

# 400 – Mapping and Regulations

**Manual Page 400-1**

## **400 MAPPING AND REGULATIONS**

The Community Rating System (CRS) provides credit to communities that enact and enforce regulations that exceed the National Flood Insurance Program's (NFIP's) minimum standards, so that more flood protection is provided for new and existing development.

The activities in this series affect only certain portions of the community and, in some cases, only portions of the delineated Special Flood Hazard Area (SFHA). Therefore, the credit points are adjusted to reflect the area affected. These activities are also adjusted to reflect the community's growth rate as explained in Section 710.

### **Contents of Series 400**

<b>Section</b>	<b>Page</b>
400 Mapping and Regulations .....	400-1
401 Special Flood-related Hazard Areas .....	400-3
402 Impact Adjustment for Areas.....	400-4
403 Impact Adjustment Map .....	400-6
410 Floodplain Mapping.....	410-1
411 Background.....	410-2
412 Elements.....	410-8
413 Impact Adjustment.....	410-27
414 Credit Calculation .....	410-29

# 401 – Special Flood-Related Hazards

Manual Page 400-3

## 401 Special Flood-related Hazard Areas

The Federal Emergency Management Agency (FEMA) and many communities in the United States have long recognized that the mapping and regulatory standards of the NFIP do not adequately address all of the flood problems in the country. There are many special localized situations in which flooding or flood-related problems do not fit the national norm for riverine and coastal floodplain management. Therefore, there are situations in which the minimum NFIP requirements do not adequately protect property from flood damage.

To encourage communities to address these hazards, the CRS provides credit throughout the *CRS Coordinator's Manual* for mapping, preserving open space, and regulating new development in areas subject to seven special flood-related hazards:

1. Uncertain flow paths: alluvial fans, moveable bed streams, channel migration, and other floodplains where the channel shifts during a flood.
2. Closed basin lakes: lakes that have a small or no outlet that may stay above flood stage for weeks, months, or years.
3. Ice jams: flooding caused when warm weather and rain break up a frozen river. The broken ice floats down river until it is blocked by an obstruction, such as a bridge or shallow area, creating a dam.

# 401 – Special Flood-Related Hazards

*Manual Page 400-3*

Uncertain flow paths

Closed basin lakes



# 401 – Special Flood-Related Hazards

*Manual Page 400-3*

Ice jams

Land subsidence



# 401 – Special Flood-Related Hazards

*Manual Page 400-3*

## Mudflows



# 401 – Special Flood-Related Hazards

*Manual Page 400-3*

## Coastal erosion Tsunamis



# 402 – Impact Adjustment for Areas

Manual Page 400-4

Impact adjustment: how much of the flood problem is covered by the activity?

- ✓ 400 Series: How much of the SFHA is affected?
- ✓ Need an impact adjustment ratio: percentage of the SFHA affected by the activity
- ✓ Example for open space:

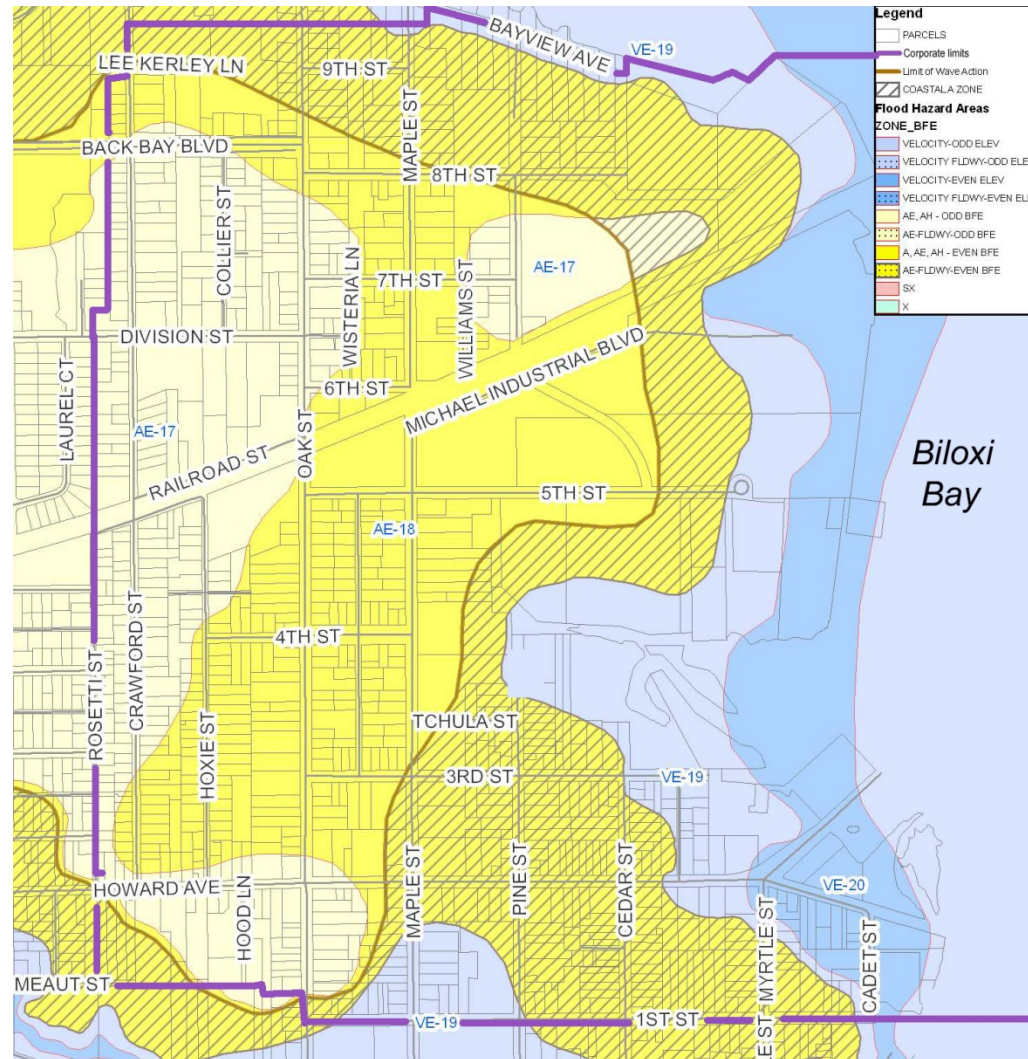
$$rOSP = \frac{aOSP}{aSFHA}$$

- ✓ Need an Impact Adjustment Map

# 402 – Impact Adjustment for Areas

Manual Pages 400-8 – 9

Step 1.  
Start with a  
base map  
that shows  
the SFHA





# 402 – Impact Adjustment for Areas

*Manual Pages 400-8 – 9*

Step 2. Can exclude areas not part  
of impact adjustment

1. Open water > 10 acres

# 402 – Impact Adjustment for Areas

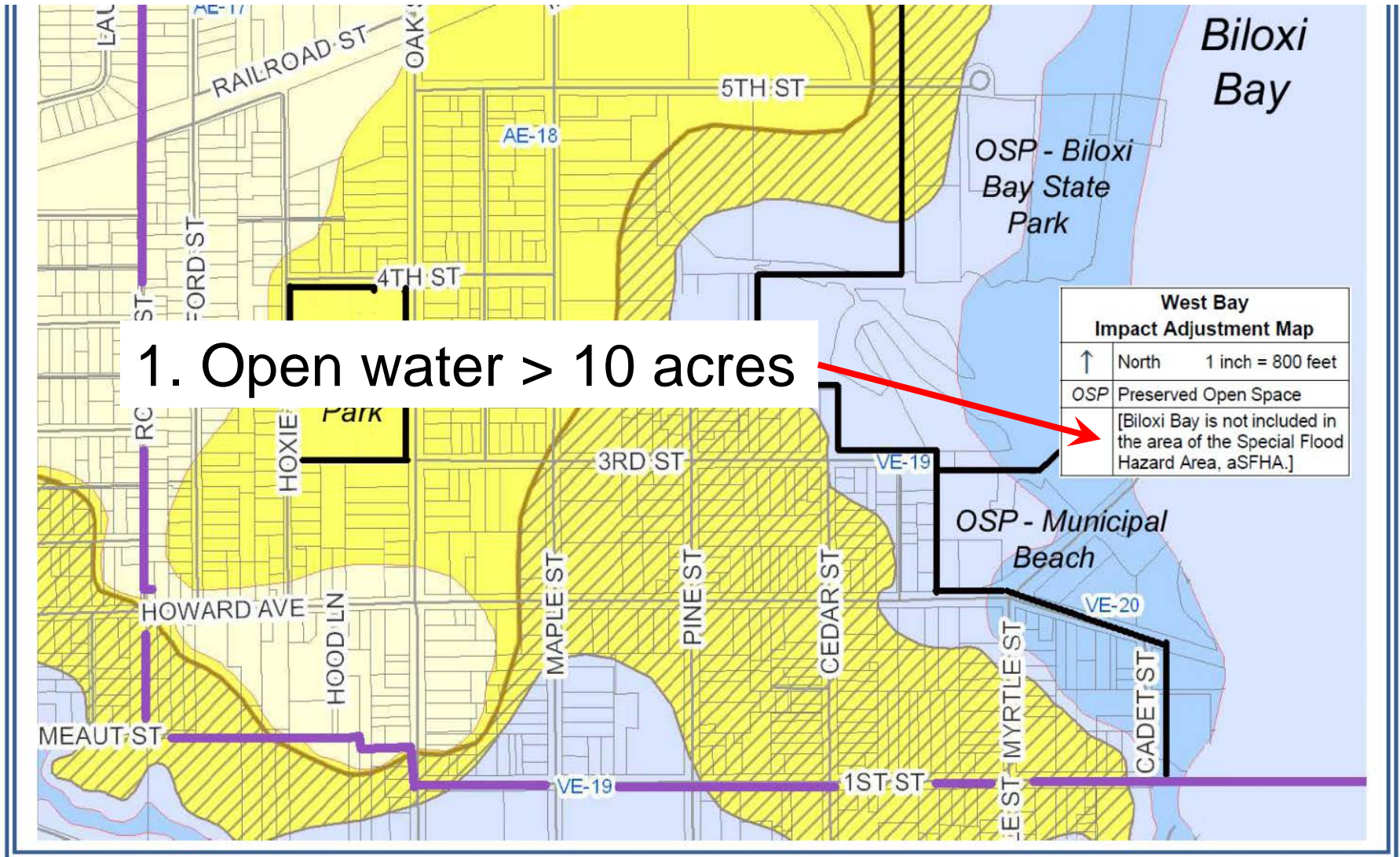
Manual Page 400-4

## 1. Open water > 10 acres



# 402 – Impact Adjustment for Areas

Manual Page 400-10



1. Open water > 10 acres

West Bay Impact Adjustment Map		
↑	North	1 inch = 800 feet
OSP	Preserved Open Space	
	[Biloxi Bay is not included in the area of the Special Flood Hazard Area, aSFHA.]	

# 402 – Impact Adjustment for Areas

*Manual Pages 400-8 – 9*

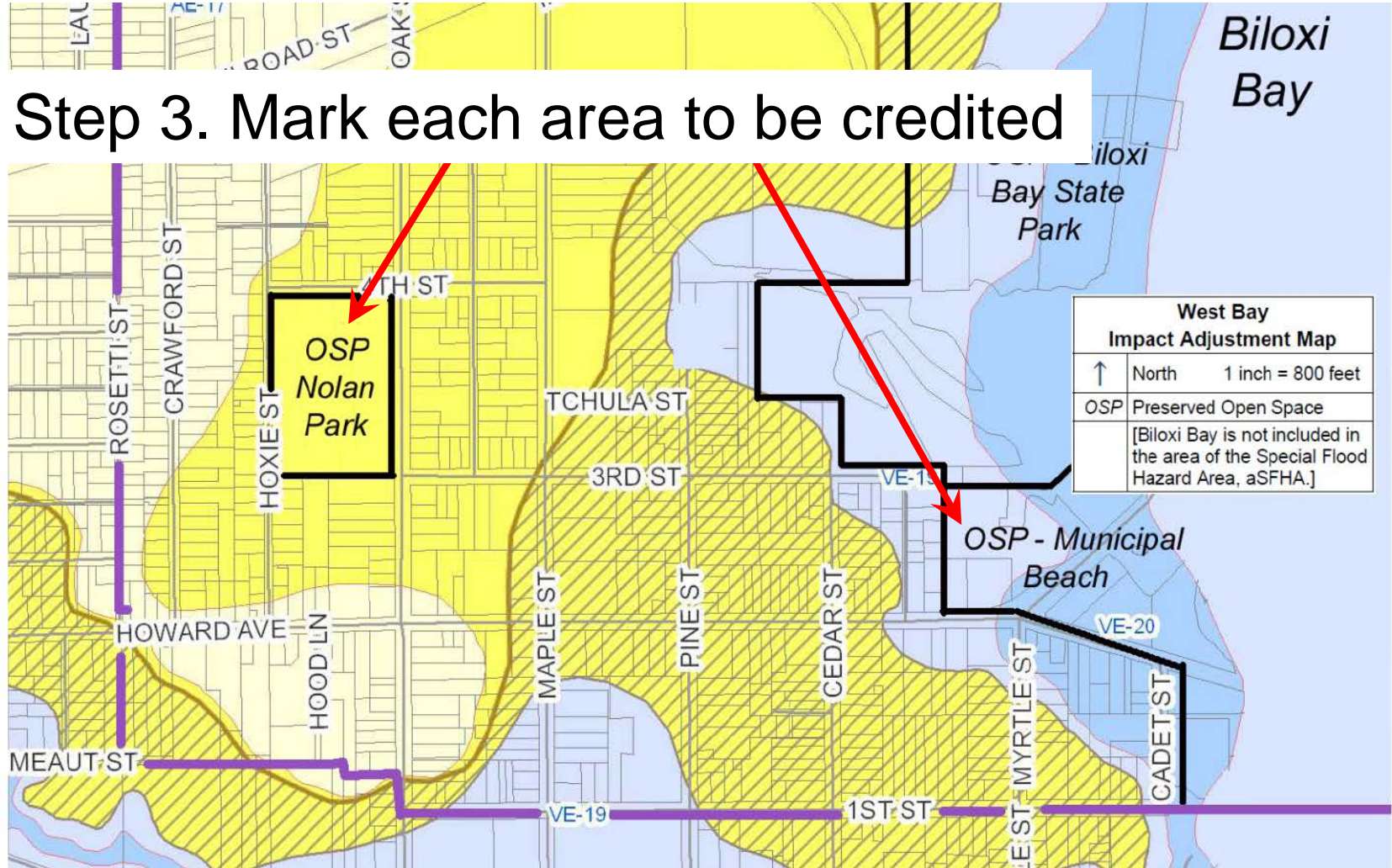
## Step 2. Can exclude areas not part of impact adjustment

1. Open water > 10 acres
2. Federal land > 10 acres
3. Optional: areas exempt from local regulations
  - Owned by another community
  - State property
  - Indian lands

# 402 – Impact Adjustment for Areas

Manual Page 400-11

Step 3. Mark each area to be credited

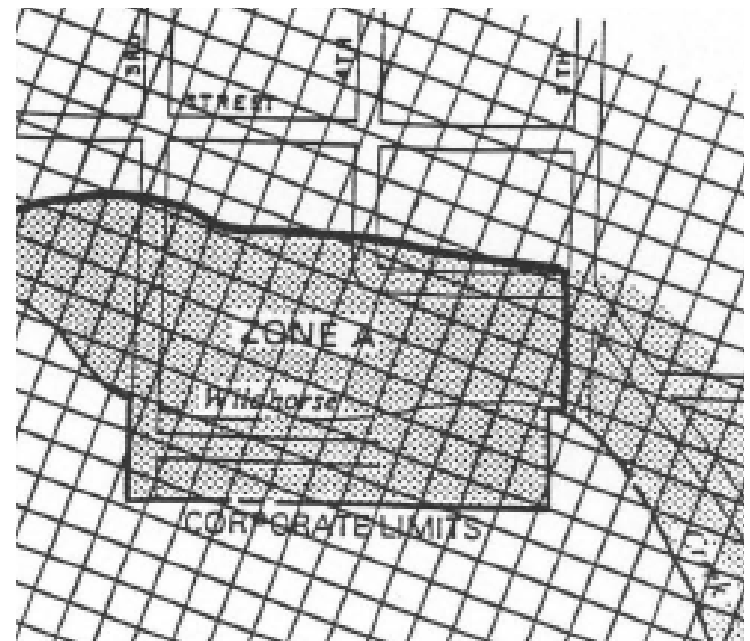


# 402 – Impact Adjustment for Areas

Manual Pages 400-11 – 12

## 403.e. Calculating areas

- ✓ Calculations do not have to be super accurate
  - GIS is easiest, if you have it
  - Known property dimensions
  - Grid square technique
- ✓ All measurements in acres



# 402 – Impact Adjustment for Areas

Manual Page 400-7

Table 403-1. Impact adjustment maps.

Activity	Affected Elements	Denominator	Optional Minimum
410 (Floodplain Mapping)	NS, SR, HSS, FWS	aSFT	0.10
420 (Open Space Preservation)	OSP, DR, NFOS, LZ	aSFHA	none
	OSI	aSFHA	0.10
	NSP	total length of shoreline	0.10
430 (Higher Regulatory Standards)	DL, FRB, FDN, CSI, LSI, PCF, ENL, OHS	aSFHA	0.10
	CAZ	aSFHA	0.5 / 0.1
440 (Flood Data Maintenance)	AMD	aSFHA	0.10
450 (Stormwater Management)	SMR, WMP	area of the watershed	0.15
540 (Drainage System Maintenance)	CDR, PSM, CIP	number of drainage components	0.10
	SBM	number of storage basins	0.10
610 (Flood Warning and Response)	FTR, EWD, FRO	number of buildings in the SFHA (bSF)	none

# 420 – Open Space Preservation

*Manual Page 420-2*

## Objectives:

- (1) Prevent flood damage by keeping floodprone lands free of development, and
- (2) Protect and enhance the natural functions of floodplains.





# 420 – Open Space Preservation

*Manual Page 420-4*

## 422.a Open space preservation (OSP)

Credit criteria

- (1) Parcel must be in the regulatory floodplain  
SFHA + areas regulated in the X Zone



# 420 – Open Space Preservation

*Manual Page 420-4*

## (2) Parcel must be “open space”

“Open space” = no buildings, storage, or filling



# 420 – Open Space Preservation

Manual Page 420-4

“Open space” does not include

- (a) Parcels not counted in the impact adjustment map  
(open bodies of water, federal land, etc..)



# 420 – Open Space Preservation

*Manual Page 420-4*

“Open space” does not include  
(b) Areas with impervious surfaces



# 420 – Open Space Preservation

*Manual Page 420-4*

“Open space” does not include

(c) Areas with buildings on them



# 420 – Open Space Preservation

*Manual Page 420-5*

“Open space” does not include

(d) Where fill, storage, or other encroachments are allowed



# 420 – Open Space Preservation

*Manual Page 420-5*

“Open space” does not include

(e) Streets, railroad, levee, linear rights of way, etc..



# 420 – Open Space Preservation

*Manual Page 420-5*

“Open space” does not include

(e) Streets, railroad, levee, linear rights of way, etc..

Including ditch or channel rights of way





# 420 – Open Space Preservation

*Manual Page 420-5*

“Open space” does not include

(e) Streets, railroad, levee, linear rights of way, etc..

Exception: waterside greenways



# 420 – Open Space Preservation

*Manual Page 420-5*

“Open space” does not include

(f) Land not intended to be preserved as open space



# 420 – Open Space Preservation

*Manual Page 420-6*

(3) Parcel must be preserved as “open space”

(a) Publicly owned land, city park, beach, school field, etc.



# 420 – Open Space Preservation

*Manual Page 420-6*

(3) Parcel must be preserved as “open space”

(b) Private wildlife or nature preserve, church camp, scout camp, hunting club, non-profit golf course



# 420 – Open Space Preservation

Manual Page 420-6

(3) Parcel must be preserved as “open space”

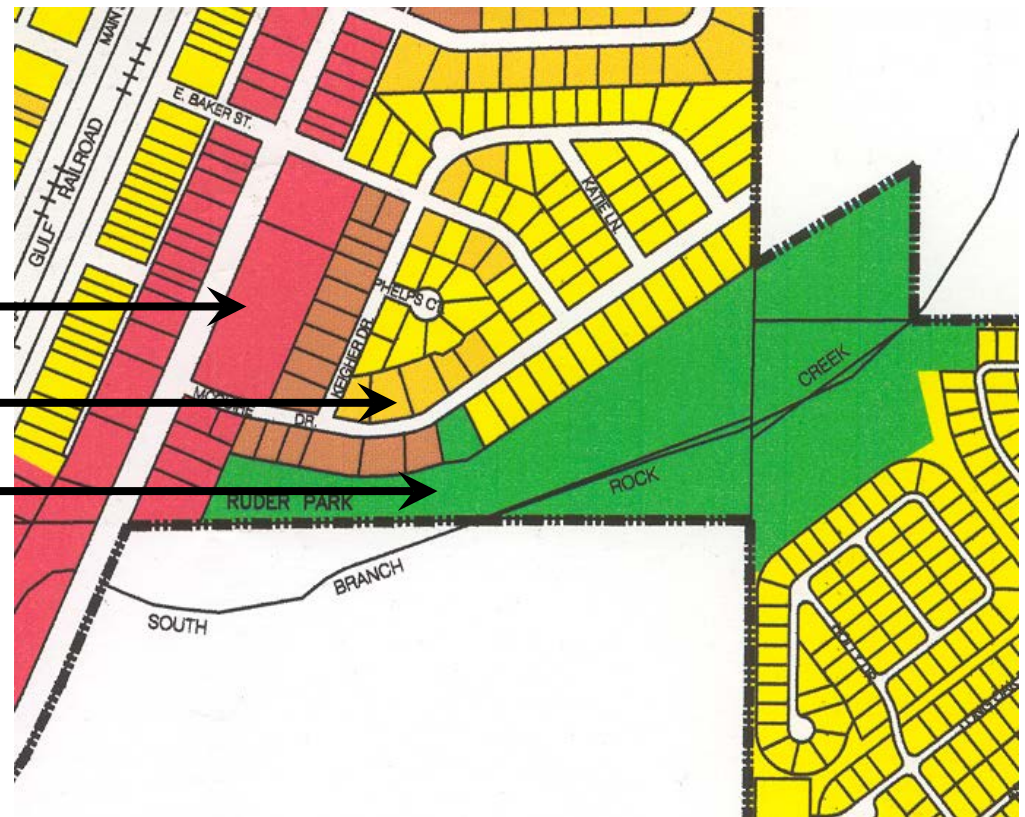
(c) Prohibitory development regulations (no buildings, filling or storage)

## Zoning Districts

Commercial

Single Family Res.

Conservation



# 420 – Open Space Preservation

*Manual Page 420-8*

## Credit Points

---

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

---

## Impact Adjustment

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.

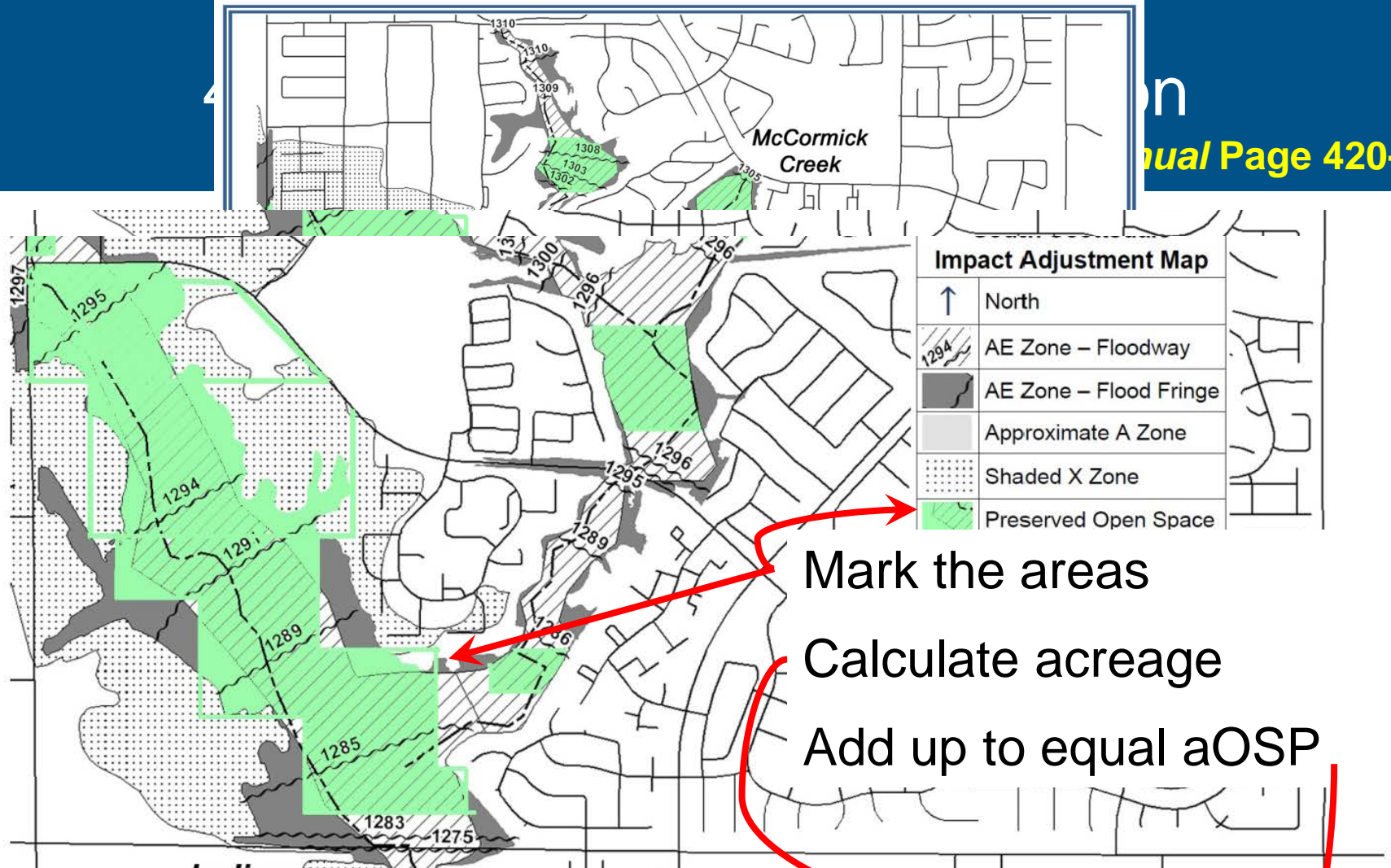
---

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

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

---



Mark the areas  
Calculate acreage  
Add up to equal aOSP

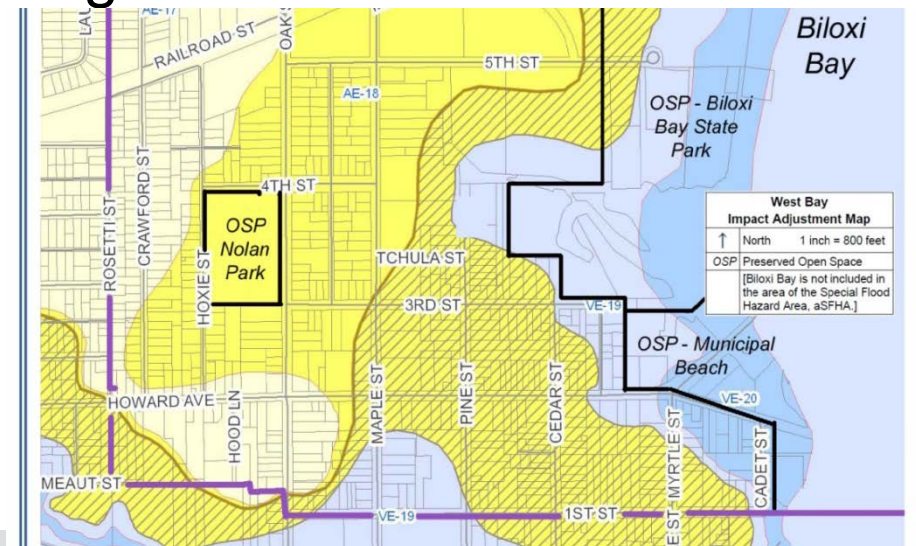
Preserved Open Spaces	Credit	Size (acres)
Indian Bend Wash Parks	OSP	143.2
South Scottsdale Country Club	OSP, DR	55.3
Undeveloped floodway parcels	OSP	<u>44.4</u>
Total areas preserved as open space	aOSP	242.9
Vacant areas subject to incentives	OSI4, OSI5	88.7

# 420 – Open Space Preservation

Manual Pages 420-10 – 11

## Documentation

- (a) Map or list of all parcels to be credited
- (b) Documentation that each parcel will be preserved
- (c) If credit for prohibitory regulations – the regulations
- (d) If outside the SFHA – the regulations for the area
- (e) Impact adjustment map





# 420 – Open Space Preservation

Manual Page 420-11

## 422.b Deed restrictions (DR)

Extra credit to guarantee parcel stays open

DEED

This Deed is made on *June 22, 1953*, **G21464** *give back to*

BETWEEN TOWNSHIP OF WAYNE IN THE COUNTY OF PASSAIC, a municipal corporation of the State of New Jersey,

whose post office address is 475 Valley Road, Wayne, New Jersey, referred to as the Grantor.

AND ALGIRDAS BREIMER and IRMGARD BREIMER, his wife,

whose address is 78 Hobson Avenue, Wayne, New Jersey, referred to as the Grantee,

**Transfer of Ownership.** The Grantor grants and conveys (transfers ownership of) the property described below to the Grantee. This transfer is made for the sum of TWO THOUSAND ONE HUNDRED DOLLARS (\$2,100.00). The Grantor acknowledges receipt of this money.

**Tax Map Reference.** (N.J.S.A. 46:15-2.1) Municipality of Wayne  
Block No. 19                      Lot No. 34                      Account No.

# 420 – Open Space Preservation

Manual Page 420-11

## 422.b Deed restrictions (DR)

(1) Parcel must qualify for OSP

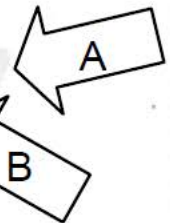
(2) Deed restriction must cover:

- 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

This conveyance is conditioned upon the acquisition by an adjoining property owner so as to preclude the creation of a non-conforming lot, and this parcel shall become part and parcel of said adjoining lot. The acquisition of this lot is not to be utilized in conjunction with a subdivision, and no building will be constructed on said lot. Said restrictions shall be deemed to run with the land.

This conveyance is subject to all restrictions, terms, conditions and facts as of record.

**Promises by Grantor.** The Grantor promises that the Grantor has done no act to encumber the property. This promise is called a "covenant as to grantor's acts" (N.J.S.A. 46:4-6). This promise means that the Grantor promises to



# 420 – Open Space Preservation

Manual Page 420-11

All FEMA grants require a deed restriction

Many park and conservation grants require one



# 420 – Open Space Preservation

## Questions?



# 420 – Open Space Preservation

## Activity 420 (Open Space Preservation)

### Assignment, Part 1

---

Refer to the Kane County Flood Insurance Rate Map (FIRM) and the GIS aerial photo maps for Dundee.

The head of the Parks Department quickly read Activity 420 in the *CRS Coordinator's Manual*. He looked for public or private non-profit parcels that are open. He marked twelve areas on the attached map and labeled them 1 through 12. He thinks they qualify for credit for open space preservation (OSP) under Activity 420.

1. Powell Creek School: baseball diamonds, a two acre parking lot (half in the A Zone), and some wooded areas owned by the school district. Total area: 30 acres Area in the A Zone: 16 acres.
2. Mitigation wetland: This is a wetland restored and set aside by the developer to meet Corps of Engineers 404 permit requirements. This was dedicated to the Nature Conservancy as part of the development approval. The Nature Conservancy added a deed restriction to the title to keep it open. There are no recreation or public facilities on the site. Total area: 3.2 acres Area in the A Zone: 3.0 acres

# 420 – Open Space Preservation

*Manual Page 420-13*

## 422.c Natural functions open space (NFOS)

Open space in its natural state provides more benefits:

- Flood storage
- Reduced sedimentation
- Water quality
- Aquifer recharge
- Richer soils
- Biodiversity
- Habitat



# 420 – Open Space Preservation

*Manual Page 420-14*

## 422.c Natural functions open space (NFOS)

Credit criteria:

1. All NFOS(1 – 5)
  - (a) OSP credit
  - (b) NFOS1 is a prerequisite for the others
  - (c) Is managed to stay in its natural state
  - (d) Plot on impact adjustment map



# 420 – Open Space Preservation

*Manual Page 420-14*

## NFOS1 Parcel in its natural state

### Examples:

- Areas not built on
- Restored to natural state
- Designated by recognized program

### Not credited:

- Scenic designation
- Recreational areas
- Clear cutting allowed
- Dune/beach nourishment





# 420 – Open Space Preservation


Manual Page 420-5

NFOS2 – Parcel in a natural functions protection plan

NFOS3 – Parcel is critical habitat

**EAJ** **HABITAT CONSERVATION PLAN**

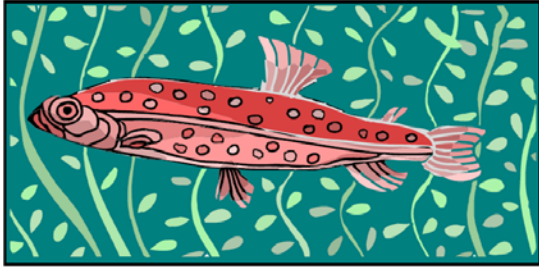
**A PLAN FOR THE PROTECTION OF SEA TURTLES  
AND ANASTASIA ISLAND BEACH MICE ON THE  
BEACHES OF ST. JOHNS COUNTY, FLORIDA**



*Prepared for:*


**U.S. FISH AND WILDLIFE SERVICE**

**SALMON HABITAT PROTECTION  
AND  
RESTORATION STRATEGY**



**WRIA-10  
Puyallup Watershed**

**WRIA-12  
Chambers/Clover Creek Watershed**

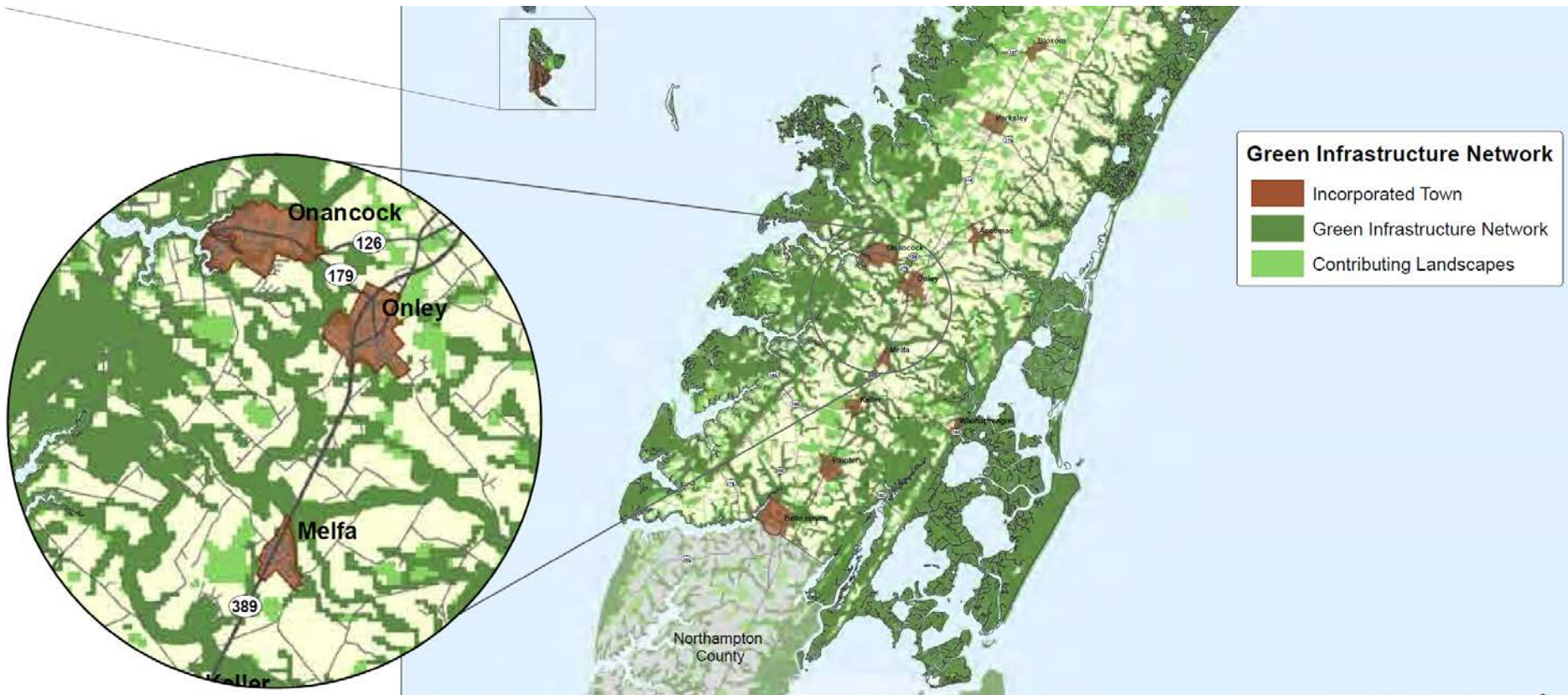
 **Pierce County  
Lead Entity**

**March, 2008**

# 420 – Open Space Preservation

Manual Page 420-15

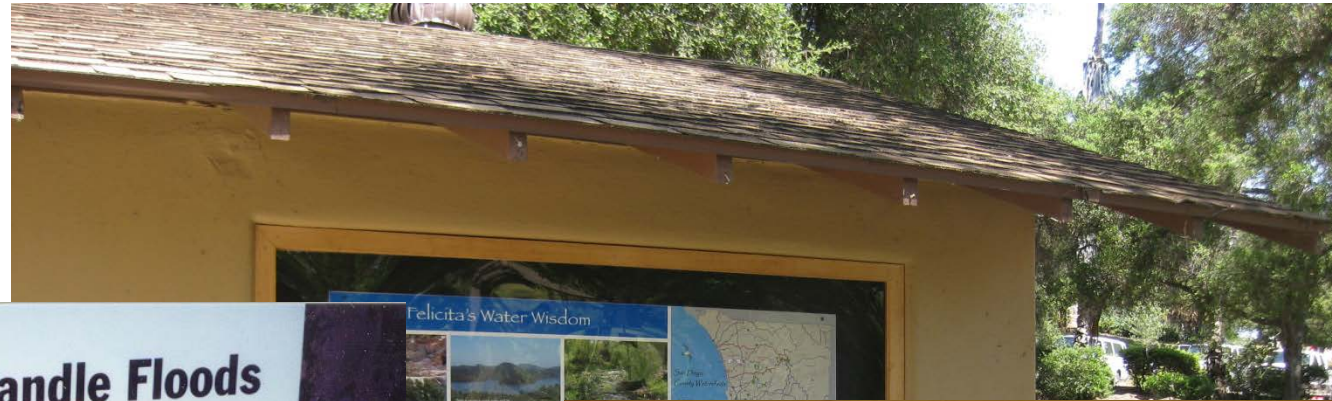
## NFOS4 – Parcel in a designated open space corridor



# 420 – Open Space Preservation

Manual Page 420-15

## NFOS5 – Parcel has educational materials

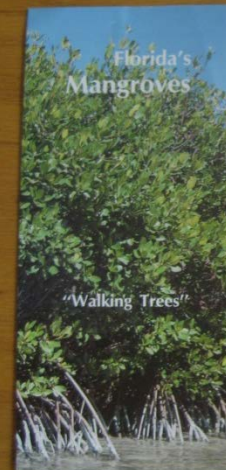


### Healthy Swamps Help Handle Floods

#### Natural flood control

Flooding rivers overflow into nearby swamps and marshes. There, the water is held and released slowly, so less water floods farms and towns downstream.

What happens to the town when the river is at flood level?  
Slide the handle.



# 420 – Open Space Preservation

Manual Pages 420-17 – 18

## NFOS Documentation

- (1) Report or
- (2) Letter or form signed by a professional

- RESCUE
- REPAIR
- RECUPERATION
- RELEASE



August 7, 2002

Insurance Services Office, Inc.  
2201 North Gordon Street  
Plant City, Florida 33563

Attention: Mr. David Klick, CFM

Re: Open Space Preservation

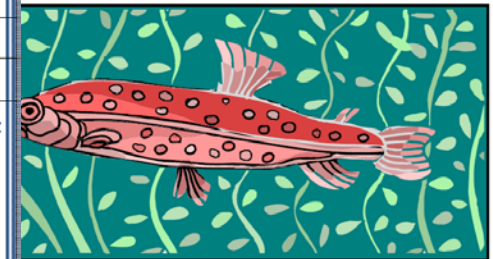
Dear Mr. Klick:

As the founder and director of the Suncoast Seabird Sanctuary bird hospital in the United States, I fully support Indian Sho Recreation Area. This nature refuge provides a valuable ha

This nature park and its surrounding area is a natural, pristin

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	<p>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.</p> <p>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 (<i>Cairina scutulata</i>), an endangered species, was spotted in the park.</p> <p>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.</p>
Name of person completing this form	Jonathon Richards, ASLA
Signature	<i>Jonathon Richards</i>
Degree or other qualifications	<p>Bachelor's of arts from Wall State University in landscape architecture, 1990.</p> <p>Registered landscape architect.</p> <p>Planner and then Director of natural area programs for Delaware County since 1994.</p>

### SALMON HABITAT PROTECTION AND RESTORATION STRATEGY



**WRIA-10**  
**Puyallup Watershed**

**WRIA-12**  
**Chambers/Clover Creek Watershed**

Pierce County  
Lead Entity

March, 2008

# 420 – Open Space Preservation

*Manual Page 420-19*

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

Separate credit described in special hazard supplements

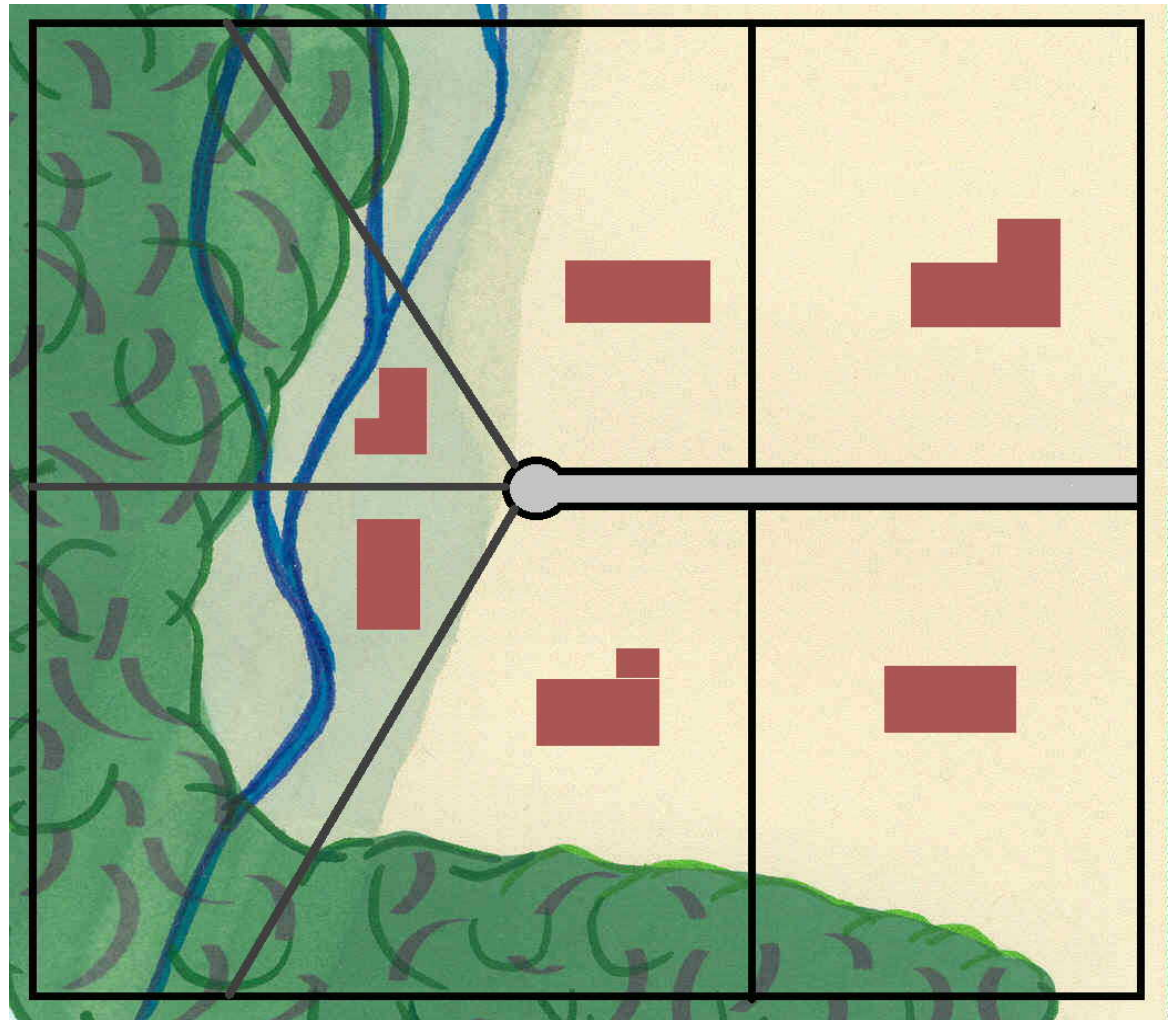


# 420 – Open Space Preservation

Manual Pages 420-20 – 23

## Conventional Subdivision

6 – 1 acre lots  
2 w/buildings  
in floodplain



# 420 – Open Space Preservation

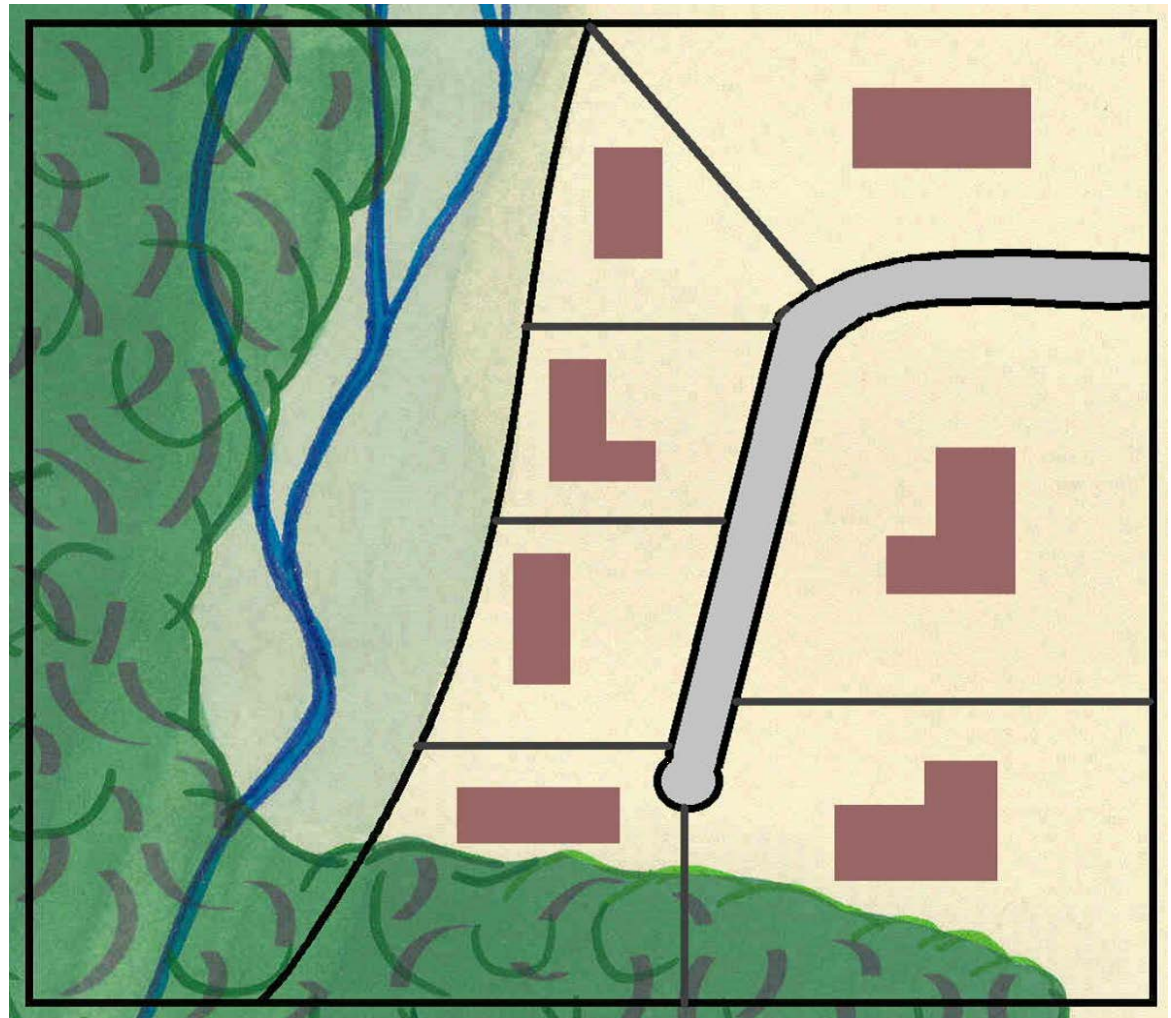
Manual Pages 420-20 – 23

## Thoughtful Subdivision

7 – ½ acre lots

All buildings out

Open Space  
Incentives (OSI)



# 420 – Open Space Preservation

Manual Pages 420-23 – 24

## 422.3 Open space incentives (OSI)

### Credit criteria

OSI 1	Set aside all of the floodplain as open space	250
OSI 2	Provide a building site for each lot on high ground	150
OSI 3	Do OSI 2 “to the extent possible”	65
OSI 4	TDRs, etc.. to encourage staying out of the floodplain	70
OSI 5	Allow cluster development through PUDs	25
OSI 6	Tax incentives to keep land open	25
OSI 7	Land use plan recommends open space	10



# 420 – Open Space Preservation

Manual Page 420-26

## OSI documentation

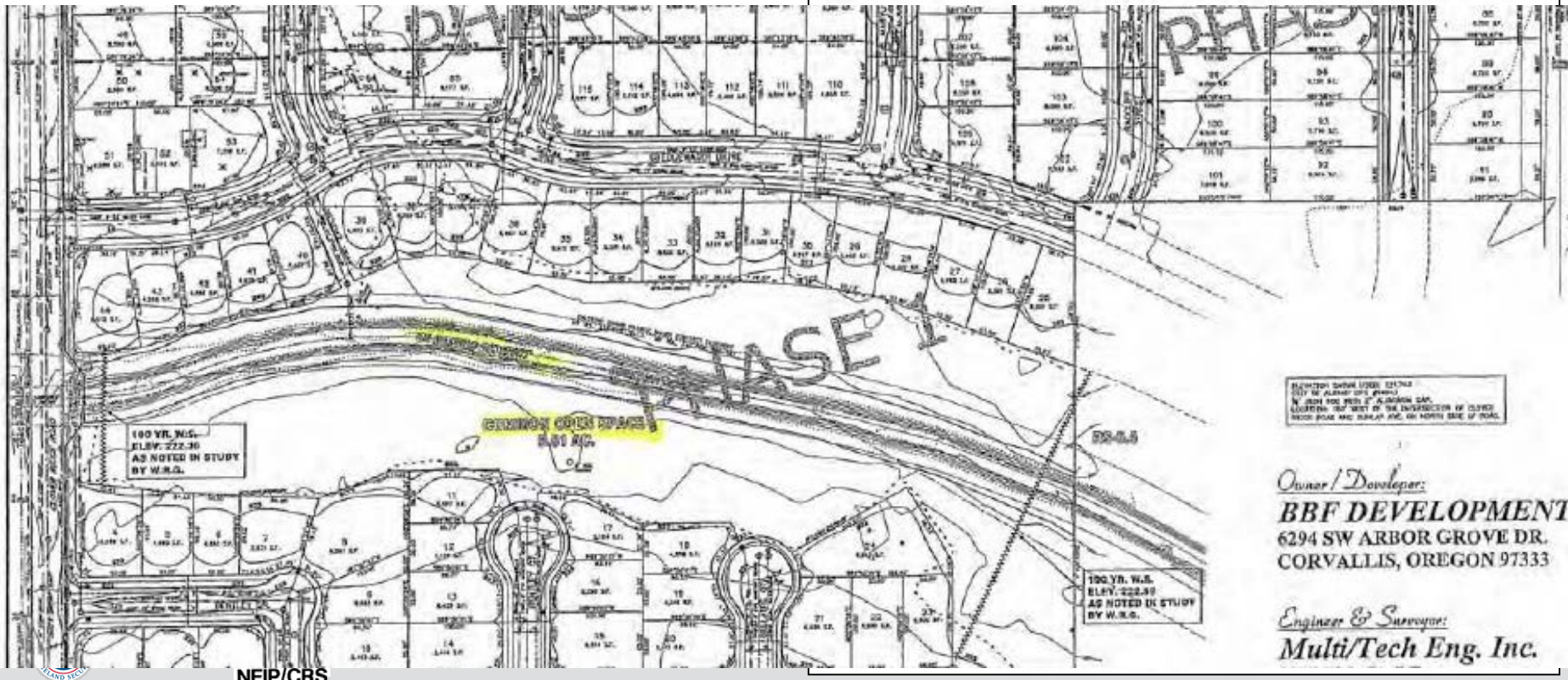
- ✓ Ordinance language
- ✓ Site plans/final plats

- 11.370 Failure to Adhere to Approved Plan, Satisfy Conditions, or Comply with Stage Development Schedule. Failure to comply with approved preliminary or final development plans, conditions of approval, or stage development schedule, shall constitute a violation of this ordinance as prescribed in Article 1.

### CONDOMINIUMS

- 11.380 Definition. A condominium is a building, or group of buildings, in which units are individually owned, and the structure, common areas and facilities are owned by all of the unit owners on a proportional, undivided basis.
- 11.390 Procedure. A proposal for new construction of a condominium is reviewed through the planned development process. A proposal for conversion of existing units into condominiums is reviewed through the conditional use process in conjunction with planned development requirements. All condominium proposals must meet the appropriate requirements of ORS Chapter 100.

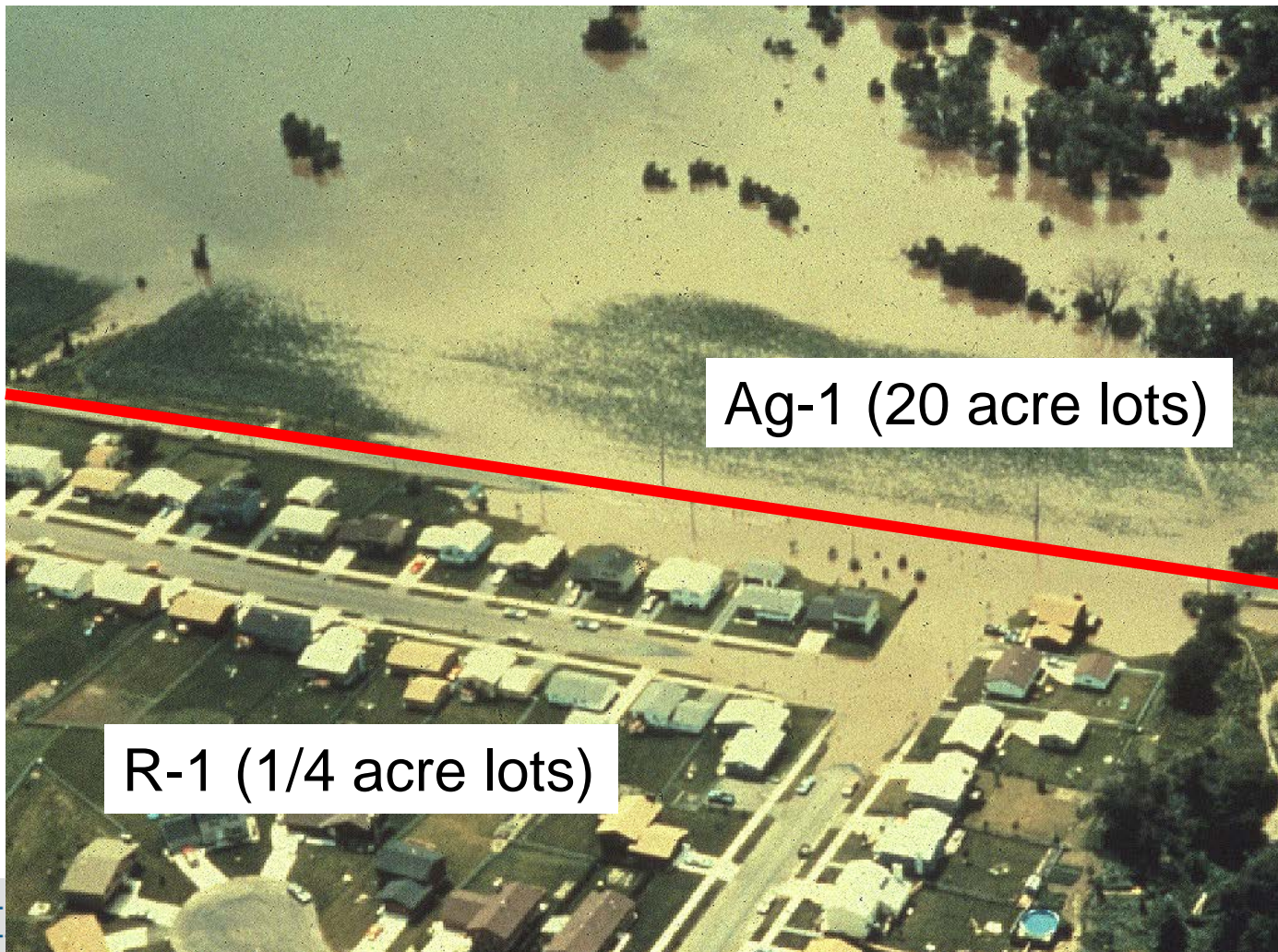
### CLUSTER DEVELOPMENT



# 420 – Open Space Preservation

*Manual Pages 420-26 – 27*

## 422.f Low density zoning (LZ)



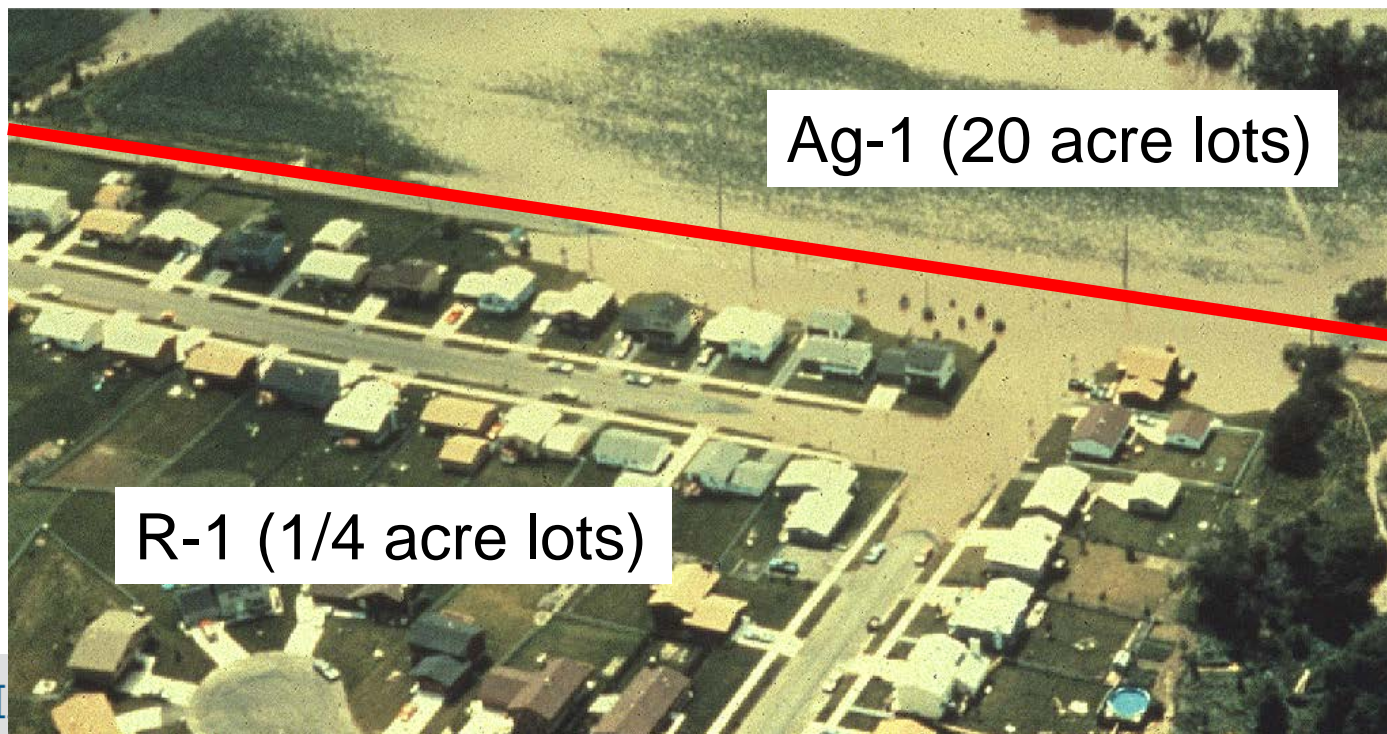
# 420 – Open Space Preservation

*Manual Pages 420-26 – 27*

## 422.f Low density zoning (LZ)

### Credit criteria

- (1) Zoning ordinance with densities for different zones
- (2) Area affected not receiving OSP credit



# 420 – Open Space Preservation

*Manual Page 420-28*

## 422.f Low density zoning (LZ)

Credit points

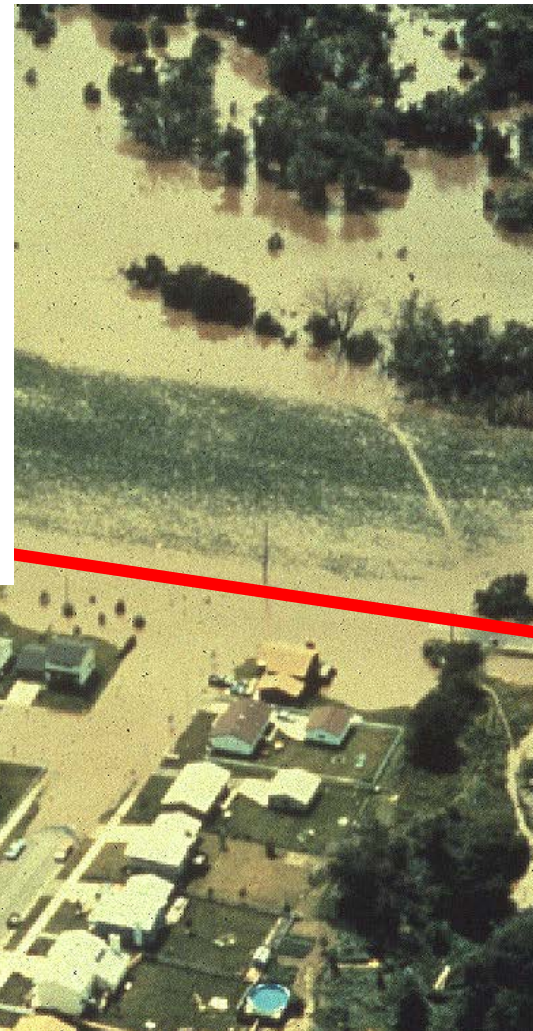
LZs = 60 points x s

s = minimum lot size (in acres)

5 acre minimum lot size

LZ5 = 60 x 5 = 300

cLZ5 = LZ5 x impact adjustment



# 420 – Open Space Preservation

*Manual Page 420-28*

Is this a naturally functioning stream?



Is this a naturally functioning shoreline?



# 420 – Open Space Preservation

*Manual Page 420-28*

## 422.g NSP (Natural Shoreline Protection)

Encourages preservation/protection of natural shorelines  
(May mean less protection of property along shoreline)



# 420 – Open Space Preservation

*Manual Pages 420-28 – 29*

## 422.g Natural shoreline protection (NSP)

- ✓ Regulations on private property
- ✓ Policy for public lands
- ✓ Programs that restore channels or shorelines



# 420 – Open Space Preservation

*Manual Page 420-29*

## Credit criteria

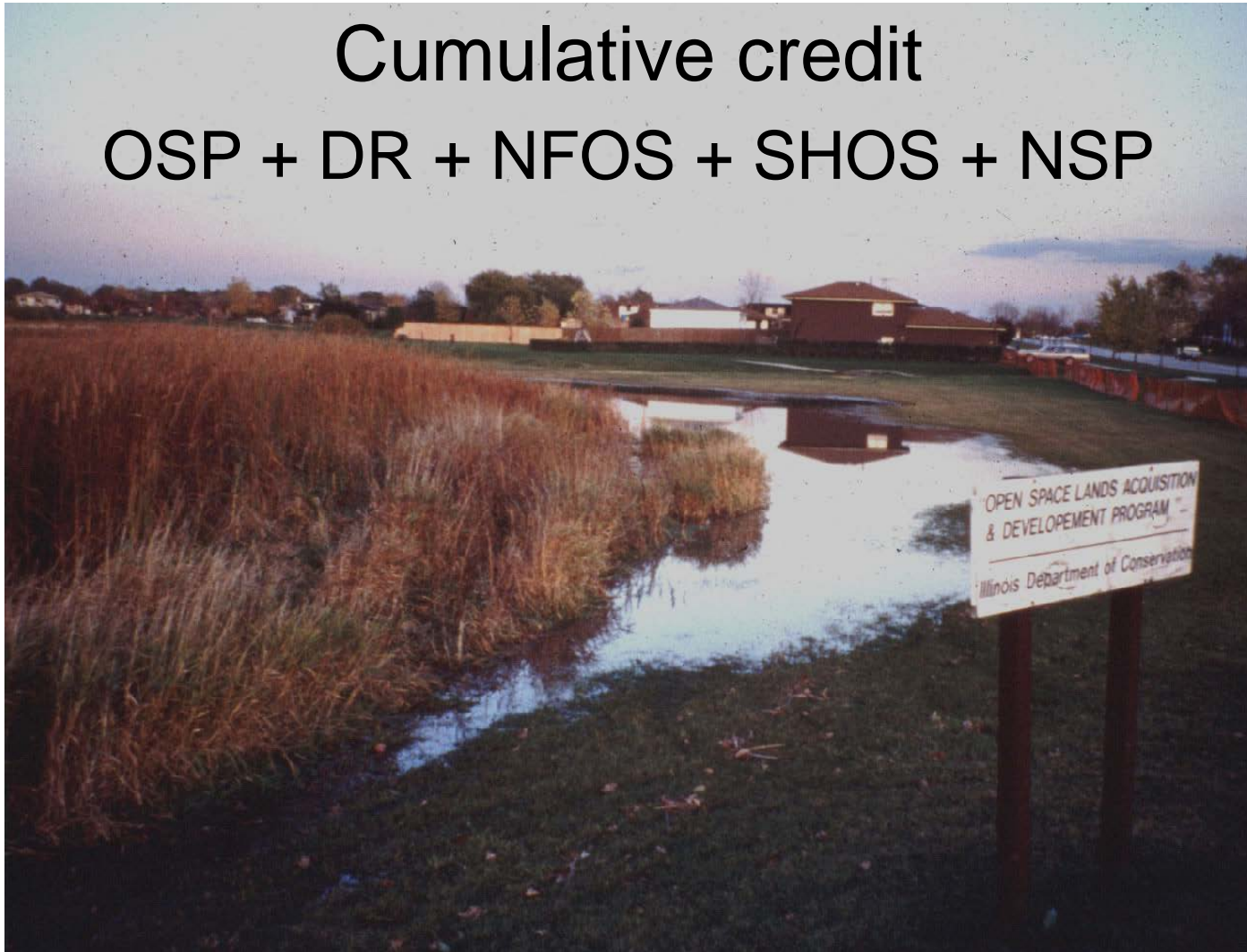
- Channels: no rip rap, dredging, filling, removal of vegetation
- Ocean shores: no dune alterations, beach nourishment, seawalls, jetties





# 420 – Open Space Preservation

Cumulative credit  
OSP + DR + NFOS + SHOS + NSP



# 420 – Open Space Preservation

*Manual Page 420-31*

## 423 Credit Calculation

---

$$c420 = (OSP \times rOSP) + (DR \times rDR) + cNFOS + cSHOS + cOSI + cLZ + (NSP \times rNSP), \text{ where}$$

$$cNFOS = (NFOS\ 1 \times rNFOS\ 1) + (NFOS\ 2 \times rNFOS\ 2) + (NFOS\ 3 \times rNFOS\ 3) + (NFOS\ 4 \times rNFOS\ 4) + (NFOS\ 5 \times rNFOS\ 5), \text{ and}$$

$$cOSI = (OSI\ 1 \times rOSI\ 1) + (OSI\ 2 \times rOSI\ 2) + (OSI\ 3 \times rOSI\ 3) + (OSI\ 4 \times rOSI\ 4) + (OSI\ 5 \times rOSI\ 5) + (OSI\ 6 \times rOSI\ 6) + OSI\ 7, \text{ and}$$

$$cLZ = \sum(LZ\ s \times rLZ\ s)$$

---

(Let ISO do it)

# 420 – Open Space Preservation

## Verification



### Two part review

1. Office review of the 10 largest sites + a sample
  - ✓ OSP/DR/NFOS: owner documentation
  - ✓ OSP/OSI/LZ/NSP: regulations and permits
2. Field check of sites
  - ✓ Check of aerial photos

Natural Floodplain Functions Form	
Property name	Pettaway County Park
Property location	1 mile northeast of Frenchford, on the Pettaway River
	Pettaway Park was created in 1954 in order to protect the area from the booming logging industry. The area

**SALMON HABITAT PROTECTION  
AND  
RESTORATION STRATEGY**



# 420 – Open Space Preservation



Questions?

Natural Floodplain Functions Form	
Property name	Pettaway County Park
Property location	1 mile northeast of Frenchford, on the Pettaway River
	Pettaway Park was created in 1954 in order to protect the area from the booming logging industry. The area

**SALMON HABITAT PROTECTION  
AND  
RESTORATION STRATEGY**



# 420 – Open Space Preservation

## Activity 420 (Open Space Preservation)

### Assignment, Part 2

---

St. Charles is a city on the Fox River downstream from Dundee. The City is considering applying to the CRS. The City's planner asks Dundee's CRS Coordinator some questions about possible credit.

#### Assignment:

1. The City has an ordinance that reads:

18.34.103. Subdivisions in the SFHA. This section applies to all subdivision proposals, annexation agreements, manufactured home parks, and other major developments

(a) Subdivisions, annexation agreements, manufactured home parks and other major developments shall be reviewed to assure that the proposed developments are consistent with the provisions of this ordinance and the need to minimize flood damage.

(b) The applicant shall be encouraged to site the parks and other public grounds within the floodplain portion of the development by use of the transfer of higher density privileges to non-floodprone areas of the development, as specified in Section 18.12.

a. Would this ordinance language receive CRS credit?

b. If so, what credit?