

# How to Map Open Space Preservation for the FEMA Community Rating System

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# CRS Activity 420:

## Open Space Preservation

- Communities earn credits for permanently preserved open space
- First five elements provide credit for parcels that qualify for:

OSP Credit

- Open Space Preservation (OSP) – 1450 points

OSP Extra  
Credit

- Deed Restrictions (DR)
- Natural functions open space (NFOS)
- Special flood-related hazard open space (SHOS)
- Coastal erosion open space (CEOS)

# How To Map Open Space Preservation (OSP) for Community Rating System Credits

1. Step-by-step instructional “How To” guide (for planners)
2. GIS workflow (for GIS analysts)
  - Supplementary documents
    - Before you get started
    - **GIS dataset checklist**
    - Worksheet for calculating credits
    - Parcel documentation checklist

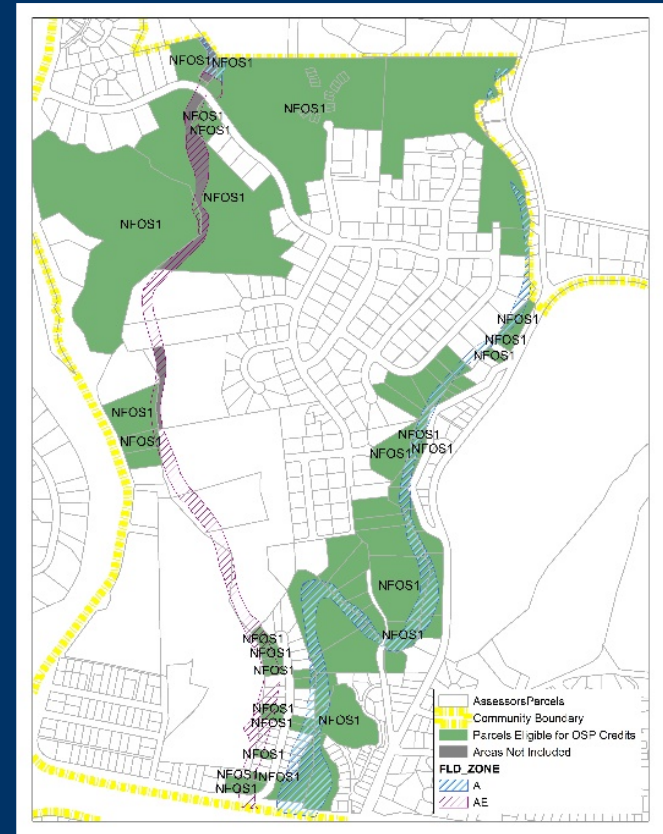




# Mapping Open Space Preservation for CRS Credits – GIS Workflow

Instructional document to prioritize eligible open space in GIS

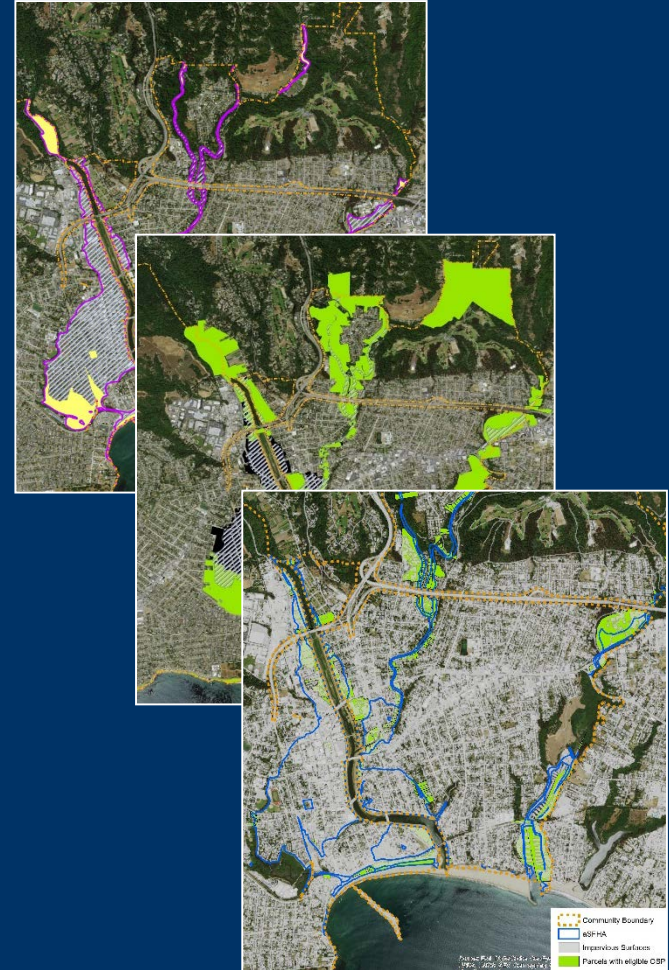
- Identify spatial data and steps for GIS analysis
- Create GIS output layers (OSP parcels and aSFHA shapefile)



# How To & GIS Workflow Steps

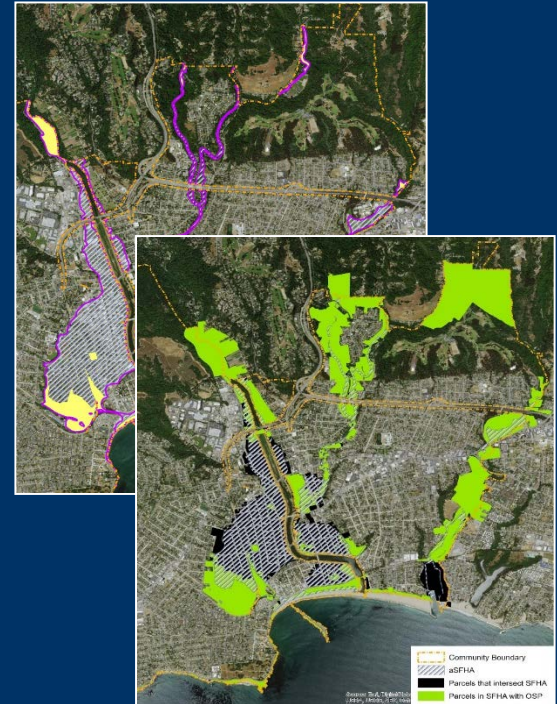
1. Calculate the community's impact adjusted SFHA
2. Identify lands that may qualify as open space
3. Exclude areas that do not qualify
4. Calculate the number of possible OSP credits

$$rOSP = aOSP/aSFHA \text{ (x 1,450 points )}$$



# How To & GIS Workflow Steps

5. Determine if parcels qualify for “extra credit”
6. Gather supporting information for each parcel or area.
7. Identify opportunities to earn more open space credit.



# How to Map Open Space for Community Rating System Credit

Steps:

7

1

Calculate the community's special flood hazard area

2

Identify lands that may qualify for open space preservation credit

3

Exclude areas that do not qualify for open space credit

## Before you get started

### Checklist of Information Sources

1

## Calculate the Community's Special Flood Hazard Area

The area of the community's special flood hazard area is a key piece of information needed to calculate most open space credits. This area is also known as the "100-year floodplain," which FEMA maps on the community's flood insurance rate map, or FIRM. While the focus of this "how-to" is on the special flood hazard area, the community may adopt a floodplain outside this area, where it enforces development regulations similar to those for new development within the special flood hazard area. If seeking credit for open space in coastal erosion areas or special flood-related hazard areas, communities may need additional mapping to calculate credit for those areas.

▼ **a. Calculate the acreage of the special flood hazard area (SFHA)** shown on the community's flood insurance rate map, as mapped by FEMA.

▼ **b. Adjust the total area of the SFHA** by subtracting non-qualifying areas and other areas the community does not regulate. This adjusted area will be the denominator for calculations that use the SFHA in Steps 4 and 5. See [Element 403b](#) (page 400-9) in the *CRS Coordinator's Manual*.

▼ **c. If applicable, map the acreage of floodplain outside the SFHA** where the community enforces development regulations similar to those enforced for new development in the SFHA.

[CRS Coordinator's Manual Guidance for Activity 410 \(pdf\)](#)

# Before You Get Started

- **Identify maps, data sources and other information available**
  - State or local watershed, floodplain or conservation plans
  - A checklist is included to help
- **Engage other state or local organizations**
  - State or local parks department, planning department
  - Tax assessor's office
  - Land trusts or other conservation organizations
- **Seek help from GIS staff or local partners with GIS capacity**
  - Identify best available datasets



# GIS Dataset Checklist and Sources


- **Community layers**
  - Special floodplain hazard area (SFHA) from FEMA's NFHL
  - Parcels and land use, zoning
- **Excluded areas**
  - Federal Lands
  - Open water
  - Impervious surfaces
- **Open spaces areas**
  - Protected areas (e.g. conservation easements, land trusts)
  - Land cover
  - Critical habitat and water/biological resources

## Step 1: Map the adjusted special flood hazard area

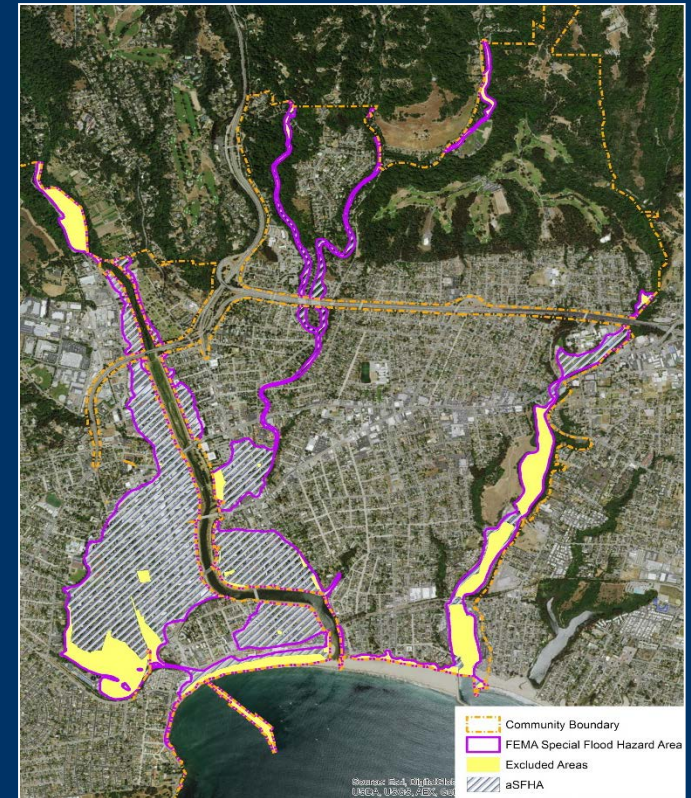
## Required GIS Data

- Special Floodplain Hazard Area (SFHA)
- Community boundary
- Federal lands
- Open water

# GIS Analysis

- Calculate the acreage of the SFHA
  - Adjust the total area of the SFHA
  - **aSFHA** is the basis for open space calculations (denominator)
- 

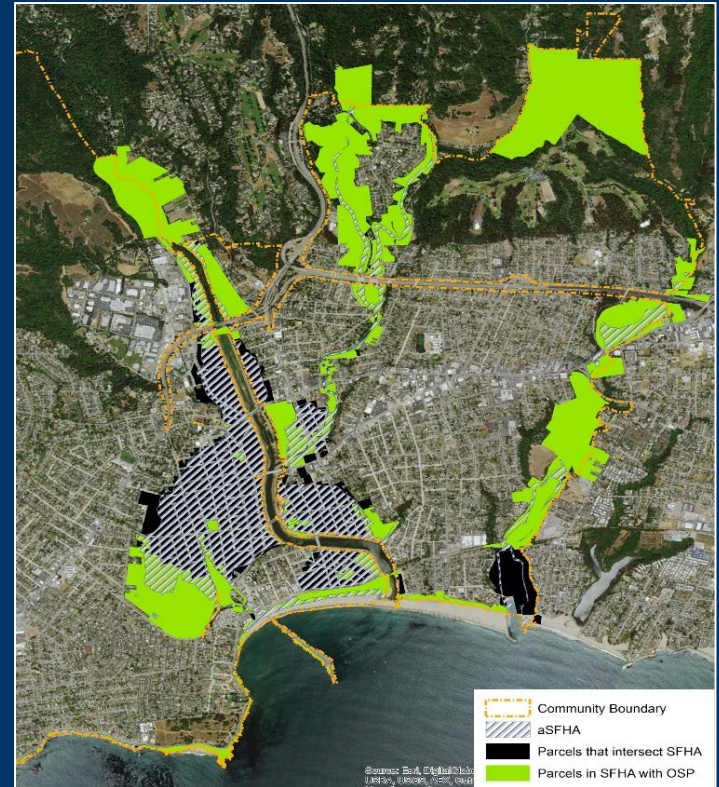
**rOSP = aOSP/aSFHA (x 1,450 points )**



## Step 2: Identify lands that may qualify for OSP credits

## Required GIS Data

- aSFHA
- Parcel database
- Protected areas
- Coastal or riverine setbacks
- Land use and zoning
- Land cover



# GIS Analysis

- Identify parcels that intersect the aSFHA and regulatory floodplain
- Query aSFHA parcel intersection using land use attribute
- Overlay land types that may qualify as “preserved” open space

# Step 3: Exclude areas that do not qualify for OSP credits

## Required GIS Data

- Regional or high-resolution land cover
- High-resolution imagery



## GIS Analysis

- Identify the portion of parcels covered by impervious surfaces
  - Option 1: Reclass high resolution land cover dataset
  - Option 2: Calculate percent impervious using regional land cover
  - Option 3: Perform image classification using ortho-imagery



# Step 4: Calculate the number of possible OSP credits

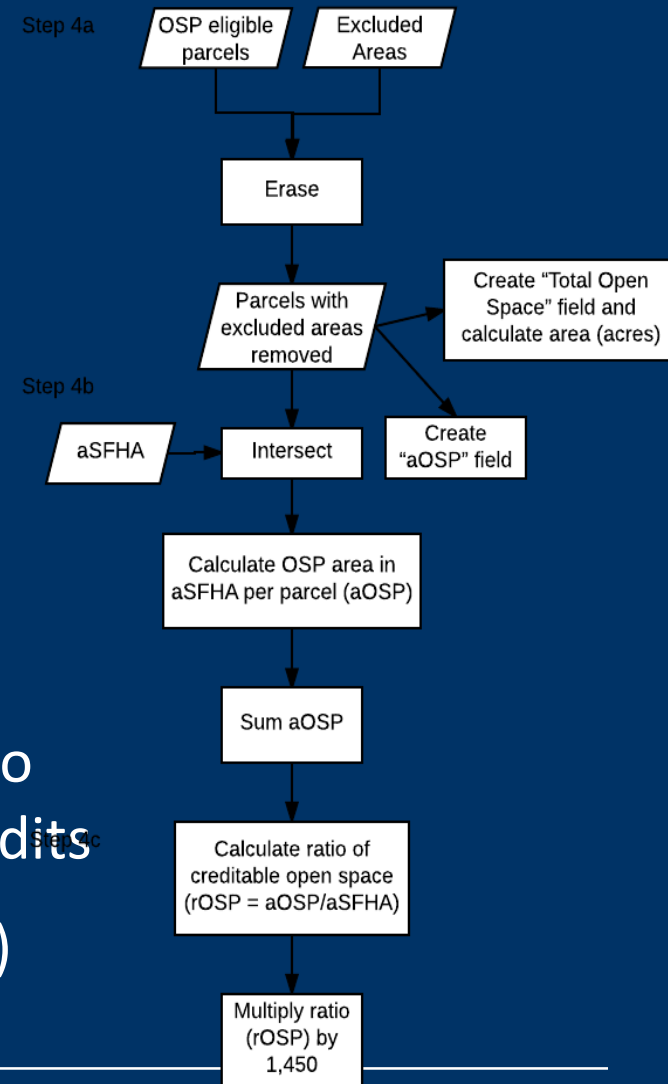
Required GIS Data:

- aSFHA (Step 1)
- OSP eligible parcels (Step 2)
- Excluded Areas (Step 3)

## GIS Analysis

- Subtract (“erase”) disqualifying areas
- Sum total area that qualifies, or aOSP
- Calculate the impact adjustment ratio to determine the total number of OSP credits

$$rOSP = aOSP/aSFHA \text{ (x 1,450 points )}$$



# Step 5: Determine if OSP parcels qualify for “extra credit”

## Required Data

- OSP eligible parcels
- Protected areas



## GIS Analysis

- Select parcels that qualify for Deed Restrictions (DR) and Natural Function Open Space (NFOS)
  - NFOS 1 – Preserved areas in natural state
  - NFOS 3 – Critical fish/wildlife habitat
- Calculate qualifying area and calculate ratio
- Add extra points

# Step 6: Documentation

Digital Coast How To

## How to Map Open Space for Community Rating System Credit

Steps:

7

5 Determine whether preserved open space parcels qualify for "extra credit"

6 Gather supporting documentation for each parcel or area

7 Identify opportunities to earn more open space credit

6

### Gather Supporting Documentation for Each Parcel or Area to Submit to FEMA

To determine the final credit to be awarded for each activity, FEMA will need to review documentation provided by the community. The documentation a community will need to provide for each element is summarized below and described more fully within the CRS Coordinator's Manual. Documentation can be hard copy or digital, although digital is preferred.

**Tip!** To help with the review, make sure parcel terminology or labeling is consistent across maps and other documentation.

▼ **a. Produce a map that shows each parcel** that qualifies for open space credit and notes which parcels also qualify for extra credit.

▼ **b. Provide a list of parcels or areas** that qualify for open space credit and credit calculations for each parcel.

▼ **c. For open space parcels outside the SFHA**, provide documentation showing that floodplain regulations are in effect in that area.

▼ **d. For parcels protected through ownership**, provide documentation that the landowner will keep the parcel open.

▼ **e. For parcels protected through a regulatory requirement**, provide the ordinance language that prohibits structures and fill in part or all of the regulatory floodplain.

# Job Aid: Worksheet for Calculating Open Space Credits under Activity 420


**Instructions:** In column B, add a unique parcel name for each property being documented. (Note: this name should be consistent with the impact adjustment map.) In column B, insert the total acreage of the parcel. In column C, insert the area of each parcel that falls within the SFHA and qualifies as protected open space (after excluding ineligible areas), using the results from a GIS or other parcel analysis. In column E, list the FEMA flood zone, or zones, in which the parcel falls. In column F, add the name of the parcel's owner. In column G, add the parcel's land use designation from property tax assessor records.

SUMMARY TABLE - Parcel documentation and Summary of Potential Credits (Parcels 1-10)


Location (Parcel Name or Number)	Total Acreage for Parcel	Area of parcel within SFHA (or regulatory floodplain) that qualifies as protected open space (aOSP)	Flood zone of parcel (particularly for any parcel outside SFHA but within regulatory floodplain)	Name of Parcel Owner	Parcel's Land Use Designation	Element 422 a. Preserved Open Space Credits (cOSP)	Element 422 b. Credits for Deed Restrictions (cDR)	Element 422 c. Credits for Natural Functions Open Space (cNFOS)	Element 422 d. Credits for Special Flood Hazards Open Space (cSHOS)	Element 422 e. Credits for Coastal Erosion Open Space (cCEOS)	Element 423 Subtotal - Credits for Preserved Open Space:
e.g. City Parks	236	143.2	AE	City	Public parks	411.66	2.41	85.17	6.54	16.69	522.47
City Parks	236	143.2	AE	City	Public parks	411.66	2.41	85.17	6.54	16.69	522.47
Country Club	73	55.3		South Scottsdale Country Club	Golf course	158.97	5.48	0.00	0.00	0.00	164.45
Indian Bend Wash Floodway	29.1	29.1		Private	Residential / Commercial	83.65	0.00	0.00	4.76	6.45	94.86
McCormick Creek Floodway	15.3	15.3		Private	Residential	43.98	0.00	0.00	0.00	0.00	43.98
						0.00	0.00	0.00	0.00	0.00	0.00
						0.00	0.00	0.00	0.00	0.00	0.00
						0.00	0.00	0.00	0.00	0.00	0.00
						0.00	0.00	0.00	0.00	0.00	0.00
						0.00	0.00	0.00	0.00	0.00	0.00
						0.00	0.00	0.00	0.00	0.00	0.00
Totals:	353.40	242.90				698.27	7.89	85.17	11.30	23.15	825.77




# Where You'll find it



Office for Coastal Management  
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ABOUTDATATOOLS**TRAINING**TOPICSSTORIES




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# Digital Coast Partnership CRS Strategy

## Community Rating System (CRS) Strategy

### Purpose:

The purpose of this Community Rating System (CRS) strategy is to coordinate, promote and encourage community participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) through decision support tool development and stakeholder engagement.

### Objective:

The Nature Conservancy's (TNC) objective is to provide stakeholder-driven decision support to support comprehensive floodplain management through the Community Rating System while encouraging engagement between planners and communities about the benefits of nature-based solutions for flood risk reduction and hazard mitigation.

### Background:

CRS is a voluntary program, established in 1990, administered by the Federal Emergency Management Agency (FEMA). It provides incentives for communities that exceed the minimum NFIP requirements for flood insurance. Communities can earn points for activities that reduce flood risk. Activities include, but are not limited to, activities about flood risk, floodplain mapping, and conserving open space. The program encourages community floodplain management activities that exceed the NFIP's minimum standards through a point system. As communities get more points, they can receive larger reductions on flood insurance rates.

While the program incentives are clear, many communities still face a variety of barriers to participation. Many coastal community planners do not have the technical capacity that supports the credit application process. The volume of information, data, and maps required to calculate potential program points and submit an application to FEMA can be overwhelming for communities with no capacity to dedicate to CRS. Organizations including NOAA's Office of Coastal Management, the Nature Conservancy (TNC), Climate Central, The Associated States of Floodplain Management, and the Coastal States Organization (CSO) are therefore investing in the development of tools and

ASFPM and CSO  
Green Guide

TNC CRS Explorer

NOAA How To Guide  
& GIS Workflow

Climate Central's Surging  
Seas CRS Guide

# Questions & Feedback?



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