projects may remove riffles so a stream will flow faster, with unfortunate consequences for listed species.

The main difference between natural and human causes of habitat alteration is that natural changes usually allow habitats to be created in another area. Human development in urban areas, on the other hand, does not offer alternatives. When a stream is straightened or leveed, it is constrained. There are no other places for pools and riffles to form or banks where trees are allowed to grow. If the floodplain is filled or urbanized, the riparian habitat is destroyed, not moved.

Examples of How Floodplain Development may Affect Habitat

Chinook Salmon

Source: Pacific Northwest National Laboratory

Chinook salmon require different habitats during different phases of their life. Adult Chinook salmon spawn in freshwater streams in the late summer and fall. Spawning habitat typically consists of gravel and cobbles in stream riffles and the edges of stream pools. This gravel layer on the bottom of the stream ("substrate") provides a sheltered place for the eggs and the flowing water provides oxygen.

Chinook fry emerge in the late winter and early spring. Young Chinook grow in the lower channels of rivers and tributaries for a year or more before entering estuaries and salt marshes. They feed and seek refuge from predators in channel, off-channel, and riparian wetland habitats that have woody debris and overhanging vegetation. Within a year, they reach their smolt stage and need to move from a freshwater to a saltwater habitat. Most Chinook spend from two to four years feeding in the north Pacific Ocean before they return to spawn. When they're ready, they swim back to the streams in which they were born, and then die after spawning.

Chinook salmon accounted for the majority of the Columbia River salmon harvest in the late 1800s. Although overfishing contributed to the species' decline, that isn't the only reason Chinook salmon are protected by the ESA.

The river habitats of the Chinook salmon have been altered by development, forestry, and agriculture as described earlier. The floodplains of the streams and rivers that drain into the Pacific Ocean have been logged, farmed, and built on. These rivers have been channelized and leveed, destroying the pools, riffles, vegetation, and overhanging banks. Some have been dammed. Floodplains have been filled. Runoff from farms and urbanized areas has increased sediment that settled in the gravel and cobbles, reducing oxygen and refuge for fry. The water quality also has been compromised by the runoff, with negative impacts on the fish.

As a result, the Chinook salmon population decreased dramatically over the years, and in the early 1990s the NMFS listed it as a threatened species in various areas on the West Coast. The Sacramento River and Upper Columbia River Chinook salmon have been listed as endangered.

In its designation for the Upper Columbia River Chinook salmon, NMFS noted:

> Their current threatened status cannot be explained by natural cycles in ocean and weather conditions. NMFS has concluded that threatened Chinook, coho, chum, sockeye, and steelhead are at risk of extinction primarily because their populations have been reduced by human "take." West Coast populations of these salmonids have been depleted by take resulting from harvest, past and ongoing destruction of freshwater and estuarine habitats, hydropower development, hatchery practices, and other causes. . .
>
> Although the primary purpose of state, local, and other programs is generally to further some activity other than conserving salmon, such as maintaining roads, controlling development, ensuring clean water or harvesting trees, some entities have adjusted one or more of these programs to protect and conserve listed salmonids. NMFS believes that with appropriate safeguards, many such activities can be specifically tailored to minimize impacts on listed threatened salmonids (50 *CFR* 223, July 10, 2000).

Sensitive Joint-Vetch

The sensitive joint-vetch is listed as threatened by the FWS. This information is taken from the *Floodplain Species Assessment and Plan for Gloucester County and James City County, Virginia*. (Note that the following is intended to serve as an example and does not necessarily reflect the latest information about this species.)

Source: U.S. Fish & Wildlife Service

> This plant is an annual that usually attains a height of three to six feet in a single growing season, but may grow as tall as eight feet. . . .
>
> The joint-vetch occurs in fresh to slightly brackish tidal river systems, within the intertidal zone where populations are flooded twice daily. It typically occurs at the outer fringe of marshes or shores, where plant diversity is high and annual species are prevalent. . . .
>
> The greatest threat to the sensitive joint-vetch has been habitat destruction. Many of the marshes where it occurred historically have been dredged and/or filled and the riverbanks stabilized with bulkheads or riprap. If water levels, tidal flow, or salinity levels change, the species would be threatened at its existing sites. Rising sea levels and saltwater intrusion could further affect existing populations as the plant depends on open freshwater tidal habitat.
>
> Other threats include sedimentation, competition from exotic plant species, recreational activities, agricultural activities, mining, runoff from upland development with associated pollution and sedimentation, impoundments, water withdrawal projects and introduced insect pests.

Loggerhead Sea Turtle

Loggerhead sea turtles occupy three different ecosystems during their lives: terrestrial, oceanic, and nearshore coastal zones. Loggerhead turtles nest and deposit their eggs on ocean beaches. Immediately after emerging from their nests, the hatchlings move to the surf and are swept away into the ocean.

Source: Sea Turtle Conservancy

When they are between 7 and 12 years old, oceanic juveniles migrate to nearshore coastal areas and continue maturing until adulthood. These areas provide crucial foraging habitat, nesting habitat, and migratory habitat for adult loggerheads. The loggerhead turtles that reside in the northwest Atlantic Ocean were listed as a threatened species in 1978.

The terrestrial and nearshore coastal habitats of the loggerhead turtle may be adversely affected by human disturbances, such as coastal development, lights along the coast, and pollution. For example, in Florida, beach "armoring" to prevent erosion, increased human beach activity, and beachfront lighting have all affected nesting turtles.

Locating ESA-Listed Species Habitat

Although floodplain managers are provided with Flood Insurance Rate Maps (FIRMs) that show flood hazard areas, they may not have information on the location of important habitat. As noted on page 3, FEMA has developed a new tool to help locate the habitat of ESA-listed threatened and endangered species.

The Flood Risk and Endangered Species Habitat (FRESH) mapping tool is available to any user at no cost. It can be found on FEMA's Floodplains and Wildlife Conservation site at FEMA.gov. There is also a FRESH users guide.

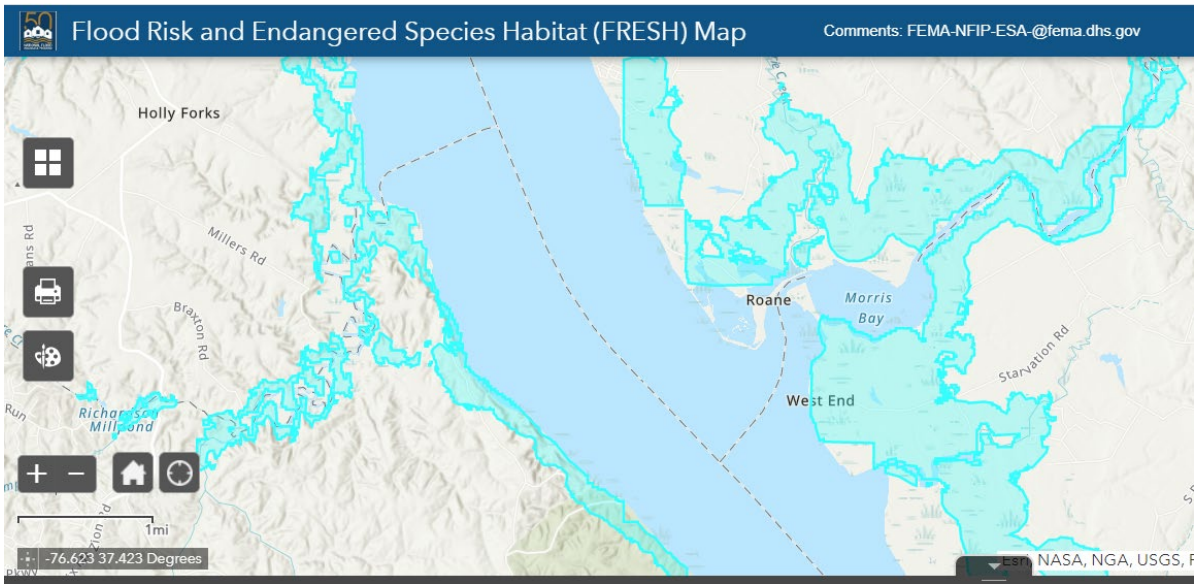
FRESH allows the user to identify an "area of interest," such as a particular floodprone area or the entire city or county limits. It can then identify the ESA-listed threatened and endangered species with range or critical habitat in that area. Note that "range" and "critical habitat" are technical terms, as defined on page 4. They are determined by the listing Service.

Table 1 is an example threatened and endangered species list that was prepared with data from FRESH.

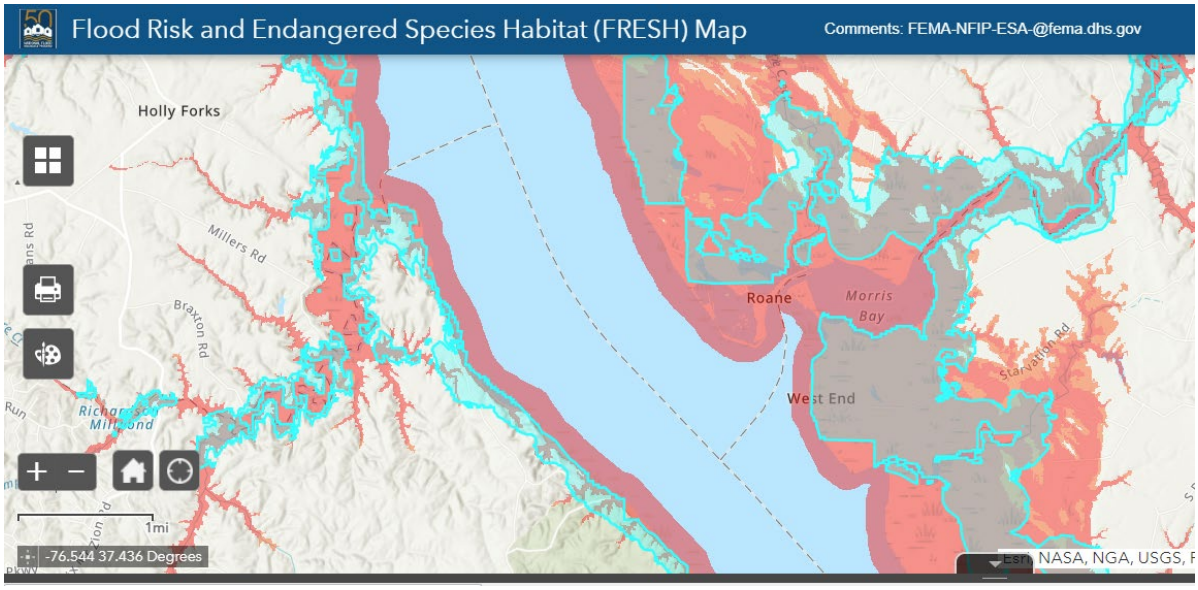
Table 1. Threatened and Endangered Species in Monroe

Species	Scientific Name	Status	Agency
Bull Trout	Salvelinus confluentus	Threatened	FWS
Canada Lynx	Lynx canadensis	Threatened	FWS
Chinook Salmon	Oncorhynchus (=Salmo) tshawytscha	Threatened	NMFS
Gray Wolf	Canis Lupus	Proposed Endangered	FWS
Green Sturgeon	Acipenser medirostris	Threatened	NMFS
Marbled Murrelet	Brachyramphus marmoratus	Threatened	FWS
North American Wolverine	Gulo Gulo Luscus	Proposed Threatened	FWS
Oregon Spotted Frog	Rana pretiosa	Threatened	FWS
Steelhead	Oncorhynchus (=Salmo) mykiss	Threatened	NMFS
Streaked Horned Lark	Eremophila alpestris strigata	Threatened	FWS
Yellow-billed Cuckoo	Coccyzus americanus	Threatened	FWS

Source: Floodplain Species Assessment, Monroe, Washington



FRESH can produce maps of the area of interest, showing range or critical habitat of individual species listed by FWS and NMFS. The above map shows the range of the sensitive joint-vetch in blue (see page 10).



When combined with FRESH's National Flood Hazard Layer, users can easily see whether a species' range or critical habitat is related to the floodplain. (The AE Zone is shown in orange.)

Good Practices to Protect Habitat

This section reviews what communities can do to protect habitat while they are implementing their floodplain management programs. All of these best practices go above and beyond the minimum requirements of the NFIP. FEMA encourages communities to consider implementing these practices and communities may receive credit under the CRS program for doing so. The practices are credited under the CRS because they prevent or reduce flood losses, and they are included in this guidebook because they also protect habitat and natural floodplain functions.

A table summarizing these CRS-credited elements can be found on pages 32–33.

Public Information Activities

The objective of this series of CRS activities is to recognize programs and projects that advise people about flood hazards, flood insurance, and/or ways to prevent or reduce flood damage to buildings and adverse impacts on the natural and beneficial functions of floodplains. The more people know about flooding and how floodplain development can affect natural floodplain functions, the more support there is for introducing and implementing habitat protection measures.

This sign can qualify for credit as an outreach project that covers the topic of protecting natural functions.

Source: City of Salem, Oregon

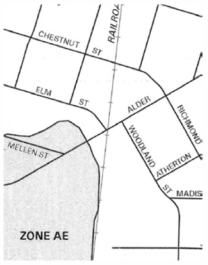
Activity 320 (Map Information Service)

A map information service provides information about local flood hazards. This information helps residents, lenders, insurance and real estate agents, builders, and anyone else interested in owning, building on, or improving floodplain property. At the community's option, it can also provide information about floodprone areas that need special protection because of their natural functions.

CRS credit. Up to 90 points can be obtained for this service. The seven elements of this activity are described in Section 322 in the *CRS Coordinator's Manual*. The natural floodplain functions element in Section 322.g gives up to 20 points for providing information about critical habitats, wetlands, conservation areas, and other attributes of natural floodplain functions.

Call the number on the cover of this brochure to learn more about your flood hazard, including .

1. Is your property in a Special Flood Hazard Area (Zone A or AE)?
2. Is it in a floodway, where special building regulations apply?



3. Was it flooded during a recent flood?
4. Is there a wetland or other feature on your property that would be subject to critical area regulations?

Example of a flood brochure that explains a community's map information service, including #4, which would increase awareness of local wetlands and other sensitive areas.

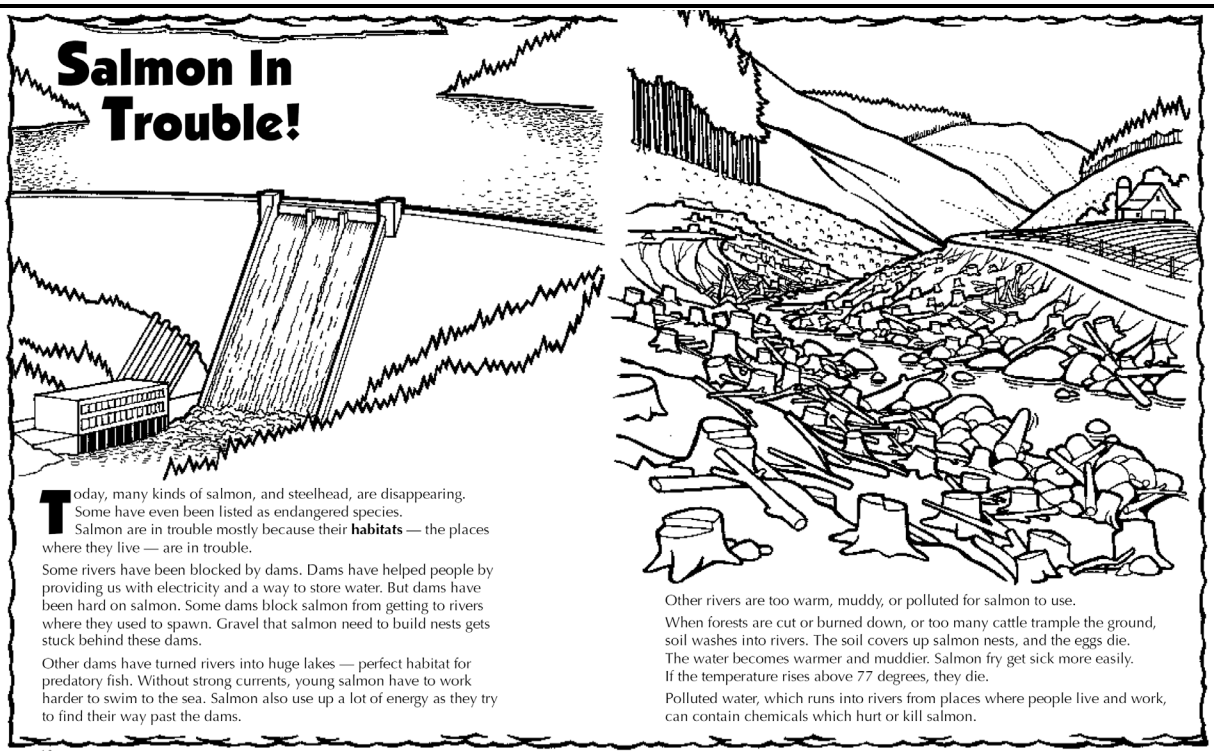
Activity 330 (Outreach Projects)

A community should reach out to residents and businesses and notify them about flood hazards, areas worthy of protection, and what individuals can do to protect habitats and other natural floodplain functions. This can be done via a variety of media, including flyers, brochures, newsletters, newspaper articles, presentations at public meetings, mailings, and signs.

A coastal example of a sign that qualifies for credit as an outreach project that covers the topic of protecting natural functions.
Source: Photo by French Wetmore

CRS credit. Activity 330 provides up to 200 points for outreach projects that are distributed every year and that cover one or more of the six priority topics that are important to FEMA and the CRS. One of those topics is "Protect natural floodplains."

Credit for these projects can be increased if the community prepares an overall program for public information (see Section 332.c of the *CRS Coordinator's Manual*), which allows for more flexibility and more credit for more messages on natural floodplain functions.



The U.S. Fish and Wildlife Service prepared this coloring book for grades 4 to 8. If schools use these or similar materials to educate students on floodplain management and habitat protection topics, their communities can receive CRS credit for them under Activity 330.

Activity 340 (Hazard Disclosure)

Disclosing the flood hazard to a prospective purchaser of a piece of property can be very helpful. It is even more useful if the disclosure informs the buyer of other natural features or development restrictions on the property, such as a wetland or conservation buffers.

Often buyers are unaware that a property is floodprone until it floods.
Source: Photo courtesy St. Tammany Parish, Louisiana

CRS credit. Section 342 of the *CRS Coordinator's Manual* provides credit for flood hazard disclosure measures, with the most credit awarded for programs by which real estate agents inform house hunters whether a property is in the regulated floodplain. A community can get up to 80 points for a systematic method of disclosing flood hazards.

Activity 350 (Flood Protection Information)

Outreach projects can provide only a limited amount of general information. Communities should make more detailed information and references available to those who want to know more. There are two primary ways that this can be done:

- The **public library** should have relevant references available and cataloged. These could include federal and state flood and habitat protection books, FIRMs, and local ordinances and plans.
- The community's **website** should have one or more pages on floodplains, the local hazards, and ways to protect natural floodplain functions. There are many area and national websites that can be linked, so local officials do not have to create their own materials. An example of one community's site is on the next page.

CRS credit. The *CRS Coordinator's Manual* explains the credit criteria for a flood protection library (Section 352.a), locally pertinent documents in the library (Section 352.b), and a flood protection website or webpages (Section 352.c). Up to 48 points are provided for these outreach services.

Mapping and Regulation Activities

This series of CRS activities credits actions that prevent flood problems and degradation of habitat. The credits focus on mapping and regulating development and protecting and preserving natural areas.

FEMA Region 10 prepared a Model Ordinance with recommended regulatory provisions that provide one set of rules that meet the requirements of both the NFIP and the ESA (Federal Emergency Management Agency, 2013). The model ordinance may be of interest to communities because it provides sample regulatory language that may be adopted to provide greater protection to floodplains. The model ordinance has a commentary that identifies CRS credits for various provisions; however, please note that the CRS activities noted in the model ordinance are based on the 2007 *CRS Coordinator's Manual*, which has been revised based on policy updates.

Community Development Department
1321 S Market Blvd. Chehalis, WA 98532
(360) 345-2229 / Fax: (360) 345-1039
www.ci.chehalis.wa.us email: comdev@ci.chehalis.wa.us

Natural Floodplain Functions

Our floodplains and riparian areas are not just a location for flood problems. They also perform some very **valuable natural functions**.

Probably the most important natural function of the area's floodplains is to provide **habitat** for aquatic species. Unfortunately, aquatic species in the Chehalis River Basin are significantly diminished from their historic level. Salmon habitat in the Basin already is degraded by 44%–78%, depending on the species. Other species, like Oregon Spotted Frog, could soon be listed under the Endangered Species Act.

To see what species live in your immediate area, checkout the Washington Department of Fish and Wildlife Priority Habitats and Species (PHS) map http://apps.wdfw.wa.gov/phsontheweb/

Other areas important to many species' habitat are **wetlands**. They also help attenuate flooding by storing floodwaters. Click here to see a map of your wetlands.

The City of Chehalis enforces several regulatory approaches to protect floodplain habitats. In addition to floodplain regulations that discourage development, the City regulates stream buffers – areas within a certain distance of a channel. A map of these areas is here.

Don't damage habitat or any of the valuable natural floodplain functions. Call the Community Development Department at (360)345-2229 before you dig, fill, grade, or build. We can tell you if you're in a floodplain, buffer zone, or other critical area and what rules are in effect.

The City also participates in the Chehalis River Basin Flood Authority, which is developing an aquatic species habitat restoration program.

The City of Chehalis, Washington's, website has background information on aquatic species habitat and links to other sources of information.

Activity 410 (Floodplain Mapping)

The first step in managing development in an area is to accurately map the area and provide the flood hazard data that is needed to determine appropriate protection criteria. The NFIP's mapping criteria are specified at FEMA's *Guidelines and Standards* website. As with other NFIP criteria, these are minimums. Communities are encouraged to identify hazard areas outside the FEMA-mapped SFHA and to use higher standards when preparing floodplain maps.

There are three ways communities can receive credit under Activity 410 by using mapping standards that will also protect habitat.

RiskMAP
Increasing Resilience Together

FEMA's Risk Mapping, Assessment and Planning (Risk MAP) program provides tools in addition to the usual Flood Insurance Rate Map. The additional Risk MAP tools are determined during meetings with FEMA that review the community's floodplain management and mitigation priorities. They could include habitat maps that could be layered with regulatory and historic floodplain maps. This would facilitate the community's map information service, improve coordination of the regulatory programs, and help the public see the relation between the floodplain and certain habitats.

(1) **Map and regulate an area outside the floodplain designated on the FIRM**. The NFIP recommends mapping and regulating all known flood hazards. Floodplain regulations may be extended to areas outside the SFHA, such as nearby wetlands or areas that may become flood hazards based on an understanding of future conditions. One result is that a larger area may be covered by the community's floodplain development regulations and that area could include more habitat.

CRS credit. The element NS—new study, in Section 412.a, credits a community for mapping and regulating flood hazards outside the floodplain shown on the FIRM. Because the credit is based on the amount of area affected, the type of study used, and other factors, maximum and average points are not comparable and are not provided for this element.

(2) **Map the floodplain using higher standards** than those required by the *Guidelines and Standards*. The NFIP standard is to map the hazard based on existing development conditions. Region 10 and the NMFS recommend using future conditions, i.e., calculating runoff based on expected future land uses. The result is usually a larger base flood discharge and a larger regulatory floodplain (Federal Emergency Management Agency Region 10, 2010).

CRS credit. Using higher study standards, such as future-conditions hydrology, is credited under Section 412.d. Because the credit is based on the amount of area affected, the type of study used, and other factors, the maximum and average points are not comparable and are not provided for this element.

(3) **Base the floodway delineation on a standard higher** than FEMA's one foot allowable surcharge. This approach expands the area subject to the most restrictive requirements on new development.

CRS credit. Adopting a larger floodway is credited in Section 412.e. The credit is up to 140 points, depending on the standard used and the amount of the SFHA that is affected.

Activity 420 (Open Space Preservation)

Once areas of concern are mapped, the best way to protect buildings from flooding and habitat from damage is to preserve the areas as open space. If there are no buildings in the floodplain, there would be no flood damage to buildings. Areas kept as natural open space allow the natural stream processes that support habitats to occur, such as meandering and collection of woody debris.

There are six ways to receive CRS credit for activities related to preserving open space and natural areas in the floodplain.

Preserving floodplain as natural open space allows natural processes, such as beavers building dams, to proceed without harming human development.
Source: Photo by French Wetmore

(1) **Preserving open space.** There are various ways to preserve floodprone areas as open space including

- Ownership by a public agency;
- Ownership by a private organization dedicated to keeping the area open, such as a church camp or hunters' club;
- Requiring developers to set aside the floodprone portions of their land; and
- Having regulatory standards that prohibit developers from filling or building (although the standards still need to allow for some reasonable economic use of the land).

CRS credit. Section 422.a provides up to 1,450 points for keeping vacant floodplain lands vacant. The points are prorated based on how much of the floodplain is preserved as open space.

(2) **Preserving open space in its natural state.** Additional credit is provided if the preserved open space also serves a natural floodplain function. From both flood protection and habitat preservation perspectives, open space that has been left in its original natural state or restored to a natural state is worth more than open space such as playing fields and parks with pavement and mowed grass.

CRS credit. Section 422.c provides up to 350 points on top of the credit in 422.a for open space parcels that provide natural floodplain functions. There are four sub-elements to open space that provides natural functions:

- Credited open space parcels that are in an undeveloped natural state or have been restored to a natural state (up to 190 points).
- Parcels that are credited as natural functions open space that are also designated in a plan to protect natural functions. The plan must meet the criteria for a natural floodplain functions plan credited in Activity 510 (Floodplain Management Planning) (up to 50 points).
- Parcels that are credited as natural functions open space that are also designated as critical habitat for threatened or endangered species (up to 50 points).

- Parcels that are credited as natural functions open space that are also in a designated open space corridor or connected network. (up to 60 points).

(3) **Preserving open space in areas subject to special flood-related hazards.** These hazards include coastal erosion, migrating channels, and alluvial fans. In many cases, the best way to protect people and property from these extremely damaging hazards is to prohibit new development. These areas can coincide with habitat along beaches and channel banks, so limiting development in them can greatly assist both property protection and habitat preservation.

A protected Loggerhead sea turtle nest on Naples Vanderbilt Beach, Florida

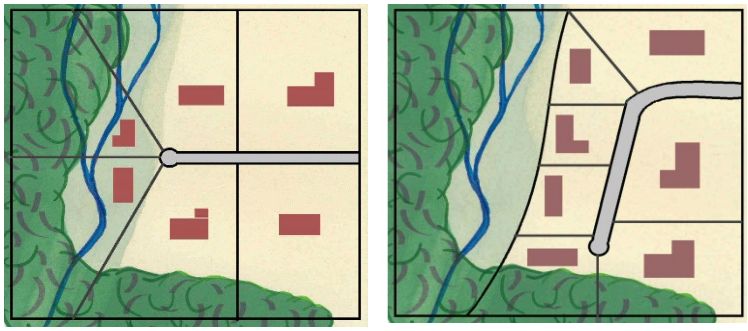
Source: Turtle Journal at http://www.turtlejournal.com/?p=16514

CRS credit. Section 422.d provides up to 150 points for parcels that qualify as preserved open space that are in areas subject to an inland special flood-related hazard. Section 422.e provides up to 750 points to communities for protecting areas at risk from coastal erosion.

(4) **Developer incentives** to keep the floodplain areas undeveloped. Land may not be for sale to a public agency. Often, communities don't have sufficient funds to purchase all the land that they would like to preserve. One way to approach these situations is to work with developers to offer them incentives to minimize developing in the floodplain.

The example to the right shows what can be done with regulations that allow planned unit or cluster developments and when communities and developers work together; they get win-win solutions.

CRS credit. Up to 250 points are provided for requirements and/or incentives that keep floodprone portions of new developments open through techniques such as density transfers, Section 422.f.

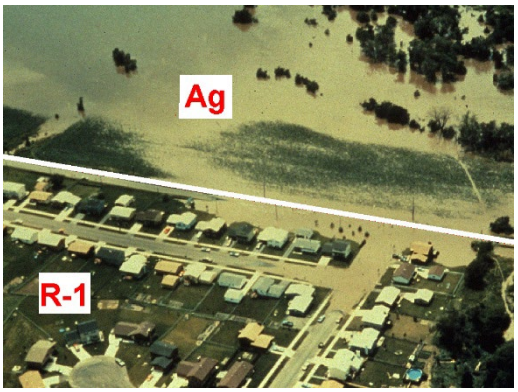


In the standard zoning approach (left), the developer considers six equally-sized lots without regard for the flood hazard. Two properties are subject to flooding and the natural stream is disrupted.

An alternative, flexible, approach is shown on the right. The floodplain is dedicated as public open space. There are seven smaller lots, but those abutting the floodplain have the advantage of being adjacent to a larger open area. Four lots have waterfront views instead of two.

These amenities compensate for the smaller lot sizes, so the parcels are valued the same. The developer makes the same or more income, the future residents are safer, and the natural areas of the floodplain are preserved as open space.

(5) **Large lot zoning.** Floodplain lots can be zoned for conservation, agriculture (right), or "rural estates," requiring minimum lot sizes of 5, 10, or 20 acres or more. The result is less disruption of floodplain land and more room to avoid riparian areas or critical habitat. Natural floodplain functions are greatest with conservation zoning, but habitat values may be realized with other types of large lot zones if the riparian buffer zone is left in a natural state. Fewer buildings in the floodplain also means less damage during a flood.



A zoning ordinance can designate wetlands and floodprone areas for agricultural, conservation, or other uses that suffer minimal damage from a flood.

CRS credit. Low density zoning provides up to 600 credit points for zoning districts that require lot sizes of 5 acres or larger, under Section 422.g.

(6) **Preserve natural shorelines.** There is often a desire to channelize streams for flood protection and to harden stream banks to stop erosion. The results can be very damaging to species that need riffles and shade. Such projects also prove very expensive to maintain as streams always try to return to their natural condition. In short, a natural shoreline is better habitat than an altered one.

A natural shoreline allows natural processes, such as channel meandering and beach erosion. Natural shorelines have associated riparian vegetation that filters runoff, providing water quality benefits.

Community provisions to preserve natural shorelines should regulate channelization, streambank armoring, and preserve riparian setbacks that protect natural vegetation.


Channelized streams and hardened banks are both expensive to maintain and provide poor habitat.
Source: New York State Department of Environmental Conservation


Allowing streams to meander naturally and riparian vegetation to grow saves maintenance costs and preserves habitat.
Source: Federal Emergency Management Agency

CRS credit. Natural shoreline protection in Section 422.h provides up to 120 points for programs that protect natural channels and shorelines. Credit is provided for regulations that govern development and construction and for policies about activities on public land. The credit points are adjusted based on how much of the community's shorelines are covered by the regulations or policies.

Activity 430 (Higher Regulatory Standards)

It is not always possible to persuade developers to preserve the floodplain as open space. It is also difficult to prevent construction on the remaining lots in an area that is already largely developed. In these cases, a

community can set higher regulatory standards than the NFIP minimums for better flood protection and protection of sensitive habitats.

There are five types of higher regulatory standards for new construction that can also serve to protect natural floodplain functions.

(1) **Restrict filling.** The two most common restrictions on filling are straightforward prohibitions and requiring compensatory storage. In the latter case, filling is allowed, but only if an equal or greater amount of fill is removed from the floodplain so there is no net loss of the floodplain's storage capacity. Although compensatory storage stabilizes flows and reduces downstream erosion, it can encourage filling of sensitive areas.

Filling large areas of a floodprone parcel can do a lot of damage to habitat.
Source: Photo by French Wetmore

In some areas of the country, almost all new buildings in floodplains are constructed on slab-on-grade foundations on top of new fill. There are other ways to elevate a building above the flood protection level that are less damaging to habitat. These include piers (below right), pilings, flow through crawlspaces, and filling limited to the area within a solid foundation stem wall.

On its website, FEMA provides a variety of technical assistance materials about flood-resistant building standards, including the NFIP Technical Bulletins.

Construction on elevated flow-through foundations is much less disruptive than filling a building site, as shown by this structure in Baldwin County, Alabama.
Source: Federal Emergency Management Agency

CRS credit. Section 432.a(1) provides up to 280 points for prohibiting fill and up to 130 points for a compensatory storage requirement. Sections 432.b and c provide higher credit for freeboard and foundation protection if the credited buildings are not constructed on fill. Section 432.g credits limiting enclosures under a building, with the most points for completely open lower areas.

(2) **Prohibit buildings.** Buildings can be prohibited from vacant parcels. This is usually done in high hazard areas, such as floodways, where no occupancy during a flood is considered safe. Although such restrictions should leave some economic use of the land, they will minimize the disruption caused by development of structures and the potential for resulting flood damage.

CRS credit. Section 432.a(2) provides up to 1,000 points for prohibiting buildings in the floodplain. If the regulations only prohibit certain types of buildings or limits the prohibition to certain areas, the points are prorated.

(3) **Prohibit hazardous materials.** Hazardous materials, such as chemicals, oil (right), and gasoline, can have an adverse impact on all species and their habitats.

This oil spill resulted after a nearby refinery was flooded. Flooded riparian habitat was destroyed.
Source: FEMA Photo by Leif Skoogfors

CRS credit. Two elements in Activity 430 credit restrictions on hazardous materials. Section 432.a(3) provides 20 points for regulations that prohibit storage of hazardous materials anywhere in the floodplain or 10 points for requiring hazardous materials to be stored indoors, above the base flood elevation.

Section 432.f addresses critical facilities, which include hazardous materials facilities. It provides up to 80 points for prohibiting new critical facilities in the 500-year floodplain or up to 40 points if new critical facilities are protected to at least one foot above the 500-year flood level.

(4) **Standards for special flood-related hazards.** Highly destructive hazards, such as coastal erosion, tsunamis, and channel migration (right) warrant restrictive regulatory standards. Prohibiting buildings altogether is not unreasonable in areas where there may be no land left after a flood. The result is more open space preserved in the floodplain, especially along shorelines and other areas that provide important habitat for threatened and endangered species.

Because of the potential for destruction, prohibiting buildings along migrating channels is often the only effective protection strategy. Cowlitz River, Washington, 2007.
Source: FEMA photo by Marvin Nauman

Mapping channel migration areas may be combined with regulatory standards to provide a greater degree of floodplain protection.

CRS credit. Sections 432.l, m and n credit restrictive development standards in areas subject to special flood-related hazards. More credit is provided if buildings are prohibited.

(5) **Other higher standards.** The CRS is intended to recognize what a community does above and beyond the minimum requirements of the NFIP. Most of the *CRS Coordinator's Manual* reviews typical activities implemented by many communities. However, not every possible activity can be predicted in the *CRS Coordinator's Manual*. Accordingly, the element "other higher standards" is in Activity 430 to allow credit for things not already listed.

Examples of past credits include, but are not limited to

- Prohibiting fences that restrict flood flows, which also allows the freer movement of animals;
- Prohibiting the installation of new septic systems in the floodplain; and
- Treating the entire floodplain as floodway—every development must demonstrate that there will be no increase in flood heights.

These higher standards, which have a side benefit of discouraging filling and building in the floodplain, can be credited as "other higher standards."

CRS credit. Section 432.o provides up to 100 points for "regulatory approaches and standards that are not addressed in the other elements of this or other activities." Each submittal for credit is individually reviewed and scored.

Activity 450 (Stormwater Management)

Most of the water that enters a stream does not come from the floodplain. It is runoff from the entire watershed. Unmanaged stormwater runoff from urban areas can adversely affect habitats when it

- Imports pollutants from the land surface;
- Increases flow volume and velocity, causing channel scour;
- Increases sediment loads in the water; and
- Decreases infiltration, reducing dry weather flows in streams.

There are four ways in which Activity 450 encourages stormwater management practices that can also help preserve habitat.

(1) **Manage the quantity of runoff.** The most common way to manage stormwater is by requiring or constructing storage basins that retain or detain the runoff. Retention basins do not release the excess runoff to the stream. Rather, they hold the runoff to recharge groundwater supplies or divert it to other uses, such as irrigation. Detention basins release the runoff slowly over a period of time.

Because traditional water quantity control measures do not match the flood frequency, timing, and duration of storm events, they can have adverse effects on various species' life stages. For example, runoff from urbanized areas is greater than from the same areas before they were developed. Restricting the peak flow may reduce flood levels, but the release of the larger amount of stored water over time can erode channel banks.

Low impact development is a term for a variety of approaches that manage stormwater at a site and minimize runoff by approximating natural conditions. The graphic summarizes many of these techniques.

Low impact development techniques are most effective when they are applied throughout the entire watershed and not just within the floodplain. It is recommended that communities adopt such a requirement for their entire community.

Low impact development practices
Source: Puget Sound Partnership, 2012

CRS credit. Section 452.a.(2) increases the credit by 50% if the regulations control for volume in addition to controlling the peak flow. Section 452.a.(3) provides up to 25 points for incorporating low impact development requirements in the community's stormwater quantity management regulations.

(2) **Overall plan for the watershed.** Traditional stormwater management regulations address one development at a time, when a developer applies for a permit. Although the adverse effects of one project on downstream areas may be small, the cumulative adverse effects can add up. A master plan for the watershed can account for the total expected impact. A watershed plan can also adjust the regulatory standards for different areas and identify corrective measures to augment preventive approaches.

CRS credit. Section 452.b provides up to 315 credits for a watershed master plan. The most points are credited for including habitat friendly approaches, including

- 30 points, if the master plan identifies existing wetlands or other natural open space areas to be preserved from development so that natural attenuation, retention, or detention of runoff is provided;
- 25 points, if the plan recommends prohibiting development, alteration, or modification of existing natural channels and the community has adopted a qualifying ordinance; and
- 25 points, if the plan recommends that channel improvement projects use natural or "soft" approaches rather than gabions, rip rap, concrete, or other "hard" techniques, and the community has adopted appropriate design standards or ordinances.

(3) **Manage erosion and sedimentation.** Construction projects typically lay the ground bare until the project is completed. This means that the land can be exposed to erosion for months. Without proper management, sedimentation will gradually fill in channels, lakes, and retention basins, diminishing their ability to carry or store floodwaters, reducing water quality, and filling in the spaces in stream gravels used as refuge by small fish. Erosion and sedimentation control regulations require builders to retain sediment-laden runoff and keep it on the site.

CRS credit. Section 452.c provides up to 40 points for requiring erosion and sedimentation control measures on new construction sites throughout the community, not just in the floodplain.

(4) **Require water quality provisions.** Most storage basins and other drainage facilities have typically been constructed solely to manage water quantity. They can and should be designed to manage water quality, too. Simply holding the "first flush" of a storm long enough to allow the sediment and other pollutants to settle out before the water is released can do a lot to improve the water quality of the stormwater released. Using aeration, velocity dissipaters, grass filter strips (below, right) and other "best management practices" can also help reduce pollutants and recharge groundwater.

CRS credit. Section 452.d provides up to 20 points for requiring new developments to include appropriate best management practices for new drainage facilities.

The drainage channel on the left is a typical "quantity only" approach, while the one on the right incorporates water quality features, too. It is also less expensive to maintain over the long run.
Source: Photos by French Wetmore

Restoration Activities

The good practices addressed in the previous sections focused on not making things worse by managing new development to minimize adverse effects on habitats. This last section looks at modifying existing development to reduce flood losses and to improve aquatic and riparian habitats at the same time.

Activity 510 (Floodplain Management Planning)

The best way to start habitat restoration and protection measures is with a plan. Most communities have comprehensive plans or land use plans. The CRS credits two kinds of plans that can protect habitat.

A **floodplain management plan** is a master plan for the community's floodplain management program. It should follow a ten-step process that

- Describes the local flooding problem, including threats to natural floodplain functions;
- Identifies concerns about and opportunities in the floodplain;
- Reviews alternative approaches to address problems, concerns, and opportunities; and
- Specifies an action plan of things to do.

There are six general categories of alternative approaches (see box) that need to be considered for full credit. Not only should natural resource protection be included in the planning process, other measures, especially structural projects and development standards, should be reviewed with their impact on habitats in mind.

Floodplain Management Categories

Preventive activities that keep problems from getting worse (e.g., zoning areas for low intensity development)

Property protection activities (e.g., relocation and elevation of buildings)

Natural resource protection activities that preserve or restore natural areas or natural functions (e.g., wetlands protection and erosion and sediment control)

Emergency response measures that are taken during an emergency to minimize its impact (e.g., flood warning)

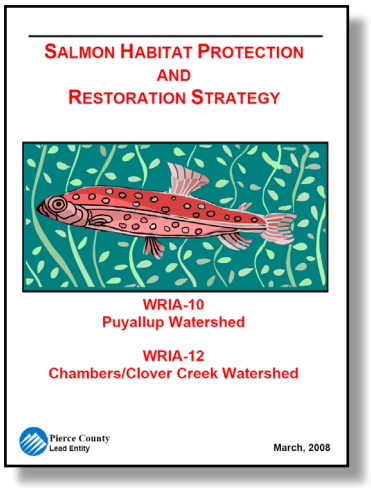
Structural projects that keep floodwaters away from an area (e.g., levees, drainage improvements)

Public information activities that advise property owners, potential property owners, and visitors about hazards, ways to protect people and property from the hazards, and the natural functions of floodplains

CRS credit. Up to 382 points can be obtained for a floodplain management plan under Section 512.a in the *CRS Coordinator's Manual*. It should be noted that many communities have submitted hazard mitigation plans for this credit. Usually they do not receive very many points (unless the ten-step process was included in the planning work) and often they do not include protection of natural functions as one of the considerations to be reviewed.

A **natural floodplain functions plan** is a plan that specifically reviews one or more natural functions within the community's floodplain and recommends ways to protect or enhance them. Examples include

- A habitat conservation plan;
- A habitat protection or restoration plan;
- A green infrastructure plan;
- A plan for a specific species (e.g., the example at the right); and
- A section of a comprehensive or other community plan that has an ecological inventory and recommends actions.



CRS credit. Up to 100 points can be obtained for one or more natural floodplain functions plans under Section 512.c in the *CRS Coordinator's Manual*. These plans must be adopted by an implementing agency, identify action items (e.g., more than policy statements), and be updated at least every ten years.

The 2021 *Addendum to the 2017 CRS Coordinator's Manual* introduced two new ways to receive credit with a natural floodplain functions plan. They are explained in the last section of this guide.

Activity 520 (Acquisition and Relocation)

One tenet of floodplain management is that the most effective flood protection measure is to remove damage-prone structures from harm's way. The federal government supports this approach to such an extent that Congress has authorized several FEMA mitigation grant programs and the U.S. Army Corps of Engineers to PURCHASE AND CLEAR FLOODPRONE BUILDINGS. Many communities and states also fund such projects.

Properties acquired with FEMA funds must be preserved as open space.

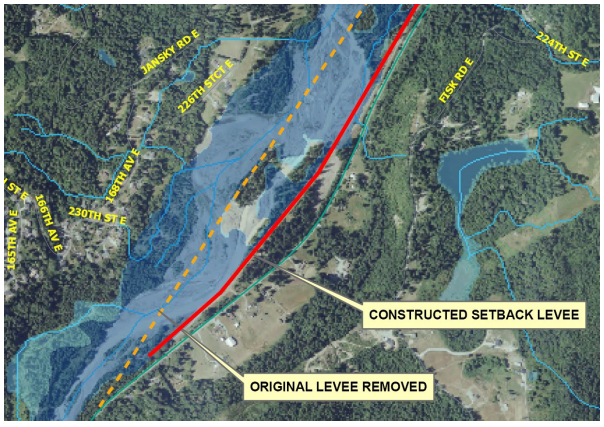
CRS credit. The *CRS Coordinator's Manual* provides credit for clearing buildings under two CRS activities:

- Acquiring and clearing buildings, especially repetitive loss buildings, from the floodplain, are credited under Activity 520 for up to 2,250 points.
- A prerequisite for Activity 520 credit is that the property must be preserved as open space so that new floodprone buildings will not be constructed on the cleared site. The credit criteria for this is the same as for open space preservation, described in Section 422.a. This is discussed in the earlier section on Activity 420.

The best use of acquired lands is to RESTORE THEM TO THEIR NATURAL CONDITION. Restoration is encouraged under the natural functions open space credit in Activity 420 (Section 422.c). That element includes the following language in the definition of "natural functions:"

> Areas that have been farmed or otherwise developed, but have been restored to a state approximating their natural, pre-development conditions. This includes restoration work, such as bioengineered channel stabilization, removal of seawalls to allow beach erosion, living shorelines, wetland or riparian habitat restoration, and moving levees back to allow channel meandering.

Buildings aren't the only items of human development that could be cleared out of a floodplain. Levees and channelization projects have also done damage to habitats. Removing levees or at least moving them back away from the channel bank can greatly help to restore the natural stream functions. There have been many channel restoration projects in recent years as more communities nationwide realize their benefits.



Site of a Pierce County CRS-credited levee setback project on the Puyallup River in Washington State.
Source: Pierce County, Washington

CRS credit. The credit for channel restoration projects under Activity 520 is dependent on the number of buildings removed from the floodplain, while the Activity 420 credit is based on the amount of land preserved as open space or restored to a naturally functioning condition.

In 2008, King County, Washington, bought the final parcels of land that allowed it to clear a swath of Cedar River floodplain at Rainbow Bend, remove a levee, create a side channel for habitat and additional flow, and build a lower setback levee near the parcel boundaries. The project goals incorporated both flood protection and habitat restoration and included the objectives listed below.

- Remove repeatedly flood-damaged homes from the highest hazard areas.
- Reconnect the river and its floodplain to restore natural and self-sustaining riverine processes and functions including flood conveyance and storage, and sediment transport and deposition.
- Increase the quantity and quality of instream, riparian, and off-channel habitat for fish and wildlife and contribute to the recovery of Chinook salmon, an ESA-listed species.
- Maintain existing levels of flood protection for remaining homes and infrastructure.

The County receives CRS credit for this project under both Activities 520 and 420.

The Rainbow Bend area during the 2009 flood, before all the buildings had been removed.

The Rainbow Bend area today. The levees have been removed and the side channel is in place.

Source: Photos by King County, Washington

CRS Criteria for Levees and Flood Control Projects

The CRS does not provide credit for construction of new levees. If a setback levee is being constructed, it may be that some floodprone buildings would have to be removed to make room for the setback levee and the area between the new levee and the river should be preserved as open space. In those cases, CRS credit would be provided as discussed in the previous section.

It should be clarified that the CRS does have Activity 620 (Levees). This credit is only for levees that meet strict construction and maintenance standards. There is additional credit if the residents are advised of the potential of a levee failure, and where the community has adopted, and periodically tests, a levee failure emergency response plan.

In Section 530, the CRS credits flood protection projects, such as channel improvements and reservoirs. This credit is only provided if buildings are protected from flooding. There is no CRS credit for structural projects that reduce flooding in undeveloped areas.

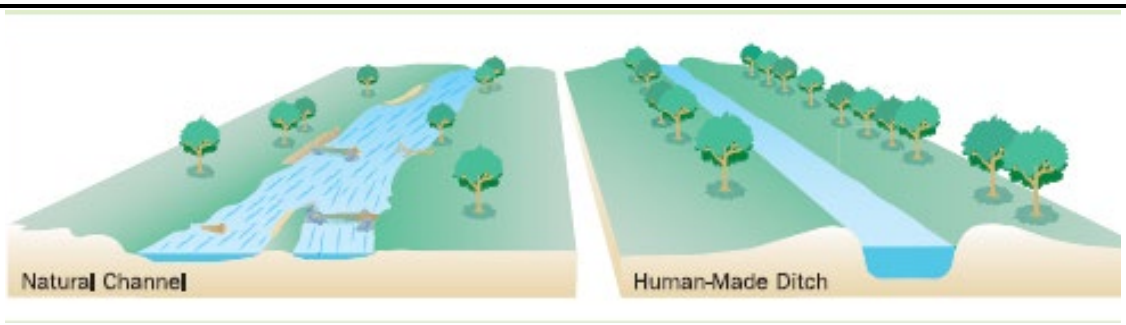
For credit under both Activities 530 and 620, local officials must complete certification forms that document the community's compliance with local, state, and federal environmental laws and regulations. These forms are provided in Appendix F of the *CRS Coordinators Manual.*

Activity 540 (Drainage System Maintenance)

A program to maintain a community's drainage system can ensure that streams stay clear of unwanted debris (shopping carts, garbage, etc.) that can obstruct floodwaters and damage habitat. It requires periodic inspections and corrections of problems found. Many communities do some of this work with volunteers.

A good drainage system maintenance program has periodic inspections of channels and basins to identify debris and obstructions before they contribute to a flood.
Source: Photo by French Wetmore

The CRS recommends that drainage maintenance procedures include cataloging streams, and differentiating between natural streams and human-made ditches. As illustrated in the graphic below, natural channels can absorb downed trees and other natural obstructions without increasing flooding elsewhere. Many human-made ditches, on the other hand, need to be treated differently—if they were built like the example on the right in the graphic, they have to be kept clear to do their jobs.



Every community should have clearly written stream maintenance procedures that differentiate between natural and human-made channels.

A drainage maintenance program should not treat natural channels and human-made ditches the same. The natural channel has a wider area in which to flow. Trees and small log or debris jams can be accommodated by minor diversions of flow without causing any problems. In fact, vegetation and minor obstructions that cause riffles and pools are desired in natural streams because they improve habitat and water quality.

More and more communities are designing drainage features to include both water quantity and water quality benefits. They may look like a hybrid of the two examples illustrated above. In any case, maintenance procedures need to take into account the desire to prevent flooding, the need to protect habitat, and the requirement to follow federal, state, and local laws.

CRS credit. Section 542 in the *CRS Coordinator's Manual* explains the various credits for drainage system maintenance, which can add up to 470 points. Under the latest *CRS Coordinator's Manual*, there is no credit for maintaining human-made ditches.

Often, the credit is for several agencies' programs. For example, a city may inspect and maintain smaller streams while the county and/or state may maintain the streams that affect its roads or bridges. A community's submittal must include signed Certifications of Compliance with Environmental and Historic Preservation Requirements for Drainage System Maintenance (CC-540EHP), found in Appendix F of the *CRS Coordinator's Manual*, from all agencies that have programs to be credited.

Putting it all Together—Assessing and Planning for Floodplain Species

The challenge of learning about threatened and endangered species, where they may exist in a community, and all the things that could be done to help them recover, at first may appear daunting. However, looking at the big picture is the best way to start.

To encourage a high-level review of the species and the actions that could be taken, the *Addendum to the 2017 CRS Coordinator's Manual* introduced two new credits.

Floodplain Species Assessment

The floodplain species assessment (element FSA in the CRS) is credited in Section 512.c of the *Addendum.* This is a new credit designed to encourage a community's floodplain management staff to:

- Identify the threatened and endangered species with ranges and/or critical habitat that overlap with the community,
- Compare the ranges and critical habitat to the floodplain, and
- Review relevant CRS activities that protect habitat in general.

The draft assessment is then sent to the FWS, NMFS, FEMA, and other appropriate agencies and organizations to get feedback on which species the community should focus on and what kinds of programs and assistance might be available. After incorporating the reviewers' comments, the resulting document is distributed to the community's governing body and others for information only.

Floodplain Species Plan

The floodplain species assessment provides information on what's out there, but doesn't commit the community to any action. If, after reviewing the assessment's findings, the community wants to act, it could prepare a floodplain species plan (element FSP in the CRS), which is also in Section 512.c of the *Addendum*.

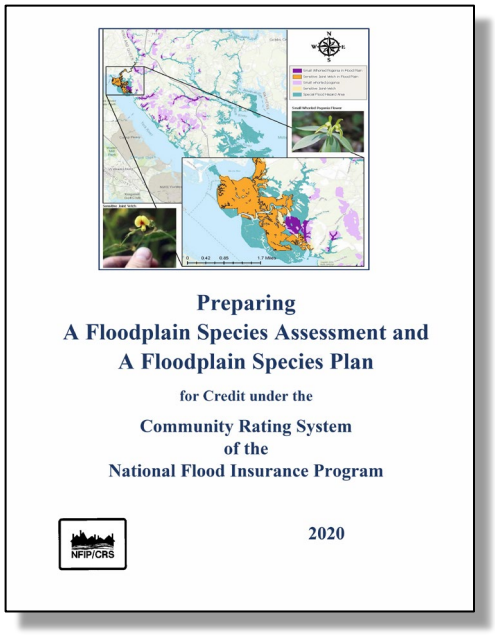
Preparing a floodplain species plan involves researching the selected species' habitat and threats and what actions the FWS and NMFS recommend to help them recover. This information is found in the Services' recovery plans and other species status and recovery documents. The community's floodplain species plan includes information on the species and the general recovery actions appropriate for a local government, and then identifies specific actions the community can undertake. The resulting action plan is usually organized by CRS activity to link the actions with the credits, but not all actions need to be credited by the CRS.

Unlike the assessment, the final floodplain species plan must be adopted by the governing body, which commits the community to implement its plan. As with other CRS-credited plans, the

community staff prepares an annual report that evaluates implementation, which is sent to the elected officials, the media, and FEMA (in the community's annual CRS recertification package).

Help. To help communities prepare a creditable floodplain species assessment and plan, FEMA has provided the following assistance:

- FRESH is a key resource that provides all that is needed for the first steps of the floodplain species assessment (see pages 11–12).
- There is a 22 page step-by-step guide that covers both elements, *Preparing A Floodplain Species Assessment and A Floodplain Species Plan.*
- There are three examples of assessments and plans prepared by different types of communities: Gloucester County and James City County, Virginia; Jefferson Parish, Louisiana; and the City of Monroe, Washington.
- The CRS has periodic webinars on the activities, which are listed on the training page of CRSresources.org.
- The CRS encourages submitting drafts for courtesy reviews, especially before sending them to the governing body. Courtesy reviews are requested through the community's ISO/CRS Specialist.



CRS credit. Details about credit for elements FSA and FSP are found under Activity 510 (Floodplain Management Planning) under the element NFP (natural floodplain functions plan). The maximum credit is 15 points for FSA and 85 points for FSP. Together they form an alternate way to obtain the full 100 points available under element NFP. It should also be noted that a good plan will identify new things to do that are credited under other activities, so preparing a Floodplain Species Plan often results in even more CRS credit.

Summary Table

The following tables summarize the CRS credit points that are available to communities that implement good floodplain management practices that can protect habitat and help reduce and prevent flood damage. The tables (one for each series of CRS activities) show the maximum number of points available under each activity. The average points are the average for the communities that receive that CRS credit, as of April 1, 2022.

		Activity/Element	Average Points	Maximum Points
300 SERIES: PUBLIC INFORMATION ACTIVITIES				
320 Map Information Service				
g	MI7	Natural floodplain functions	20	20
330 Outreach Projects				
a	OP	Outreach projects	98	200
c	PPI	Program for Public Information bonus	66	80
340 Hazard Disclosure				
a	DFH	Real estate agent disclosure of SFHA	25	35
b	ODR	Other disclosure requirements	12	25
c	REB	Real estate brochure	9	12
d	DOH	Disclosure of other hazards	8	8
350 Flood Protection Information				
a	LIB	Library	8	10
b	LPD	Locally pertinent documents in the library	6	10
c	WEB	Website	39	105
400 SERIES: MAPPING AND REGULATIONS				
410 Floodplain Mapping				
a	NS	New study	170	350
d	HSS	Higher study standards	39	200
e	FWS	Floodway standard	114	140
420 Open Space Preservation				
a	OSP	Preserved open space	429	1,450
c	NFOS	Natural functions open space		
		1. Parcels in or restored to natural state	39	190
		2. Parcels designated in a plan	15	50
		3. Parcels designated as critical habitat	10	50
		4. Parcels in designated open space corridor	19	60
d	SHOS	Special hazards open space	67	150

		Activity/Element	Average Points	Maximum Points
e	OSI	Open space incentives	29	250
f	LZ	Low density zoning	200	600
g	NSP	Natural shoreline protection	42	120
430 Higher Regulatory Standards				
a	DL	Development limitations		
		(1)(a) Prohibit filling	218	280
		(1)(b) Compensatory storage	140	130
		(2) Prohibit new buildings	300	1,000
		(3)(b) Prohibit storage of hazardous materials	19	20
b	FRB	Freeboard credits where there is no filling	*	500
c	FDN	Foundation protection where there is no filling	*	80
f	PCF	Protection of critical facilities	30	80
g	ENL	Enclosure limitations (requiring open foundation)	*	240
l	SHR	Special flood-related hazards regulations	70	100
m	TSR	Tsunami hazard regulations	*	50
n	CER	Coastal erosion hazard regulations	*	370
o	OHS	Other higher standards	96	100
450 Stormwater Management				
a	SMR	Stormwater management regulations	100	355
		(3) Low impact development	16	25
b	WMP	Watershed master plan	120	315
c	ESC	Erosion and sedimentation control	18	40
d	WQ	Water quality regulations	20	20
500 SERIES: FLOOD DAMAGE REDUCTION ACTIVITIES				
510 Floodplain Management Planning				
a	FMP	Floodplain management planning	187	382
c	NFP	Natural floodplain functions plan	**23	100
520 Acquisition and Relocation				
	All	Acquisition and relocation of buildings	178	2,250
540 Drainage System Maintenance				
a	CDR	Channel debris removal	153	200
b	PSM	Problem site maintenance	48	50
c	CIP	Capital improvements program	33	70
d	SDR	Stream dumping regulations	24	30
e	SBM	Storage basin maintenance	74	120

* The national database does not separate the credits within these elements.

** Several communities have had courtesy reviews that indicate full credit, but only one of those communities made it through the verification process in time to be in the April 2022 database.

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