420 Open Space Preservation—Summary

Maximum credit: 2,870 points

Note that OSI and LZ are not counted toward the maximum credit because these two elements and OSP are mutually exclusive.

422 Elements

a. **Open space preservation (OSP)**: Up to 1,450 points for keeping land vacant through ownership or regulations.

b. **Deed restrictions (DR):** Up to 50 points extra credit for legal restrictions that ensure that parcels credited for OSP will never be developed.

c. **Natural functions open space (NFOS):** Up to 350 points extra credit for OSP-credited parcels that are preserved in or restored to their natural state.

d. **Special flood-related hazards open space (SHOS)**: Up to 150 points if the OSP-credited parcels are subject to one of the special flood-related hazards or if areas of special flood-related hazard are covered by low-density zoning regulations.

e. **Coastal erosion open space (CEOS):** Up to 750 points if the OSP-credited parcels are subject to coastal erosion.

f. **Open space incentives (OSI)**: Up to 250 points for local requirements and incentives that keep flood-prone portions of new development open.

g. **Low-density zoning (LZ)**: Up to 600 points for zoning districts that require lot sizes of 5 acres or larger.

h. **Natural shoreline protection (NSP)**: Up to 120 points for programs that protect natural channels and shorelines.

Credit Criteria

Each element has a separate section discussing credit criteria.

Impact Adjustment

Each element has a separate section describing the impact adjustment.

Documentation Provided by the Community

Each element has a separate section describing needed documentation.

420 OPEN SPACE PRESERVATION

The OBJECTIVES of this activity are to

(1) Prevent flood damage by keeping flood-prone lands free of development, and

(2) Protect and enhance the natural functions of floodplains.

421 Background

Floods are natural processes and floodplains are necessary to every river and coastal system. A floodplain has been defined as any land susceptible to being inundated by flood waters. Floodplains can also be regarded as the land needed by a river or stream to convey and store flood waters or the coastal areas subject to inundation during a storm.

Preserving the floodplain as open space allows it to serve these primary natural functions and many other important functions. Keeping the floodplain free of development—free of buildings and infrastructure—means that there will be no flood insurance claims, no closed businesses, no homeless residents, no damaged infrastructure, and that the community can return to normal quickly after flooding occurs.

421.a. Activity Description

The maximum credit for Activity 420 is 2,020 points.

Credit is given for areas in a regulated floodplain that are permanently preserved as open space. Additional credit is given for parcels of open space that are protected by deed restrictions or that have been preserved in or restored to their natural state. Credit is also given for measures that require or encourage less development in floodplains, and for the protection of natural channels and shorelines.

The first five elements provide credit for parcels that qualify as preserved open space. The credit can be based on development restrictions placed by the property owners or those found in local regulations.

(1) Open space preservation (OSP) provides credit for keeping vacant lands vacant through ownership by a public agency, non-profit organization (such as a church camp), or restrictive regulations. To qualify, a property must be open, meaning there are no buildings, filling, or storage of materials.

(2) Deed restrictions (DR) provides extra credit for ensuring that parcels credited for OSP will never be developed. This is done via a legal restriction that prevents subsequent owners from changing the use of the property.

(3) Natural functions open space (NFOS) provides extra credit for parcels credited for OSP that are preserved in or restored to their natural state. There are bonus credits for additional attributes of the parcel.

Two elements provide credit for the protection of areas subject to special flood-related hazards and coastal erosion.

(4) Special flood-related hazard open space (SHOS) provides extra credit for OSP-credited parcels that are in areas subject to a special flood-related hazard.

(5) Coastal erosion open space (CEOS) credits a community for protecting areas most at risk from coastal erosion.

The next two elements credit local regulations that encourage minimal floodplain development.

(6) Open space incentives (OSI) credits a community for having requirements and/or incentives that keep flood-prone portions of new developments open through techniques such as density transfers.

(7) Low-density zoning (LZ) provides credit for zoning districts that require lot sizes of 5 acres or larger, resulting in fewer buildings constructed in the floodplain.

The eighth element credits programs that protect natural channels and shorelines. As with the first five elements, this credit can be based on shoreline protection practices put in place by public property owners or on protection requirements embodied in local regulations.

(8) Natural shoreline protection (NSP) credits programs that protect natural channels and shorelines, the areas most valuable for protecting the natural functions of floodplains. The programs can be local policies that are adhered to on public lands and/or regulations that govern development on private lands.

At the time of the verification visit, the ISO/CRS Specialist will review the documentation and visit a sample of the parcels in the field.

422 Elements

422.a. Open space preservation (OSP)

The maximum credit for this element is 1,450 points.

OSP credits preserved open space in the floodplain. The objective of open space preservation is to prevent or minimize development in the regulatory floodplain that obstructs floodwaters; exposes insurable buildings to damage; is subject to erosion or other flood-related hazards; or adversely affects water quality, water quantity, or other floodplain functions.

NOTE: *A community does not need to prohibit all use of private property to obtain CRS credit. Communities are advised to have their attorneys or corporation counsels ensure that their regulations that prevent construction of buildings or the placement of fill in hazardous areas do not constitute a taking of private property.*

Several different methods of preserving floodplain lands as open space (OSP) are recognized. To be

termed "open space," the land must be free from buildings, filling, significant pavement, or other encroachment to flood flows. To be considered "preserved," there must be a signed statement from a public or creditable private owner or regulations that prohibit buildings, filling, or other encroachments on flood flows.

Each parcel that qualifies as preserved open space is plotted on a map. The area of the parcel within the regulatory floodplain portion is calculated. The total area of preserved open space is divided by the total area of the Special Flood Hazard Area (SFHA) in the impact adjustment step. The result is a ratio that is used to determine the total credit for OSP.

Credit Criteria for OSP

(1) The parcel must be located in the community's regulatory floodplain, which means that the parcel is located in either

   (a) The SFHA as shown on the community's Flood Insurance Rate Map (FIRM), or

   (b) A floodplain outside the SFHA where the community enforces development regulations similar to those enforced for new development in the SFHA. The community must map the area and document its floodplain management regulations.

(2) The parcel must be "open space," meaning there are no buildings, storage, filling, significant pavement, or other encroachment to flood flows. Simply having vacant land in the floodplain does not qualify for open space credit. Six types of properties in particular are NOT counted for this activity:

   (a) Properties not counted in any calculations for the 400 series of Community Rating System (CRS) activities. This includes large bodies of water, federal lands, and other types of property as explained in Section 403. When plotting open space lands, these excluded areas should be marked on the impact adjustment map to ensure that they are not mistakenly included in the calculations. See Section 403 for more information.

   (b) Areas with impervious surfaces. Parking lots and streets do not qualify. For example, if a parcel such as a park has a parking lot, a paved tennis court, and a paved road, those areas must be excluded from the area calculations in the impact adjustment. Minor areas, such as sidewalks, trails, or pervious pavements, do not need to be excluded.

   (c) Areas with buildings on them. See Section 301 for a discussion of "buildings." Insurable buildings on parcels larger than 10 acres will not disqualify a lot, provided that the building is "a necessary appurtenance" of the open space use. Open pavilions and similar structures are not insurable buildings as defined in Section 301 and they do not disqualify a parcel for this credit. However, their roofs are impervious surfaces and their area must be deducted from the parcel's area calculations.

Example 422.a-1.

1. If a large city park has a swimming pool, the park can be counted as open space even though it may have a building with restrooms, lockers, and clothes-changing areas. If it has a paved parking lot, however, the area of that impervious surface must be deducted from the credited area of open space.

2. A 12-acre park that includes the first settler's home or other historical building that is an integral part of the park can still be considered OSP.

3. A ranger's cabin will not disqualify a state forest for OSP credit.

4. A school playing field can be credited if there are no insurable buildings on it. Structures like bleachers or fences are not "buildings" as defined in Section 301. The areas of any impervious surfaces, such as a basketball court and parking lot, are deducted from the total area of creditable open space.

(d) Parcels on which fill or other encroachments may be placed. One of the objectives for preserving open space is to prevent increased flood damage from future development. Even though insurable buildings may not be allowed, filling, dumping, or storage on a lot can aggravate flood problems on other properties.

For example, an open area that is used for temporary storage of rock or construction materials does not qualify as open space. Plowing and other alterations of the ground are not counted as filling, provided that they do not create obstructions to the flow or loss of storage of flood waters.

Certain types of fill related to flood protection can be allowed without losing the OSP credit. Examples include construction of sand dunes, beach nourishment, and habitat restoration projects. However, with the exception of habitat restoration projects, the properties on which these activities take place would not be eligible for natural functions open space credit (NFOS).

(e) Streets, pavement, parkway, railroad, levee, canal, ditch, and channel rights of way. Such narrow, linear strips of utility easements or publicly owned property are excluded from consideration as open space because they are necessary to serve the development or use of an area.

Such properties with pervious surfaces may be included in the open space calculation if they are an integral part of a larger open space area or a designated public greenway. Narrow greenways that parallel a river or shoreline may be counted as open space provided that they allow public access, even if they are recorded or

considered as drainage easements or channel rights of way. The CRS encourages programs that bring people closer to the water so they learn to appreciate floodplains and their natural functions.

(f) Publicly owned property that is not intended for open space use, such as a vacant lot in an industrial park. One of the keys to the open space credit is the fact that the area will remain open space, not just that it is owned by a public agency. Therefore, areas set aside by a developer or a public agency only until future economic or other conditions allow it to be developed, are excluded.

(3) The parcel must be "preserved" as open space. This criterion may be met in one of three ways:

(a) Public land, such as state and local parks and easements, can qualify if the owning agency states in writing that the lands are intended to be kept as open space. As noted in Section 403, there is no open space credit for federal lands. Examples of such creditable open space parcels include, but are not limited to

- City and county parks and forest preserves,
- State parks and state forests,
- Publicly owned beaches or natural areas,
- School playing fields, and
- Floodplain easements dedicated to the community by developers.

(b) Private wildlife or nature preserves that are maintained for open space purposes can qualify if the owner states in writing that they are intended to be kept as open space. Examples of such creditable open space parcels include, but are not limited to

- Church retreats,
- Hunting club lands,
- Golf courses owned by nonprofit associations,
- Audubon Society preserves, and
- Boy Scout or Girl Scout camping areas.

A parcel set aside by a developer as a temporary "preserve" until the area develops is not considered preserved open space.

(c) Open space areas subject to land development regulations that prohibit buildings and filling can qualify for OSP. The credit criteria are the following:

- The regulations must prohibit construction of new buildings;
- The regulations must prohibit filling, grading, or other activities that obstruct flood flows or remove flood storage in areas subject to riverine flooding;
- The area where the regulations are in effect must be mapped or defined by lots or a legal description so it can be mapped. For example, a wetlands regulation

that is dependent upon site analysis to define whether a property is a wetland is not acceptable;

- The maintenance of existing levees and engineered dune and beach nourishment programs within the area is permissible;
- Credit is only given for such regulated lands that are vacant at the time of application for CRS credit; and
- If an ordinance prohibits residential development in the V Zone, floodway, or other portion of the regulatory floodplain, the community may request OSP credit for all areas that are zoned for residential use only.

Examples of such regulations include, but are not limited to

- State or local regulations that prohibit buildings and filling in the floodway,
- State or local regulations that prohibit buildings and filling in wetlands or other designated natural areas,
- Coastal construction setback lines that prohibit buildings, and
- Streamside buffers and setback regulations (provided that they prohibit buildings and filling).

Below are some examples of regulations that would NOT qualify for credit. This is not a comprehensive list.

- The Coastal Barrier Resources Act is not acceptable because it does not prevent construction of buildings; it only denies federal support for new development.
- Florida's Coastal Construction Control Line does not qualify because it does not prohibit buildings, it only requires a state permit for buildings. However, more restrictive local regulations could qualify.
- Ordinance language prohibiting structures that may cause obstructions in the floodway is not credited because such a prohibition is a requirement of the National Flood Insurance Program (NFIP). Most floodway regulations allow buildings in the floodway if the applicants can show that they cause no obstruction or if a Conditional Letter of Map Revision (CLOMR) or Letter of Map Revision (LOMR) is obtained.

Open space subdivision design, cluster development, transfers of development rights, and planned unit developments are regulatory approaches that can require or encourage developers to set aside floodplains and other areas as dedicated open space. Unless the regulations specifically identify certain undeveloped floodplains and mandate that they be set aside, there is no OSP credit for these regulations because there is no assurance that the developer will set aside specific areas. However, such regulations are credited under Section 421.e, open space incentives (OSI). Once the parcel is set aside and preserved as open space, it may qualify for OSP credit as publicly owned land.

Example 422.a-2.

In a strip of single-family lots along a stream, each lot has a house situated in the floodplain fringe. There are no buildings in the floodway, and the community's regulations prohibit fill, paving, storage, and the placement of new buildings in the floodway. The open space area, the floodway, is currently vacant and the regulations will keep it open, so it can be credited.

Credit Points for OSP

OSP = 1,450 points, based on the amount of the SFHA that is preserved as open space

Impact Adjustment for OSP

OSP credit is adjusted based on the ratio of preserved open space areas in the regulatory floodplain to the area of the SFHA. Section 403 has additional information on impact adjustments for areas. The areas qualifying for OSP need to be marked on an impact adjustment map.

$$rOSP = \frac{aOSP}{aSFHA}$$, where

aOSP = the size of the area(s) preserved as open space (OSP) in the regulatory floodplain, and

aSFHA = the size of the community's SFHA shown on its FIRM

Because OSP can include areas of the community's regulatory floodplain that are outside the SFHA, it is possible that aOSP can be greater than aSFHA. In those cases, rOSP can be as large as 1.5. Note that studies done to delineate those regulated floodplains outside the SFHA can generally be credited under Activity 410 (Flood Hazard Mapping).

NOTE: *The community's aSFHA should be reviewed and updated each year for the Program Data Table that is included in the annual recertification (see Section 213.a).*

Example 422.a-3.

South Scottsdale is a fictitious community used for CRS examples (see Figure 420-1). The City has three areas that qualify for OSP:

1. Much of the north part of the Indian Bend Wash floodplain has been purchased and cleared to form a string of parks. The property boundaries of the park have been outlined in green and the areas in the floodway and flood fringe are shaded in green on the map in Figure 420-1.

2. The area along the south part of Indian Bend Wash was owned by a large development corporation. When the corporation wanted to develop a 640-acre tract in another part of the City, the City offered to allow a higher density of development on that tract if the corporation set aside its Indian Bend Wash holdings. The corporation agreed. It deeded the floodplain portion to the country club to which most of the board members belonged. There is a deed restriction that the area must forever remain as a golf course. The corporation then developed the areas to the east and west and received a higher price for the lots that backed up on the golf course than it could have received for lots if the floodplain had been developed.

3. Ten years ago, the City amended its floodplain management regulations to prohibit new buildings, critical facilities, filling, or storage of materials in the regulatory floodway. The areas that were not developed at the time of the amendment are shaded in green on the map in Figure 420-1. Most of these areas are along McCormick Creek.

All three types of preserved open space qualify for OSP credit. The table shows South Scottsdale's open space, and the spaces are shown in Figure 420-1.

Location	Parcel Owner	Land Use	Total Open Space (acres)	Acres in the Regulatory Floodplain (OSP)	Acres Deed Restricted (DR)	Acres of Natural Functions Open Space (NFOS)
City Parks	City	Public parks	236	143.2		
Country Club	South Scottsdale Country Club	Golf course	73	55.3	55.3	
Indian Bend Wash Floodway	Private	Residential/ commercial	29.1	29.1		
McCormick Creek Floodway	Private	Residential	15.3	15.3		
TOTALS				**242.9**	**55.3**	
Tributary A	OSI4		88.7			
Tributary A	OSI5		88.7			

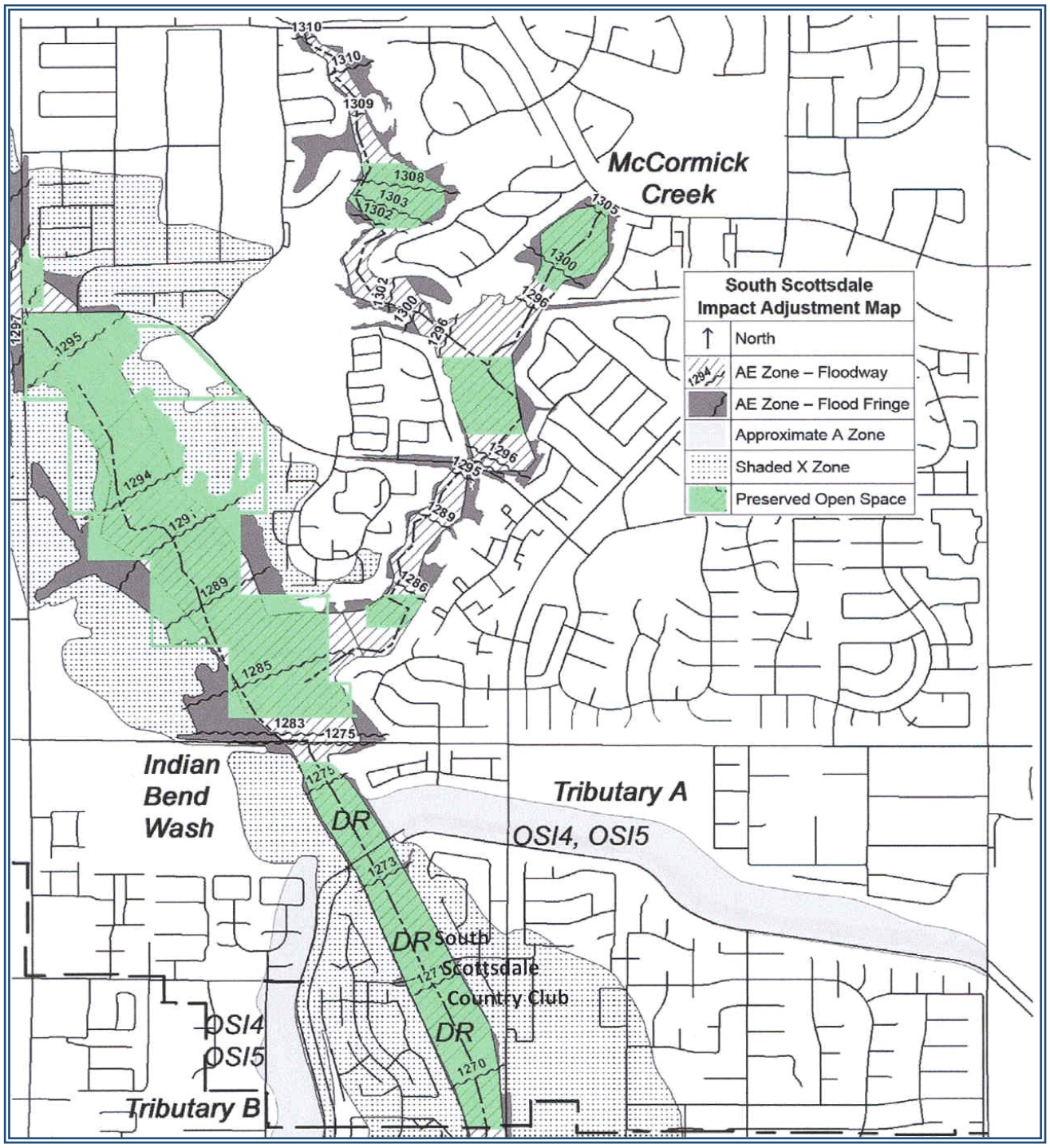


Figure 420-1. South Scottsdale's impact adjustment map for Activity 420.

OSP = 1,450 (before the impact adjustment)

aOSP = 143.20 + 55.30 + 44.40 = 242.90 acres

aSFHA = 504.40 acres (see Figure 410-5)

$$rOSP = \frac{aOSP}{aSFHA} = \frac{242.90}{504.40} = 0.48$$

The formula in Section 423, Credit Calculation, calls for multiplying the value for preserving open space (1,450) by the ratio for rOSP, 0.48. The credit for South Scottsdale's open space, cOSP, is 48% of 1,450.

Note that if South Scottsdale enforced floodplain management regulations throughout the SFHA and the shaded X Zone, then the area calculations for the parks would include the X-Zone portions. This would provide a larger numerator (aOSP), but the denominator (aSFHA), would not change. The result would be a larger ratio and, therefore, more points.

Documentation for OSP Provided by the Community

(1) At each verification visit,

(a) A map (or set of maps) and a list of parcels that notes which parcels qualify for OSP, DR, NFOS, SHOS, or CEOS credit. The map(s) and list must correspond to each other. Each parcel or group of parcels must be labeled on the map. The list must include, at a minimum, parcel owner, land use designation, acreage of parcel, and acreage of the parcel within the SFHA. If a community regulates outside of the SFHA, the acreage of the parcel in the regulatory floodplain and the flood zone of the parcel must also be included. This means that parcels located in the X Zone should not be included unless the regulatory floodplain is greater than the SFHA. An Excel spreadsheet list is preferred.

(b) For each parcel that is preserved as open space because of ownership (Section 422.a, credit criterion (3)(a) or (b)), documentation that the owner will keep the parcel open.

(c) For each parcel that is preserved as open space because of a regulatory requirement (Section 422.a, credit criterion (3)(c)), the ordinance language that prohibits structures and fill in part or all of the regulatory floodplain. See also Sections 231.b and c on documenting regulatory language.

(d) For each parcel that is preserved as open space outside the SFHA, documentation showing that floodplain regulations are in effect in the area.

(e) An impact adjustment map.

The ISO/CRS Specialist may visit a sample of the sites to verify that they meet the element's credit criteria.

Documentation can be digital or hard copy.

422.b. Deed restrictions (DR)

The maximum credit for this element is 50 points.

Just because an open space parcel is a city park today, that does not necessarily mean that there is any legal restriction that keeps a city council from building on it or selling it for development. This element provides additional credit for areas of the regulatory floodplain that have the assurance that the parcel will always remain open: a deed restriction (DR).

Credit Criteria for DR

(1) All areas to be credited for DR must first qualify for OSP credit. If only a portion of a parcel qualifies for OSP, only that portion can qualify for DR.

(2) There must be language attached to the deed for the parcel that prohibits new buildings. The exact language for a legal arrangement or deed restriction will vary from state to state and should be prepared by a local attorney. It should include three features:

(a) No new buildings may be allowed on the property;

(b) The restriction runs with the land; and

(c) The restriction cannot be changed by a future owner; rather, it can only be amended by a court for just cause.

More common examples of deed restrictions include, but are not limited to

- Property donated by a person or family for park purposes often has the stipulation that it be used only for public recreation;
- Properties purchased with funds from the Federal Emergency Management Agency's (FEMA's) mitigation grant programs qualify for this credit because the titles have a deed restriction that prohibits construction of buildings on the parcel in the future;
- Public lands that were improved with assistance from a state or federal open space or recreational program often have a deed restriction requirement as a condition of funding; and
- A community, other agency, organization, or owner may attach such a restriction to its existing parks and other public open areas in order to receive the deed restriction credit.

Regulatory requirements for easements or other dedications do not qualify for DR credit. DR credit is for a requirement that is filed or recorded with the deed, and cannot be removed by ordinance or other action except by a court order. Although a subdivision ordinance requirement may qualify for OSI, to be eligible for DR credit, the parcel must have been platted and the restrictions on developing it recorded.

After a subdivision is platted, some parcels may be set aside as a park, an easement, retention basin, or other open space purpose. This does not automatically receive DR credit.

Documentation is needed that shows that the community or property owner (e.g., the homeowners association) is not free to sell or build on the property.

Credit Points for DR

DR = 50 points

Up to 50 points are provided for this element, based on the amount of the SFHA that is preserved as open space with deed restrictions. Note that every parcel for DR credit must have already qualified for OSP credit.

Impact Adjustment for DR

DR credit is adjusted based on the ratio of preserved open space areas with deed restrictions to the area of the SFHA. The areas qualifying for DR need to be marked on the impact adjustment map prepared for OSP. Note that every parcel for DR credit must already qualify for OSP credit.

$$rDR = \frac{aDR}{aSFHA}, \text{ where}$$

aDR = the size of the area(s) that qualify for deed restriction credit (DR), and

aSFHA = the size of the community's SFHA shown on its FIRM

rDR cannot be greater than rOSP

Example 422.b-1.

The South Scottsdale Country Club was deeded floodplain property owned by a large development corporation. There is a deed restriction specifying that the area must forever remain as a golf course. The area qualifies for both OSP and DR.

DR = 50 (before the impact adjustment)

The area of the floodplain portion of the South Scottsdale Country Club is

aDR = 55.3 acres

aSFHA = 504.4 acres (see Figure 410-5)

$$rDR = \frac{aDR}{aSFHA} = \frac{55.30}{504.40} = 11.00$$

According to Section 423, Credit Calculation, the value for deed restrictions (50) is multiplied by the ratio for rDR, 0.11.

Documentation for DR Provided by the Community

(1) At each verification visit,

(a) A list of the parcels that have qualifying deed restrictions, and copies of the deeds that are requested for review. The language that qualifies must be marked. DR credit can only be documented with a copy of the actual deed restriction. An ordinance requiring deed restrictions or dedication of easements is not adequate documentation that there is a permanent legal restriction that prevents future owners from developing that property.

(b) The impact adjustment map used for OSP credit, with "DR" marked on the qualifying areas.

422.c. Natural functions open space (NFOS)

The maximum credit for this element is 350 points.

The more commonly considered natural floodplain functions are listed in the box. There are three reasons why preserving open spaces that support these functions warrant the additional credit available under this element.

(1) More and more studies are showing that natural open space can be more effective at controlling or attenuating flooding and is less expensive over the long run than traditional manmade flood control structures.

(2) Local officials and their constituents who are aware of the benefits that naturally functioning floodplains provide to their communities want to protect them. This can generate a continuous level of interest to protect floodplains in order to support local economies or improve recreational opportunities. This interest level persists between infrequent floods, adding to the attention and resources available for flood loss reduction efforts.

(3) Disrupting natural features has adverse impacts on the flooding regime.

Some Natural Functions of Floodplains

WATER RESOURCES

Natural Flood and Erosion Control

- Provide flood storage and conveyance
- Reduce flood velocities
- Reduce peak flows
- Reduce sedimentation

Water Quality Maintenance

- Filter nutrients and impurities from runoff
- Process organic wastes
- Moderate temperature fluctuations

Groundwater Recharge

- Promote infiltration and aquifer recharge
- Reduce frequency and duration of low surface flows

BIOLOGICAL RESOURCES

Biological Productivity

- Promote vegetative growth through rich alluvial soils
- Maintain biodiversity
- Maintain integrity of ecosystems

Fish and Wildlife Habitats

- Provide breeding and feeding grounds
- Create and enhance waterfowl habitat
- Protect habitats for rare and endangered species

– *A Unified National Program for Floodplain Management*
FEMA-248 (1994)

Accordingly, NFOS credits areas preserved as open space (OSP) where the natural floodplain functions are also preserved or restored. NFOS credit is in addition to OSP. Note that other programs to support natural floodplain functions in the watershed (outside the floodplain), such as low impact development and preserving natural flood storage areas, such as wetlands, can be credited under Activity 450 (Stormwater Management).

Credit Criteria for NFOS

(1) For all NFOS credit:

(a) All areas to be credited for NFOS must first qualify for OSP credit; If only a portion of a parcel qualifies for OSP, only that portion can qualify for NFOS.

(b) Credit for NFOS1 is a prerequisite for the rest of the credits;

(c) The property must be managed to stay in the natural state or otherwise managed to keep its designation; and

(d) The areas qualifying for each credit need to be marked on the impact adjustment map prepared for Activity 420 .

(2) NFOS1: Credit is provided if parcels with OSP credit are in an undeveloped natural state or have been restored to a natural state.

The following types of open space in a community's regulatory floodplain can receive NFOS1 credit.

- Areas in their undeveloped natural state (i.e., areas that have not been built on, graded, or farmed).
- 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.
- Areas designated as worthy of preservation for their natural functions by a federal, state, or nationally recognized private program. Examples of such programs include, but are not limited to
    - State sensitive-areas programs that place development restrictions on designated properties;
    - The Nature Conservancy's Heritage Program Inventory; and

> Surface waters, their floodplains, and watersheds are parts of a broader, single system. This interaction of land and water exists in a state of dynamic equilibrium. If a component of the natural system is disturbed, the entire system works to readjust towards a new equilibrium. This is true of riverine and coastal systems alike. The effects of a system's readjustment are often felt far from the original site of the disturbance and can last for decades.
>
> —*The Natural and Beneficial Functions of Floodplains: Reducing Flood Losses by Protecting and Restoring the Floodplain Environment*, FEMA-409 (2002)

- The U.S. Fish and Wildlife Service's Threatened and Endangered Species' Critical Habitat Designations (some designations may also qualify the parcel for credit under NFOS3).

The following types of open space usually would NOT receive NFOS1 credit, unless additional information was supplied that showed that the above criteria are met.

- Areas designated only as "scenic," as historically significant, or as outstanding canoeing or boating streams.
- Areas developed and maintained for recreational uses, such as golf courses, groomed beaches, and zoos.
- Forests where unrestricted commercial clear cutting is allowed (sustainable forestry practices that preserve natural functions may be recognized).
- Dune and beach nourishment projects that involve filling, snow fences, or other artificial constraints on natural dune migration or beach erosion.

(3) NFOS2: Credit is provided if parcels credited as NFOS1 are also designated in a plan to protect natural functions. The plan must meet the criteria for a natural floodplain functions plan (NFP) credited in Activity 510 (Floodplain Management Planning).

(4) NFOS3: Credit is provided if parcels credited as NFOS1 are designated as critical habitat for threatened or endangered species or if the species is present. "Threatened or endangered species" include those already on a federal or state list and those on an official federal or state list of "species of concern."

(5) NFOS4: Credit is provided if parcels credited as NFOS1 are also in a designated open space corridor or connected network. This credits a designated open space corridor or connected network of wetlands, woodlands, wildlife habitats, wilderness, and other areas that support native species, maintain natural ecological processes, and sustain air and water resources. "Designated open space corridor" means the property has been identified for its corridor or network value in an approved plan. Such a network sometimes is called "green infrastructure."

Credit Calculation for NFOS

NFOS = the sum of the following

NFOS1 = 190 points, for having parcels that qualify as OSP in or restored to their undeveloped natural state

NFOS2 = 50 points, for having parcels that qualify as NFOS1 designated in a natural floodplain functions protection plan

NFOS3 = 50 points, for having parcels that qualify as NFOS1 designated as critical habitat for threatened or endangered species

NFOS4 = 60 points, for having parcels that qualify as NFOS1 also in a designated open space corridor

Impact Adjustment for NFOS

NFOS credit is adjusted based on the ratio of preserved open space areas that qualify for each sub-element (NFOS1, NFOS2, etc.) to the area of the SFHA.

$$rNFOS\# = \frac{aNFOS\#}{aSFHA}, \text{ where}$$

aNFOS# = the size of the area(s) that qualifies for NFOS credit (aNFOS1 is the area of all parcels that qualify for NFOS1 credit, etc.) and

aSFHA = the size of the community's SFHA shown on its FIRM

rNFOS# cannot be greater than rOSP

Documentation for NFOS Provided by the Community

(1) At each verification visit,

(a) For each parcel, documentation that supports credit under NFOS1 and any additional credit requested. The document must describe the natural floodplain functions of the parcel. The document can be

(i) A report or plan prepared by a qualified agency, such as a habitat conservation plan, a natural areas inventory, green infrastructure plan, etc., that includes the property to be credited, or

(ii) A memo or letter signed by a professional in a natural science such as botany, biology, forestry, or landscape architecture. The sample natural floodplain functions form shown in Figure 420-2 can also be used.

(b) [For NFOS2] A copy of the plan and the resolution or other formal adoption action. This is not needed if the plan is submitted for NFP credit under Activity 510 (Floodplain Management Planning).

(c) [For NFOS3] Documentation of which endangered or threatened species are present and documentation from a federal or state wildlife agency that the species has been listed.

(d) [For NFOS4] A copy of the appropriate open space corridor plan.

(e) The impact adjustment map and inventory used for OSP credit, with "NFOS#" marked on the qualifying areas.

The ISO/CRS Specialist may visit a sample of the sites to verify that they meet the element's credit criteria.

Natural Floodplain Functions Form

Property name	Pettaway County Park
Property location	1 mile northeast of Frenchford, on the Pettaway River
Summary of the habitat or natural benefits provided at this property	Pettaway Park was created in 1954 in order to protect the area from the booming logging industry. The area has never been developed or farmed. It lies at the headwaters of the Pettaway River and consists of bottomlands, ravines, white-oak forest interspersed with marsh and meadows. It is a stop on the Mississippi Flyway for migrating birds, including sandhill cranes. In 2002, a white winged wood duck (*Cairina scutulata*), an endangered species, was spotted in the park. The park's Nature Center houses a variety of exhibits, nature displays, maps, photographic studies, and a research library. The Nature Center also offers a variety of nature-oriented programs for families and adults such as owl prowls and astronomy programs.
Name of person completing this form	Jonathon Richards, ASLA
Signature	*Jonathon Richards*
Degree or other qualifications	Bachelor of arts from Wall State University in landscape architecture, 1990. Registered landscape architect. Planner and then Director of natural area programs for Delaware County since 1994.

Figure 420-2. An example of a form to inventory natural floodplain functions.

422.d. Special flood-related hazards open space (SHOS)

The maximum credit for this element is 150 points.

The CRS offers credit for open space preservation and low-density zoning in areas subject to the following special flood-related hazards:

1. Uncertain flow paths (alluvial fans and channel migration);
2. Closed basin lakes;
3. Ice jams:
4. Land subsidence;
5. Mudflows; and
6. Tsunamis.

Credit Criteria for SHOS

(1) The area must qualify for OSP credit.

(2) The area must be included in a special hazard area map.

(3) The area must be subject to special hazard-specific regulations credited under Activity 430 of at least 20 points before the impact adjustment.

Credit Calculation for SHOS

$$cSHOS = \frac{aSHOS \times 150}{aSFHA}, \text{ where}$$

aSHOS = the area of special hazards-prone open space, and

aSFHA = the size of the community's SFHA shown on its FIRM

Note that aSHOS may be extended into areas outside the aSFHA, therefore aSHOS divided by aSFHA may exceed 1.0. However aSHOS plus aSHR (under Activity 430) divided by aSFHA may not exceed 1.5.

Documentation for SHOS Provided by the Community

(1) At each verification visit,

(a) Documentation that shows that the area meets OSP requirements;

(b) Documentation that the area for which open space credit is requested lies within the mapped special hazard.

(c) A copy of the special hazards regulations that would apply to the area if it were not open space.

422.e. Coastal erosion open space (CEOS)

The maximum credit for this element is 750 points.

The CRS offers credit for open space preservation of areas subject to coastal erosion.

Up to 750 points are provided for the preservation of open space within a community's mapped coastal erosion hazard area. Qualifying areas must be landward of a coastline eroding at a rate greater than or equal to 1.5 feet per year and qualify for OSP credit.

Designated open space may include areas protected by coastal construction setbacks, but creditable setbacks must prohibit all buildings or other encroachments. Regulations merely requiring permits for construction in certain areas are not sufficient for CEOS credit.

Dune and beach areas preserved in their natural undeveloped state may also qualify for natural functions open space (NFOS) and natural shoreline protection (NSP) credit.

Credit Criteria for CEOS

(1) The area must be seaward of an area that is eroding at a rate greater than or equal to 1.5 feet per year.

(2) The area must qualify for OSP credit.

(3) The community must earn at least 25 points for mapping coastal erosion hazard areas (MCE) in Section 412.f.

(4) The community must receive at least 10 points for keeping maps updated (EDM) in Section 442.d.

(5) The community must receive at least 20 points for its coastal erosion regulations (CER) in Section 432.n.

Credit Calculation for CEOS

$$cCEOS = \frac{aCEOS}{aCE} \times \frac{LCE}{LC} \times \frac{(year\ (projected) - year\ (current))}{100} \times CFSL \times 500,$$

where

aCEOS = the size of the area(s) that qualifies for CEOS,

aCE = the size of the community's coastal erosion hazard area,

LCE = the length of coastline eroding at ≥ 1.5 feet per year,

LC = the total length of the coastline,

year (projected) = the year to which the location of the erosion reference feature is projected,

year (current) = the year the credit is requested or verified, and

CFSL = the multiplier for consideration of future sea level

The multiplier CFSL is:

1.2, for using the NOAA "intermediate-high" projection for the year 2100 and

1.5, for using the NOAA "high" projection for 2100

See Section 404 for guidance on using sea level rise projections for CRS purposes.

Documentation for CEOS Provided by the Community

(1) At each verification visit,

(a) A map identifying the coastal erosion hazard areas.

(b) A map showing open space with the coastal erosion hazard areas and the size of each.

(c) Documentation that the area meets OSP requirements.

(d) Documentation that the community received at least 25 points for MCE in Section 412.f, 20 points for CER under Section 432.n, and 10 points for EDM in Section 442.d.

422.f. Open space incentives (OSI)

The maximum credit for this element is 250 points.

Most communities have undeveloped areas that are not preserved as open space through one of the means recognized under OSP. The CRS recognizes that there are many tools that can encourage the owners to keep the floodplain open when a site is developed. These can include

- Density transfers,
- Transfers of development rights (TDRs),
- Bonuses for avoiding the floodplain or other sensitive areas,
- Planned unit developments (PUDs),
- Cluster development,
- Greenway and setback rules, and
- Open space ratio credits for open space in the floodplain.

The end results of these different approaches are similar. Examples are shown in Figure 420-3.

A community can receive OSI credit for regulations that encourage developers to set aside flood-prone areas as flowage easements and then, once a parcel is appropriately deeded, the community can receive credit under OSP (and possibly DR and/or NFOS) for that site.

These regulations do not have to be enacted for floodplain management purposes. Many communities have adopted them for farmland preservation, protection of sensitive areas, and even for economic reasons. For example, developments such as the example cluster plan in Figure 420-3 have shorter streets, resulting in lower maintenance, cleaning, and snow plowing costs for the community.

If a community's program uses an approach to minimize development or disturbance in the floodplain that is not described here, it should be submitted for scoring in accordance with Section 113.d.

Most of the regulations credited for OSI address subdivisions and larger developments, where the developer has the option of leaving some of the land vacant. If a community's regulatory program effectively prohibits all new buildings from the floodplain, the community should apply for open space preservation credit under OSP.

Credit Criteria for OSI

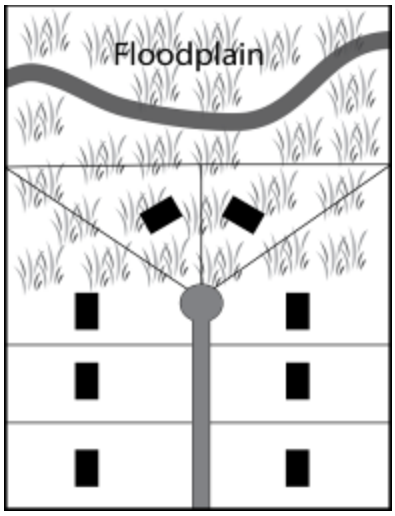
(1) For full credit for OSI, regulations must clearly apply to both new development and re-development, and there must be undeveloped areas within the community's regulatory floodplain. OSI credit is prorated if the regulations do not apply to redevelopment.

(2) If a community has no vacant land suitable for a subdivision or other large development, OSI credit will be prorated. If the regulations do not clearly state that they apply to redevelopment projects, then the community must provide a statement from its attorney that the regulations apply to redevelopment projects in order to receive OSI credit.

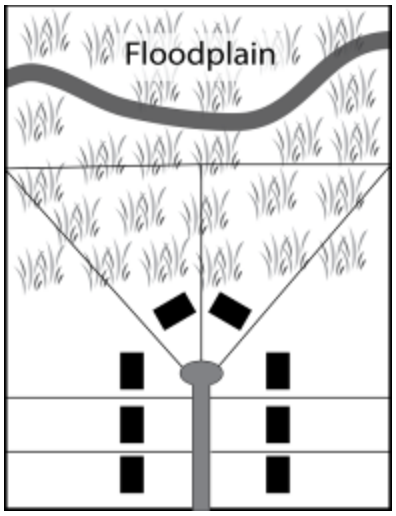
(3) OSI1: Credit is provided if the regulations set aside all of the regulatory floodplain in a subdivision as open space (such as drainage or flowage easements or back yards) or otherwise keep them free from development. Regulations that meet OSI1 criteria do not qualify for OSP credit. However, after a subdivision's final plat is recorded, the areas set aside could qualify for OSP credit.

Some variations to this credit include

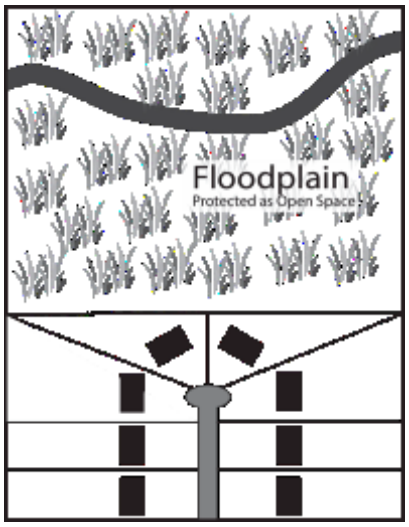
- The credit can be prorated if smaller areas are set aside;
- If the community requires that 50% of the floodplain be kept open, then 50% of the area is credited; and
- If the requirement is limited to one or two zoning districts, the credit can be prorated accordingly.



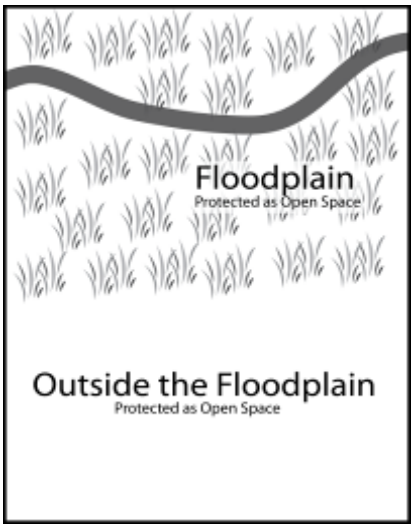
Traditional approach: Some new lots and house sites are within the regulatory floodplain.



Building protection: All buildings are on high ground, outside of the regulatory floodplain. Portions of some lots are within the floodplain and therefore still may be subject to development, filling, and grading that reduce natural floodplain functions and increase flood risk.



Clustering: All buildings and lots are clustered outside of the regulatory floodplain. The development has the same density as the first two graphics, but with smaller lot sizes. All of the land in the regulatory floodplain is preserved as open space.



Transfer of development rights: The community provides the developer an incentive to dedicate the entire parcel for open space, such as allowing a higher density development at another location, well away from the flood hazard area.

Figure 420-3. Alternative ways to develop a property that is partially flood-prone.

(4) OSI2: Credit is provided if the regulations require that each lot in a new subdivision provide a building site that is on natural high ground, out of the regulatory floodplain. This credit is not provided if filling the floodplain (or cutting and filling) is allowed to meet the building site requirement or if a Letter of Map Revision based on Fill (LOMR-F) is required.

Example 422.f-1.

Ordinance language might read:

If a parcel has a buildable site outside the Regulatory Floodplain, it shall not be subdivided to create a new lot, tract, or parcel with a building site plan that does not have a buildable site outside the Regulatory Floodplain. This provision does not apply to lots set aside from development and preserved as open space.

(5) OSI3: Credit is provided if the regulations state that TO THE EXTENT POSSIBLE, each lot in a new subdivision must provide a building site that is on natural high ground, out of the regulatory floodplain. If a lot does not have a buildable site out of the regulatory floodplain, all new structures, pavement, and other development must be sited where they have the least impact on habitat. This can be done by locating the structures as far from the water body as possible or placing the structures on the highest land on the lot.

(6) OSI4: Credit is provided if the regulations include transfer of development rights language or a density bonus to encourage staying away from the floodplain. Fewer points are provided for transfer of development rights or a density bonus within the same development.

Example 422.f-2.

Ordinance language might read:

The proposed subdivision should have one or more new lots in the Regulatory Floodplain set aside for open space use through deed restriction, easement, subdivision covenant, or donation to a public agency. The density of the development in the portion of the development outside the Regulatory Floodplain may be increased to compensate for the amount of land in the Regulatory Floodplain preserved as open space in accordance with _____(section of the community's zoning or other development ordinance that allows PUDs and/or transfers of development rights).

(7) OSI5: Credit is provided for regulations that allow cluster development through a planned unit development (PUD) or otherwise.

(8) OSI6: Credit is provided for a program that provides tax incentives to keep land open, such as keeping farmland tax rates low when the owner signs an agreement to not develop it or not to sell it for development. If the program results in permanent preservation of open space, each qualifying parcel should be credited under OSP and, if appropriate, DR.

(9) OSI7: Credit is provided if the community's land use plan recommends open space use or low-density development of flood-prone areas.

Credit Points for OSI

OSI1 = 250 points, for regulations that set aside all of the regulatory floodplain in a subdivision as open space

OSI2 = 150 points, for regulations that REQUIRE each lot in a new subdivision to provide a building site that is on natural high ground, out of the regulatory floodplain

OSI3 = 65 points, for regulations that require that, TO THE EXTENT POSSIBLE, each lot in a new subdivision provide a building site that is on natural high ground, out of the regulatory floodplain, or that otherwise does not adversely affect natural floodplain functions

OSI4 = 70 points, for having regulations that provide for transfers of development rights or density bonuses to encourage staying out of the regulatory floodplain. This credit can be up to 50 points if the bonus allows increased density within the same development

OSI5 = 25 points, for regulations that allow cluster development through PUDs or other means

OSI6 = 25 points, for a program that provides tax incentives to keep land open

OSI7 = 10 points, if the community's land use plan recommends open space use or low-density development of flood-prone areas

Impact Adjustment for OSI

OSI credit is adjusted based on the ratio of the area affected by the OSI regulation to the area of the SFHA.

(1) The areas covered by the regulation(s) need to be marked on the impact adjustment map prepared for OSP.

(2) The first four sub-elements (OSI1, OSI2, OSI3, and OSI4) are mutually exclusive. That is, a community can only receive one of these credits for an area. However, a community could receive credit for one of these four plus OSI5, OSI6, and/or OSI7 in the same area.

(3) There is no impact adjustment for OSI7.

$$rOSI\# = \frac{aOSI\#}{aSFHA}, \text{ where}$$

aOSI# = the size of the area(s) that qualify for OSI# credit (aOSI1 is the size of the area that qualifies for OSI1 credit, etc.), and

aSFHA = the size of the community's SFHA shown on its FIRM

Note that aOSI cannot include areas that are credited under OSP.

Example 422.f-3.

A coastal county's OSI4 regulations allowing the transfer of development rights only affect inland riverine floodplains. This area is calculated to be 14.64 square miles. The total area of the County's SFHA is 17.42 square miles.

$$rOSI4 = \frac{aOSI4}{aSFHA} = \frac{14.64}{17.42} = 0.84$$

If the county receives credit for a provision under OSI5 or OSI6, the impact adjustment is calculated separately.

Example 422.f-4.

South Scottsdale has a provision to transfer development rights in order to preserve natural, sensitive, and flood-prone areas. This provision proved very successful when developable land was set aside as the South Scottsdale Country Club (see Examples 422.a-3 and 422.b-1).

OSI4 = 70

The City's code also authorizes cluster development.

OSI5 = 25

The city's comprehensive plan calls for preserving all flood-prone areas as open space, to the extent possible with a minimum of City funding.

OSI7 = 10

The application of OSI4 and OSI5 is limited to undeveloped lands that are not already preserved as open space. There are only two such areas left in South Scottsdale—the floodplain for Tributary A and the southern portion of Tributary B's floodplain. They are so marked on the impact adjustment map in Figure 420-1.

Area of Tributary A floodplain: 68.90 acres

Area of south part of Tributary B floodplain: 19.80 acres

aOSI4 = aOSI5 = 68.90 + 19.8 = 88.70 acres

aSFHA = 504.40 acres (see Figure 410-5)

$$rOSI4 = \frac{aOSI4}{aSFHA} = \frac{88.70}{504.40} = 0.18$$

$$rOSI5 = \frac{aOSI5}{aSFHA} = \frac{88.70}{504.40} = 0.18$$

According to Section 423, Credit Calculation, the values for OSI4 and OSI5 are multiplied by their ratios, 0.18.

There is no impact adjustment for OSI7.

Documentation for OSI Provided by the Community

(1) At each verification visit,

(a) For each regulatory requirement, the ordinance language (see also Section 231.c on submitting ordinance language as documentation), and letters from the community's attorney as required under credit criterion (2).

(b) The impact adjustment map used for OSP credit, with "OSI" marked on the qualifying areas. It must show areas that are currently vacant and areas that are credited for open space preservation (OSP).

(c) For extra credit for regulating flood-prone areas outside the SFHA, documentation showing that floodplain regulations are in effect in these areas.

(d) During the verification visit, the ISO/CRS Specialist will need to see site plans and final plats that will document how the regulation has been applied.

The ISO/CRS Specialist may visit a sample of new developments to verify that they have been constructed in accordance with the approved plans.

422.g. Low-density zoning (LZ)

The maximum credit for this element is 600 points. There is additional credit for low-density zoning in areas subject to special flood-related hazards.

Credit is provided for zoning areas of the regulatory floodplain to keep them substantially open. Zoning an area for agriculture, conservation, or large residential lots preserves more open space than allowing more intensive development.

LZ credit is available for undeveloped land within low-density zoning districts, as well as for areas developed in accordance with the density requirements within the regulatory floodplain. "Low-density" means that that size of the lots is at least 5 acres. For this element, it does not matter why an area is zoned for low density; what counts is the minimum lot size and lot coverage allowed in the zoning district.

The credit for low-density zoning is based upon the traditional zoning approach of setting minimum lot sizes for different zoning districts. The bigger the lot size, the less dense the floodplain development and the more credit provided. The credit also factors in lot coverage for non-residential zones.

Credit Criteria for LZ

(1) The community must have a zoning ordinance that identifies different development criteria and densities for different areas. Other types of regulations are not credited. For example, a health ordinance that requires a minimum lot size to accommodate a septic field is not credited. The area may be developed to a higher density if a sanitary sewer is installed in the future.

(2) The lands to be credited for LZ must not qualify for OSP credit.

Credit Points for LZ

LZ = up to 600 points, for zoning regulations

LZ#s = 60 points x s, where

s = the minimum lot size in acres

(1) For the credit calculation, density is measured in terms of acres per building. A zoning district with a minimum lot size of 5 acres allows a density of 5 acres per building. For this area, s = 5, and the area would be designated "LZ#5" on the impact adjustment map used for OSP credit.

"s" may have any value from 5.00 to 10.00. The highest allowable density is a five-acre lot (s = 5.0), and minimum lot sizes larger than 10 acres are credited as 10 acres (s = 10.00).

Example 422.f-1.

In a "rural estates" zoning district, the density is one unit per 5 acres.

s = 5, LZ#5 = 60 x 5 = 300 points (before the impact adjustment)

(2) For residential zones, density is based on the minimum lot size for one unit. Where multi-family residential buildings are allowed, "s" is based on the number of units allowed per parcel. For example, if duplexes are allowed in a district with a minimum lot size of 10 acres, the density is credited as one unit per 5 acres, or s = 5.00.

(3) For non-residential zones, density is also based on the lot coverage allowed. For five-acre lots, the maximum allowable lot coverage credited is 10%. For 10-acre or larger lots, the maximum allowable lot coverage credited is 5%. Credited lot coverage is prorated for other lot sizes.

(4) Different zoning districts with the same density requirement can be counted together as one LZ#s.

(5) Where minimum lot sizes are in units other than acres, they must be converted to acres to calculate the credit for this element.

Impact Adjustment for LZ

LZ credit is adjusted based on the ratio of the area affected by the zoning district within the regulatory floodplain to the area of the SFHA. The areas covered by each low-density zoning district need to be marked on the impact adjustment map prepared for OSP. Note that all areas for which LZ credit is requested must not qualify for OSP credit.

$$rLZ\# = \frac{aLZ\#}{aSFHA}$$, where

aLZ# = the size of the area(s) that qualify for LZ# credit within the regulatory floodplain (aLZ#5 is the size of the area that qualifies for LZ#5 credit, etc.), and

aSFHA = the size of the community's SFHA shown on its FIRM

Note that aLZ cannot include areas credited under OSP

Documentation for LZ Provided by the Community

(1) At each verification visit,

(a) For each LZ value, the zoning ordinance language that explains the density requirement.

(b) The impact adjustment map used for OSP credit, with "LZ#" marked on the qualifying areas. It must show the areas to be credited for LZ, areas that are credited for open space preservation (OSP), and the SFHA. Only the portion that covers the SFHA is needed.

(c) For extra credit for low-density zoning in flood-prone areas outside the SFHA, documentation showing that floodplain regulations are in effect in these areas.

The ISO/CRS Specialist may visit a sample of new developments to verify that they have been developed in accordance with the required density.

422.h. Natural shoreline protection (NSP)

The maximum credit for this element is 120 points.

Natural channels and shorelines are the areas most valuable for protecting natural flood-plain functions. They are important places for aquatic and riparian habitat. NSP credit is for allowing these areas to follow their natural processes, such as channel meandering and beach erosion, and to encourage natural shorelines that provide water quality benefits for runoff.

Note that a setback or buffer that prohibits buildings and filling can qualify as OSP but are not sufficient for NSP.

Programs to protect channels and shorelines in their natural state are credited in NSP. These include

- Regulations that govern development and construction, such as an ordinance or regulation that governs public and private construction activities; and
- Local policies followed on public lands, such as a written community policy that covers shorelines in city parks.

Protection credit is only available for channels or shorelines that are currently in their approximate natural state, i.e., there is no concrete, rip rap, levees, armoring, beach nourishment, dams, or other human intervention that constrains the natural processes of the shoreline of the river, stream, lake, or ocean.

Credit Criteria for NSP

(1) The regulation or program to protect natural shorelines must prohibit

- In channels and channel banks in riverine areas: Rip rap or armoring, channel alterations, dredging, filling, grubbing, and removal of vegetation; and

- On shorelines of lakes or oceans: The filling of or other alterations to a beach, including beach nourishment projects; alterations to sand dunes; and construction of seawalls, bulkheads, armoring, or other shoreline stabilization structures.

(2) The regulation or program may allow human alterations that benefit natural floodplain functions, such as removing a levee, restoring habitat, or planting to preserve sand dunes, provided that the projects do not prevent channel or shoreline movement or reduce other natural floodplain functions.

Credit Points for NSP

NSP = up to 120 points, based on the length of the community's shorelines that are affected by the natural shoreline protection regulations or programs

Impact Adjustment for NSP

(1) The impact adjustment is not related to the areas of the SFHA or channels in the SFHA. It is based on the length of protected shorelines divided by the total length of all the shorelines in the community. Each channel has two shorelines, one on each side. It is possible that only one side would qualify for NSP credit, so they are measured and counted separately.

(2) Credit is provided in developed areas, undeveloped areas, and areas credited as preserved open space (OSP). Communities are encouraged to take steps to protect shorelines in parks and other public lands. Credit is provided even if the only creditable activity is a community policy for parks and other public lands.

(3) The community must prepare an impact adjustment map showing all streams, ditches, and ocean or lake shorelines in the community. The length of these features is the value for aSL. Armored or concrete channels, manmade ditches, hardened shorelines, etc., are counted toward aSL, but not toward aNSP.

The map must be consistent with the impact adjustment map used for channel debris removal (CDR) under Activity 540 (Drainage System Maintenance). Unlike the map for CDR, however, the impact adjustment map prepared for NSP must show all streams in both developed and undeveloped areas.

$$rNSP = \frac{aNSP}{aSL}, \text{ where}$$

aNSP = the length of shoreline affected by the program, and

aSL = the total length of shoreline in the community

If less than 10% of all the community's shorelines are affected by the regulations or programs or the community does not prepare an impact adjustment map, the value of rNSP = 0.1 can be used.

Documentation for NSP Provided by the Community

(1) At each verification visit,

(a) [For credit for protection of natural shorelines] A copy of the regulations or policy on which the credit is based.

(b) An impact adjustment map (not needed if the community is using the optional minimum impact adjustment value of 0.1).

The ISO/CRS Specialist may visit a sample of shoreline sites to verify that they qualify for the credit.

423 Credit Calculation

c420 = (OSP x rOSP) + (DR x rDR) + cNFOS + cSHOS + cCEOS + cOSI + cLZ + (NSP x rNSP), where

cNFOS = (NFOS1 x rNFOS1) + (NFOS2 x rNFOS2) + (NFOS3 x rNFOS3) + (NFOS4 x rNFOS4), and

cOSI = (OSI1 x rOSI1) + (OSI2 x rOSI2) + (OSI3 x rOSI3) + (OSI4 x rOSI4) + (OSI5 x rOSI5) + (OSI6 x rOSI6) + OSI7, and

cLZ = LZ#s x rLZ#s

Example 423-1.

South Scottsdale calculates its credit for Activity 420.

OSP = 1,540	rOSP = 0.48
DR = 50	rDR = 0. 11
OSI4 = 70	rOSI4 = 0.18
OSI5 = 25	rOSI5 = 0.18
OSI7 = 10	

cOSI = (OSI4 x rOSI4) + (OSI5 x rOSI5) + OSI7
= (70 x 0.18) + (25 x 0.18) + 10 = 12.60 + 4.50 + 10
= 27.10

cSHOS = 0, cLZ = 0, cNSP = 0

c420 = (OSP x rOSP) + (DR x rDR) + cNFOS + cSHOS + cOSI +
cLZ (NSP x rNSP)

c420 = (1,450 x 0.48) + (50 x 0.11) + 0 + 0 + 27.10 + 0 + 0
= 696.00 + 5.50 + 27.10 = 728.60

This is rounded to the nearest whole number. c420 = 729

424 For More Information

a. Additional information, reference materials, and examples can be found at www.CRSresources.org/400.

b. More information on planning and regulatory techniques to preserve floodplain open space can be found in *Subdivision Design and Flood Hazard Areas,*(2015), Planning Advisory Service Report #584. It can be downloaded from the American Planning Association's website at https://www.planning.org/nationalcenters/hazards/subdivisiondesign/.

425 Related Activities under the Community Rating System

- Activity 320 (Map Information Service) credits providing information about natural and sensitive areas (MI7) and Activity 440 (Flood Data Maintenance) credits having a data base or GIS layer of such areas. These should include the areas credited for NFOS.
- Activity 410 (Flood Hazard Mapping) provides credit for mapping and regulating areas outside the SFHA. If such areas include parks or other qualifying preserved open space, those areas can be credited in this activity.
- The first element under Activity 430 (Higher Regulatory Standards), development limitations (DL), provides credit for regulations that prohibit filling, buildings, and/or storage of materials. If a community's regulations do not qualify for OSP, they may qualify for DL credit.
- A prerequisite for Activity 520 (Acquisition and Relocation) credit is that the property that has been cleared must meet the OSP criteria for preserved open space. All such properties should receive OSP credit. If the properties were cleared with FEMA mitigation funds, they should also qualify for deed restriction (DR) credit. Many other federal and state funding programs have similar deed restriction requirements.