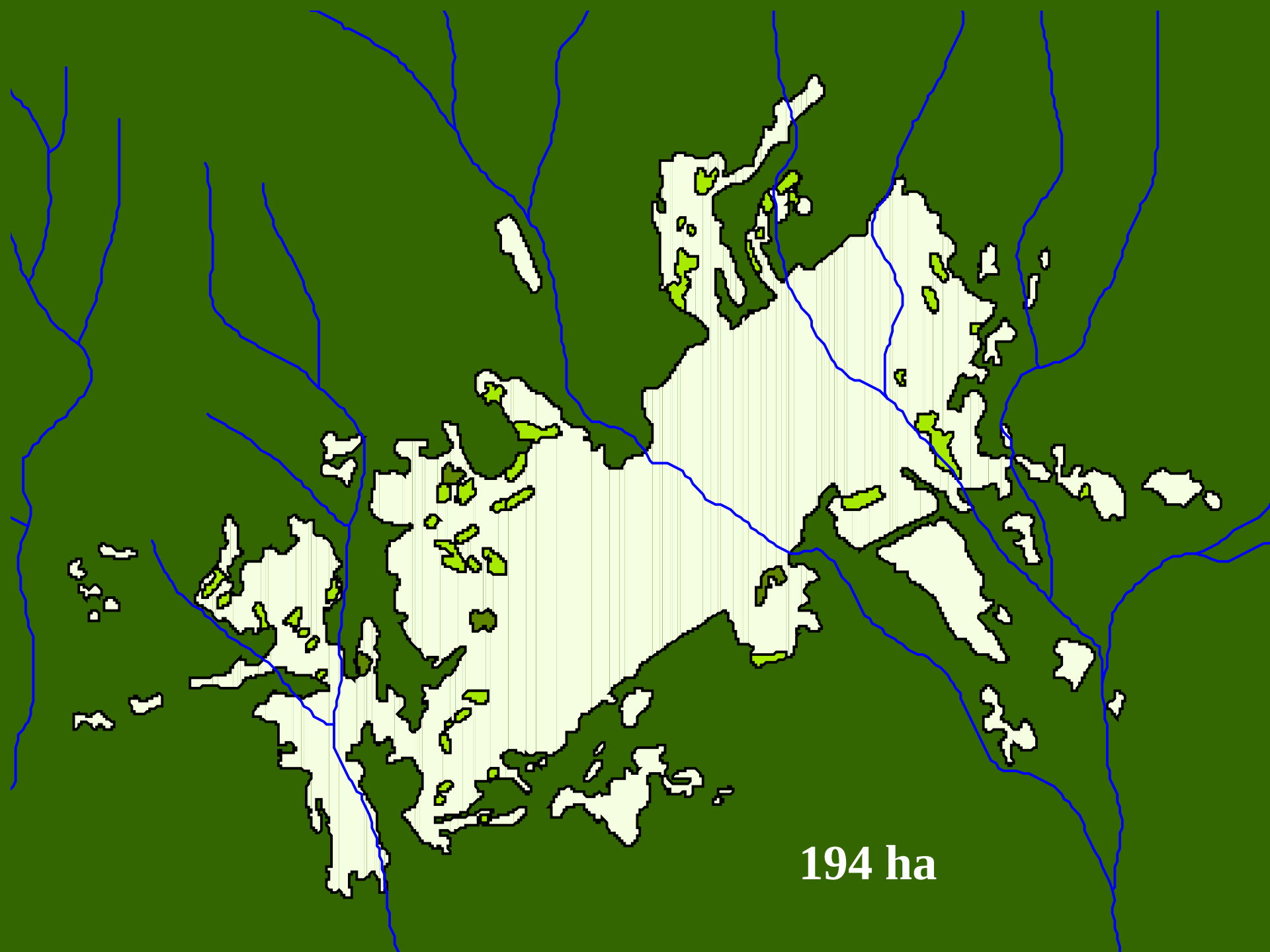
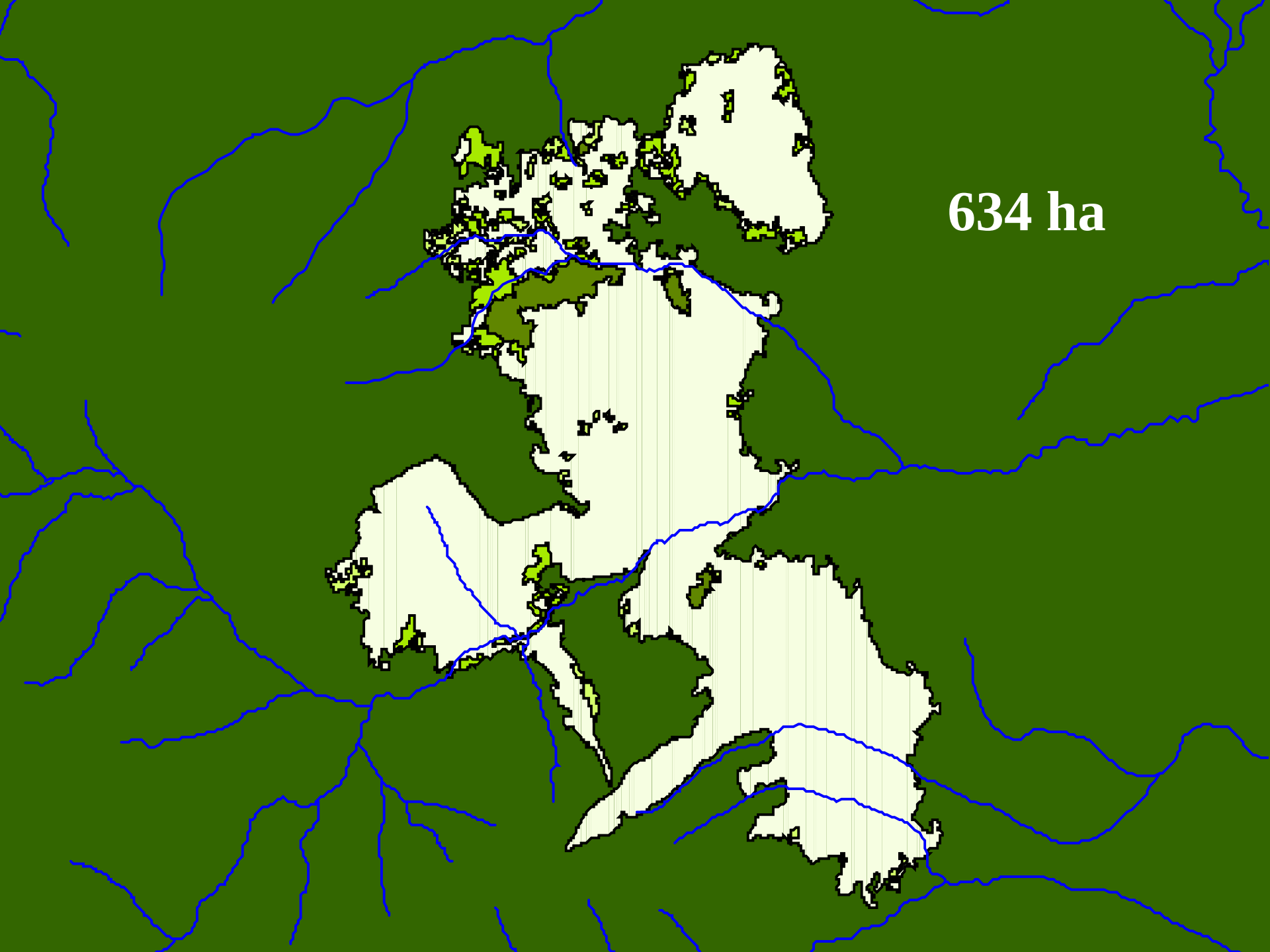
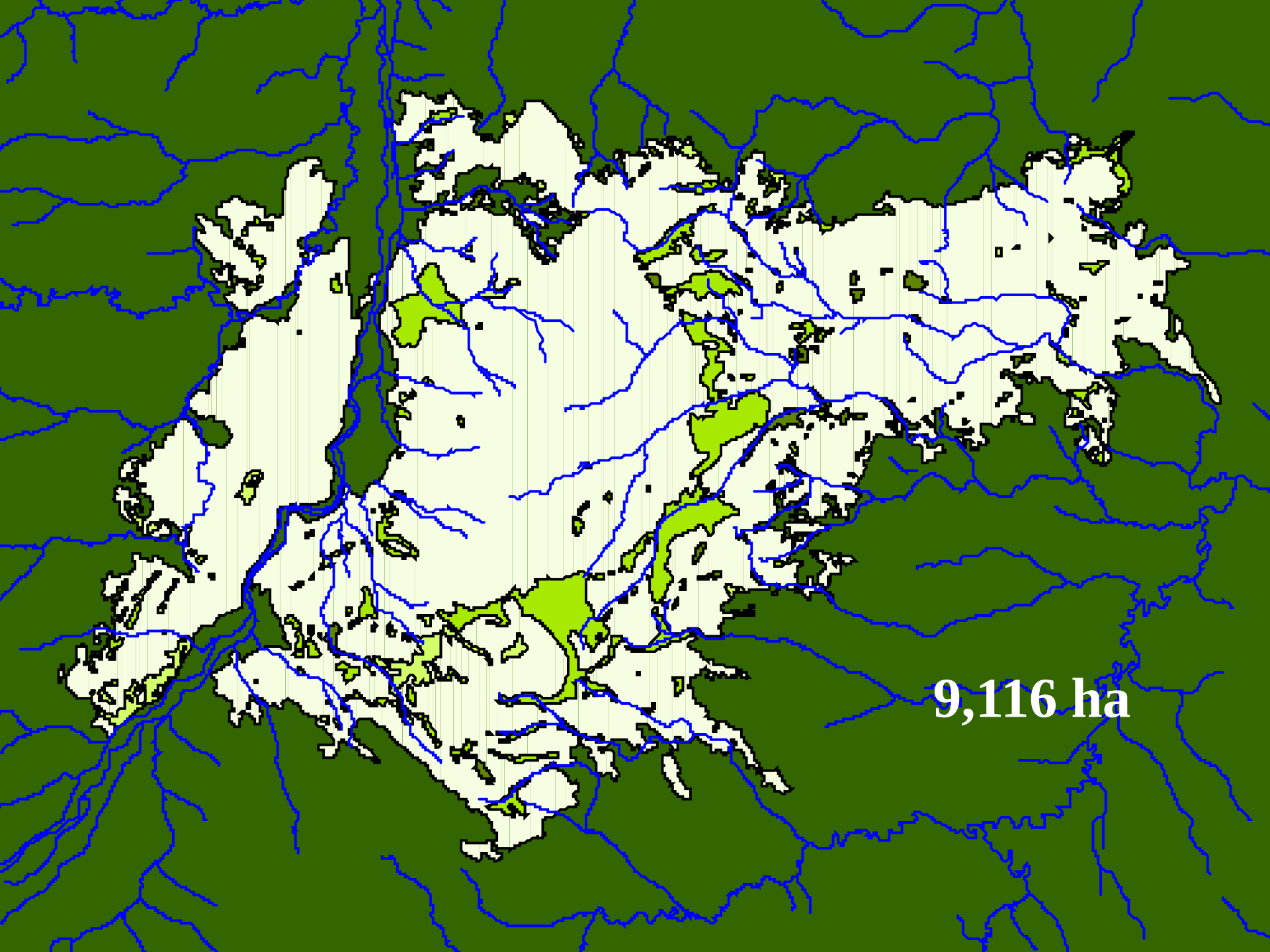
**DISTURBANCE = The net area affected by any process which results in ecosystems being dramatically altered over a short period of time.**

***i.e.,*** ***fire, insect outbreak, flooding, landslide, harvesting, wind, ice,….***

***For now, our interest is limited to fire.***


194 ha

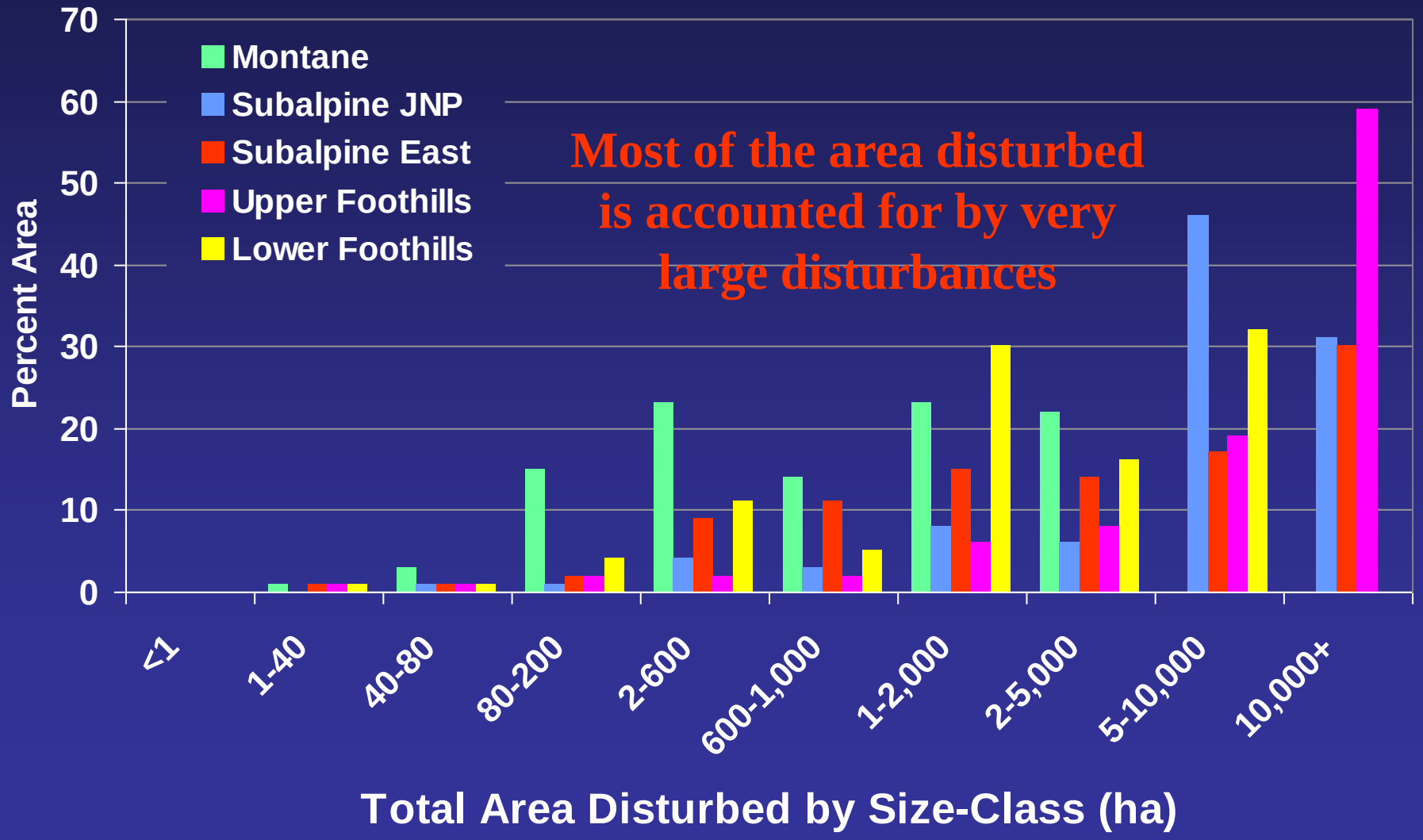

634 ha


9,116 ha

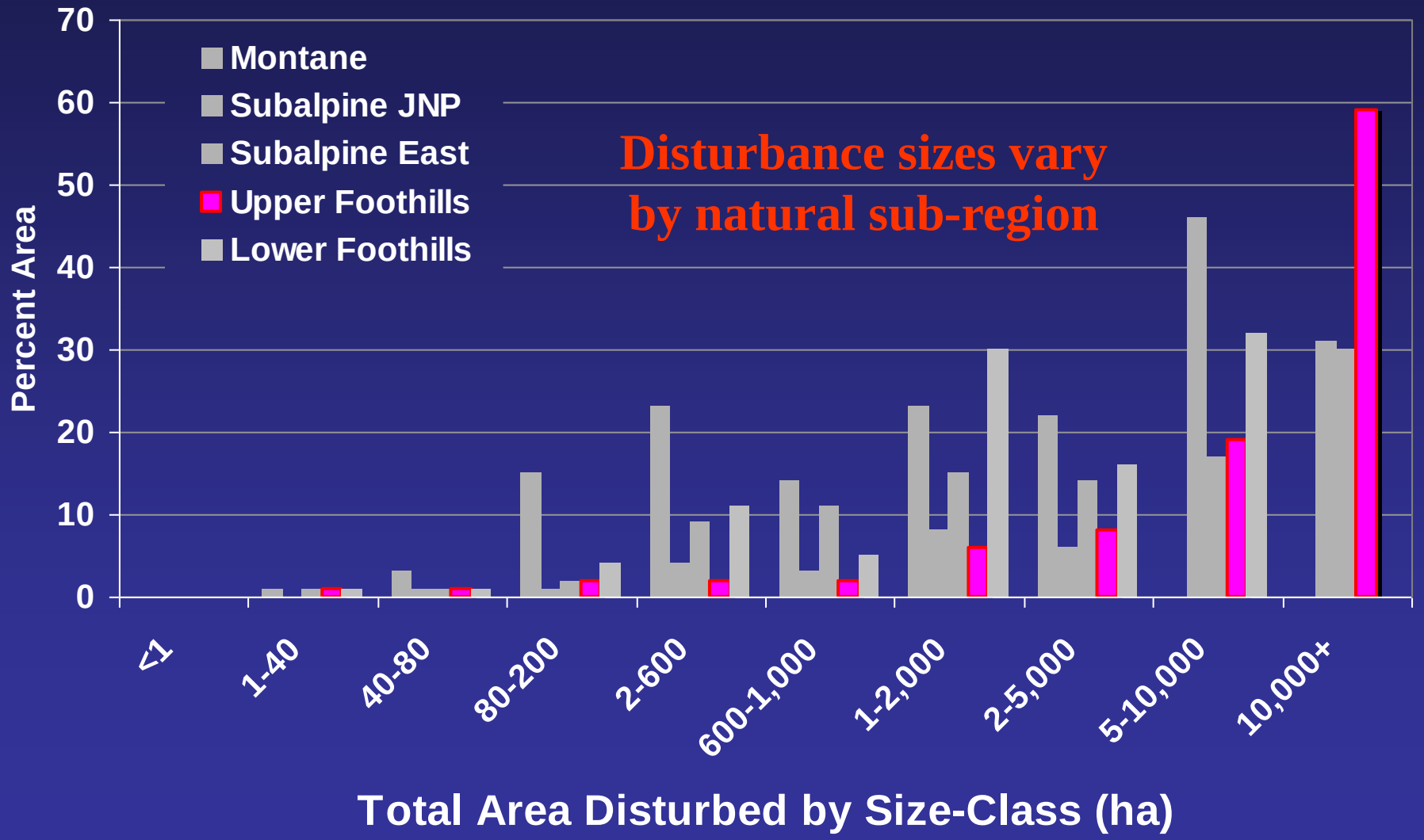
# At First Glance

- Sizes range from very small to very large
- One disturbance has many patches
- Burn boundaries are not straight
- Material is left over in the middle
- Fires burn everything and anything

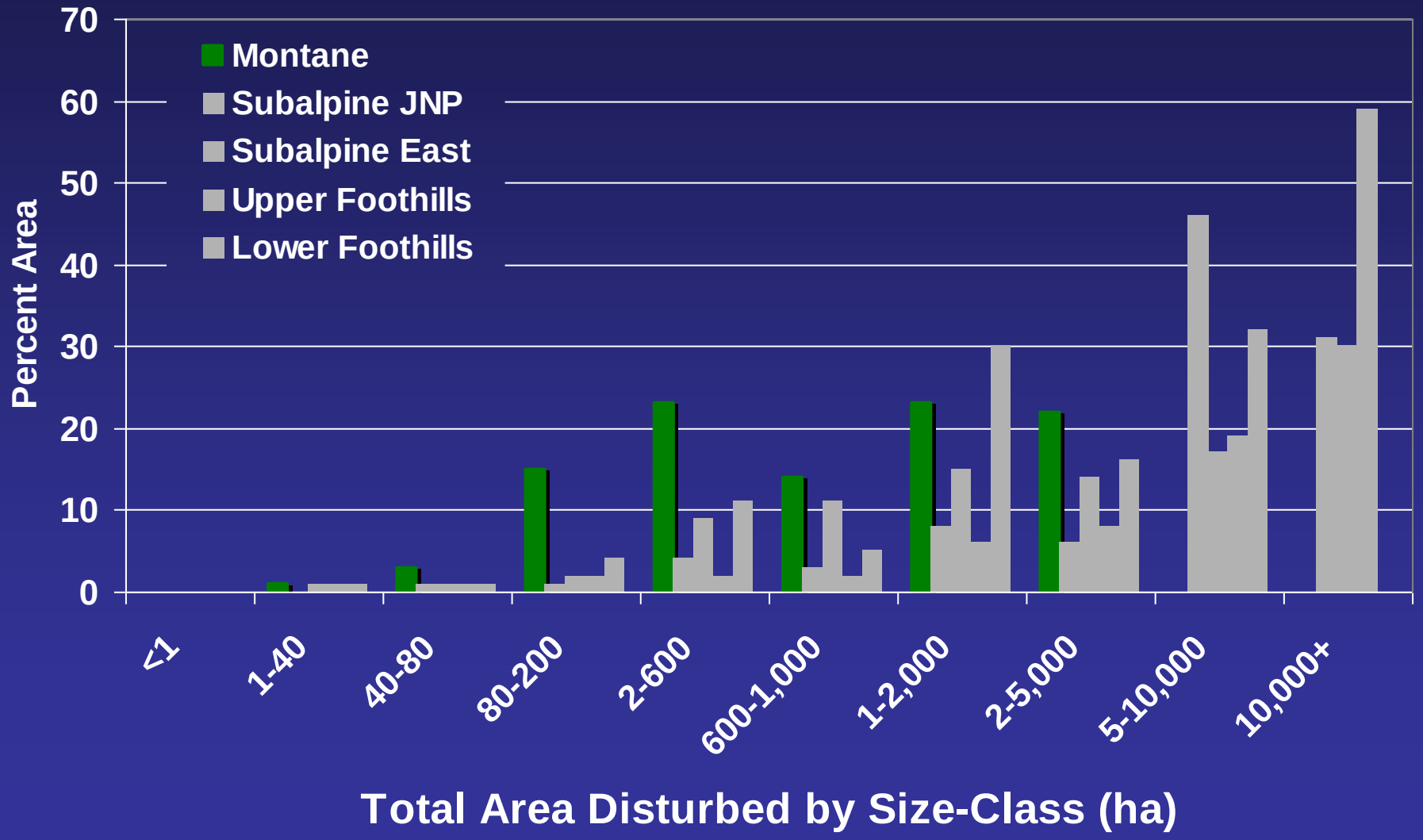
# Disturbance Size Distributions on FMF Landscapes by Area



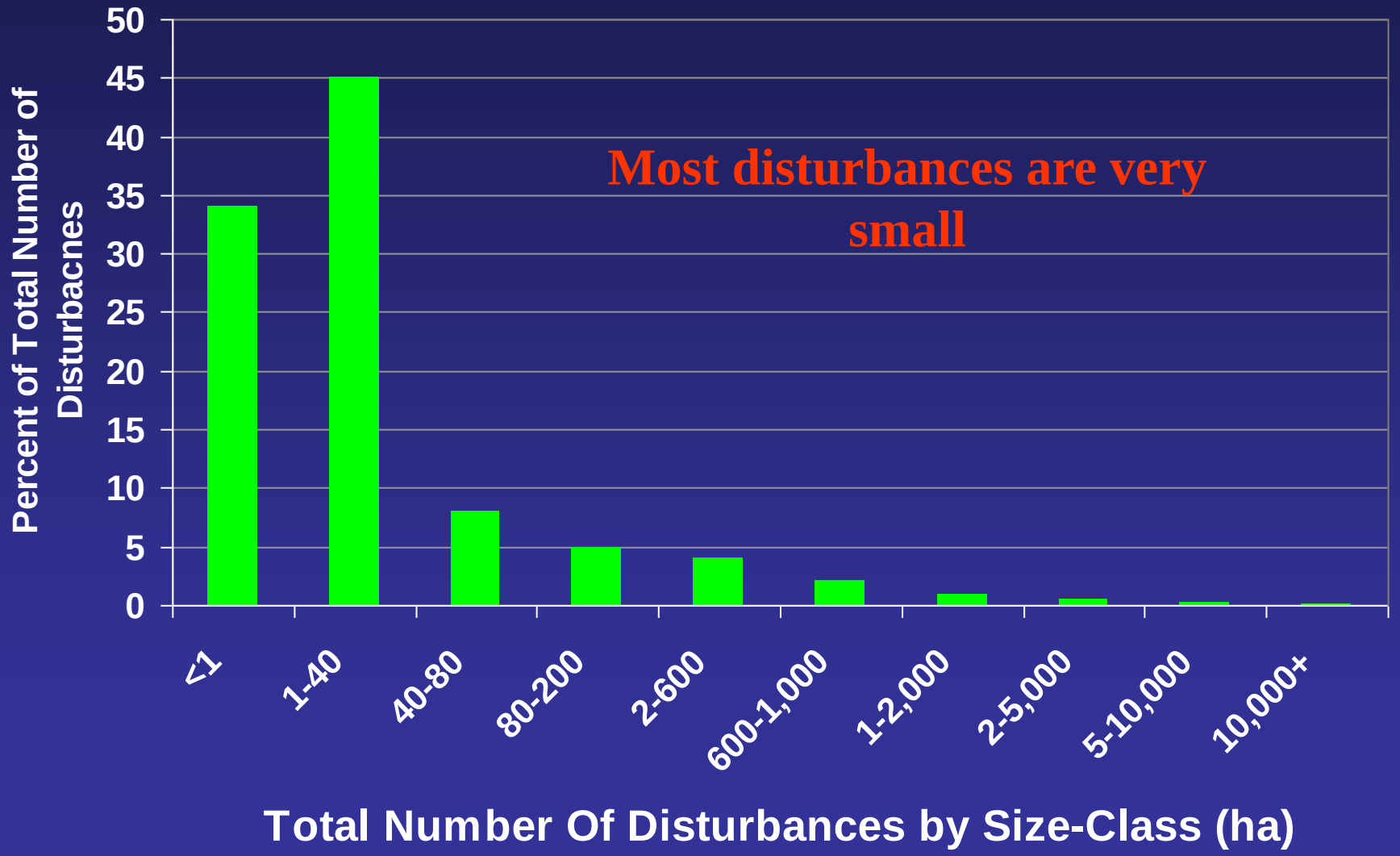
# Disturbance Size Distributions on FMF Landscapes by Area



# Disturbance Size Distributions on FMF Landscapes by Area



# Disturbance Size Distributions on FMF Landscapes by Numbers



# At First Glance

- Sizes range from very small to very large
- One disturbance has many patches
- Burn boundaries are not straight
- Material is left over in the middle
- Fires burn everything and anything

# Disturbance vs. Event

28 Ha Burnt Forest

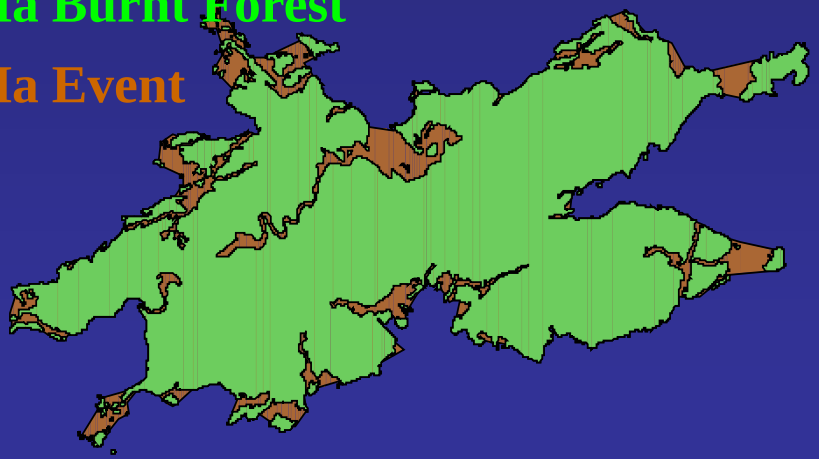
38 Ha Event

8,886 Ha Burnt Forest

10,856 Ha Event

697 Ha Burnt Forest

1,422 Ha Event



1,163 Ha Burnt Forest

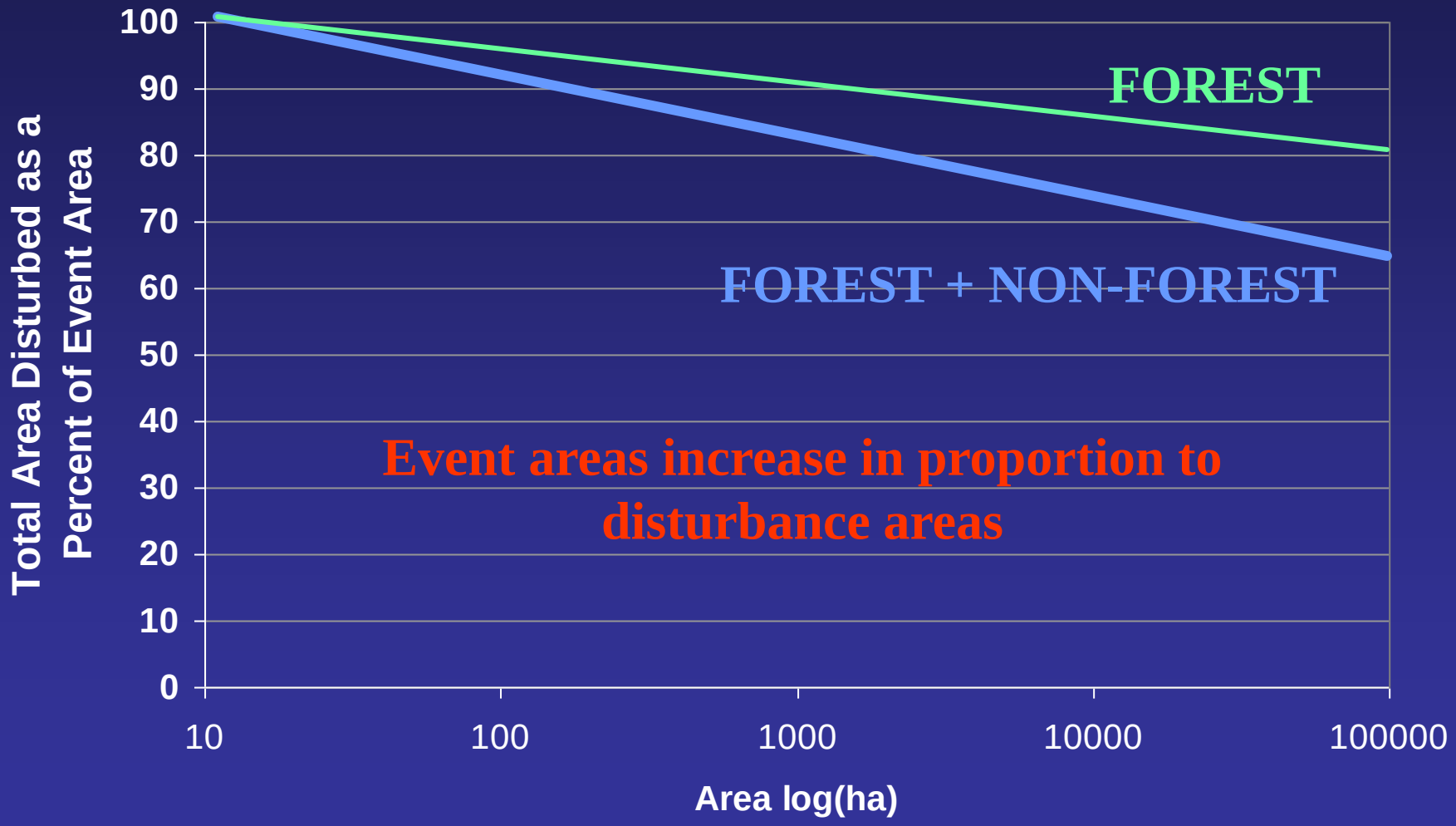
1,325 Ha Event

**DISTURBANCE = The net area affected by any process which results in ecosystems being dramatically altered over a short period of time.**

**EVENT = The greater (gross) area of a disturbance (formed by a collection of forest and non-forest patches)**

# What did not burn in the event area?

# Disturbance Event Area Relative to the Net Area Disturbed

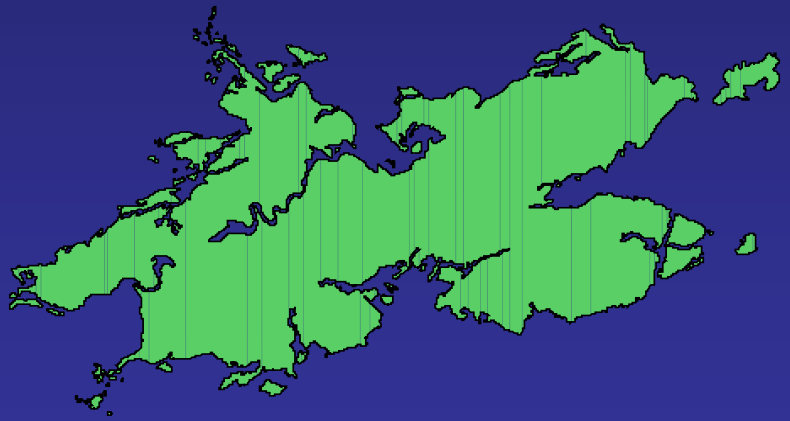


**15 Patches 28 ha**

**13 Patches 8,886 ha**

***Forested Patches Cluster to Form Disturbance Events***

**54 Patches 697 ha**



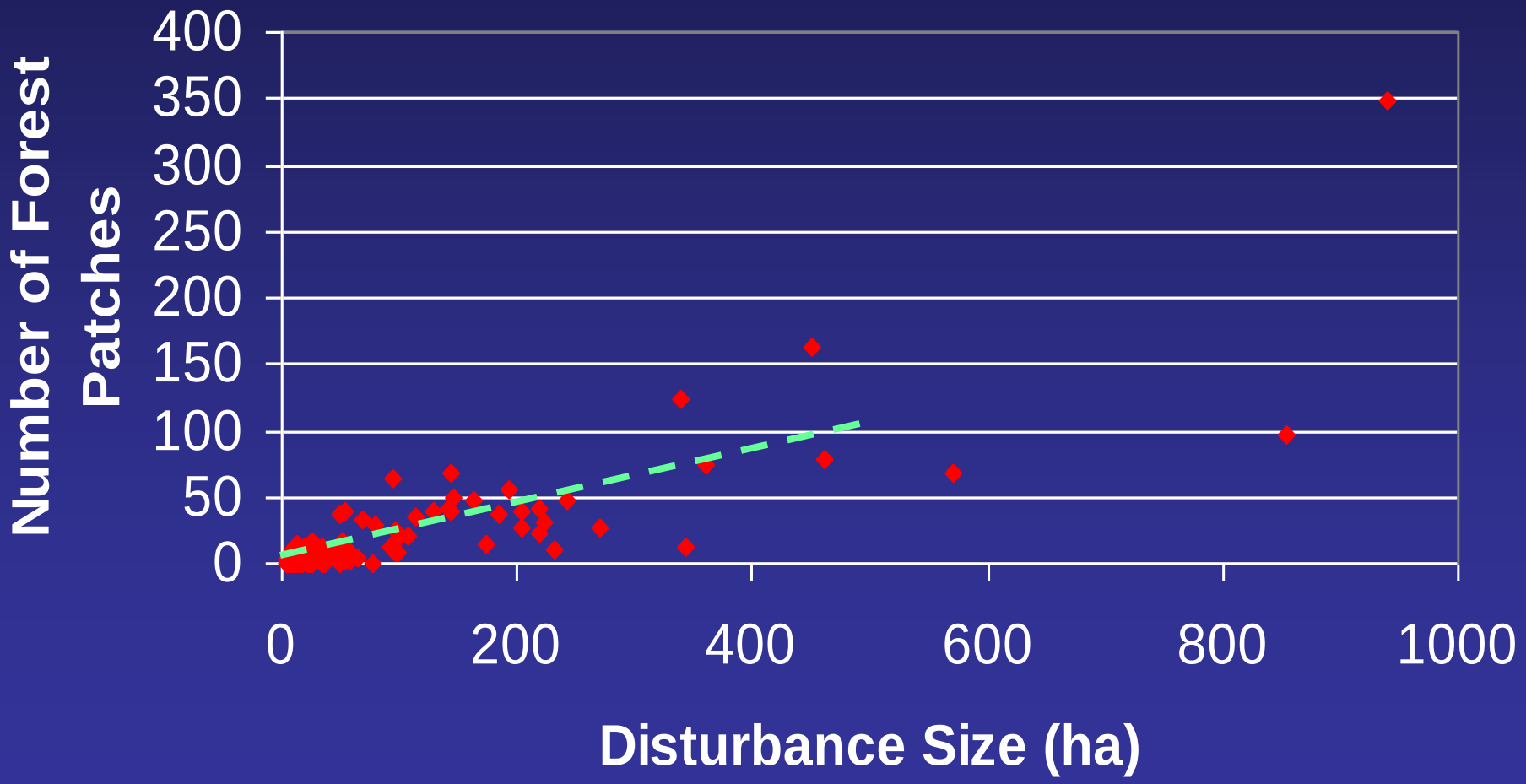
**76 Patches 1,163 ha**

**DISTURBANCE = The net area affected by any process which results in ecosystems being dramatically altered over a short period of time.**

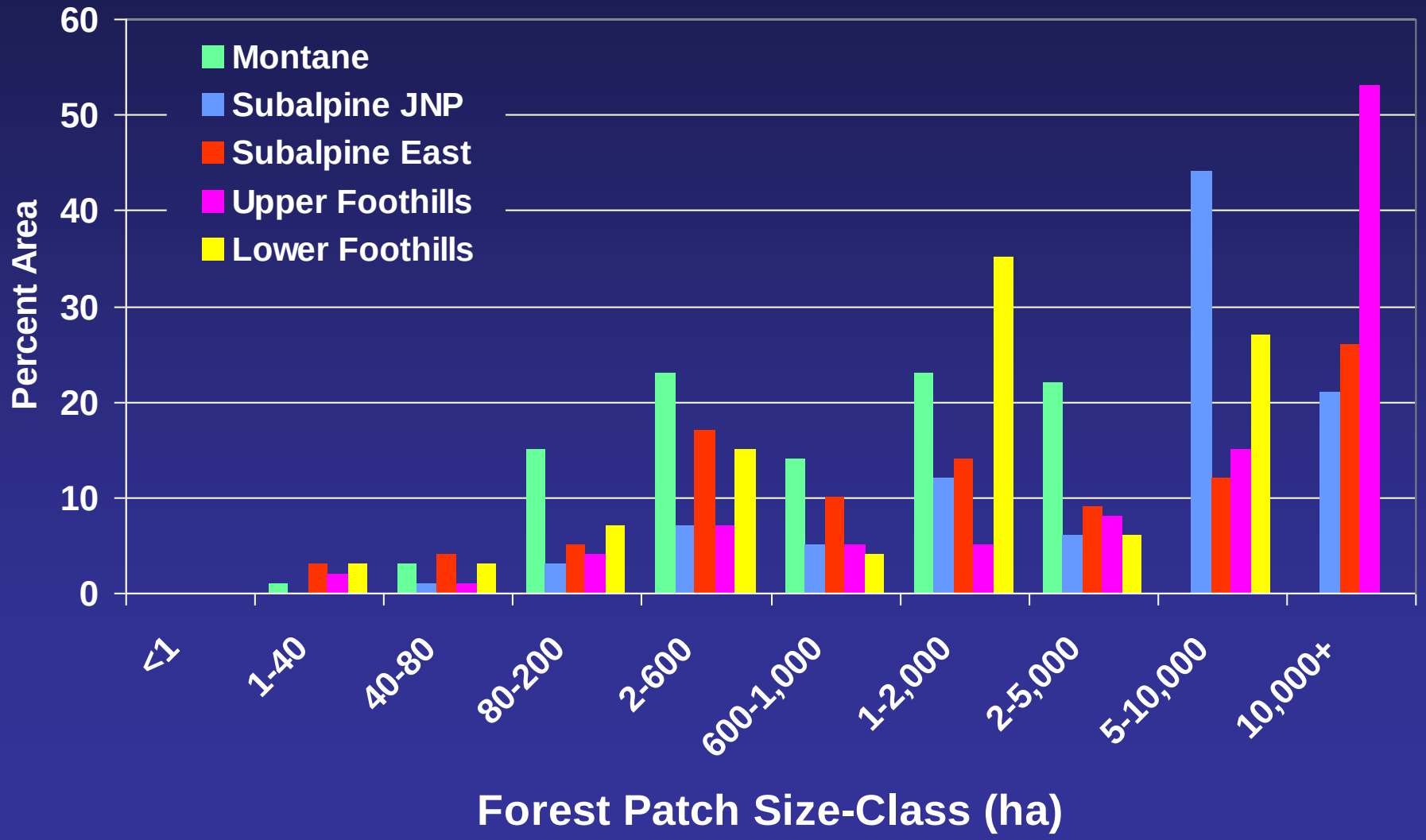
**EVENT = The greater (gross) area of a disturbance (formed by a collection of forest and non-forest patches)**

**FOREST PATCH = The contiguous area of same-aged forest, or same type of non-forest.**

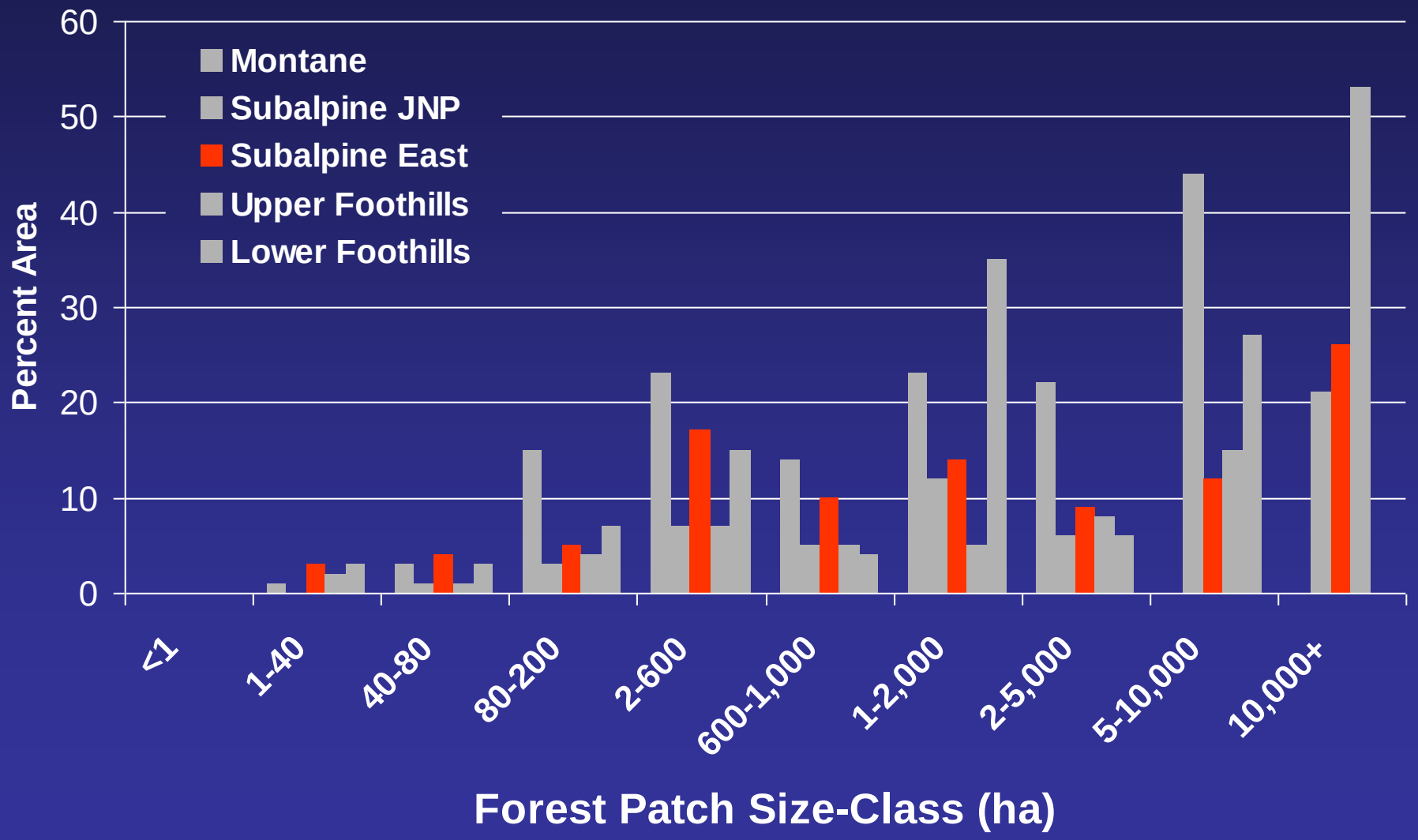
# Numbers of Forest Patches per Disturbance



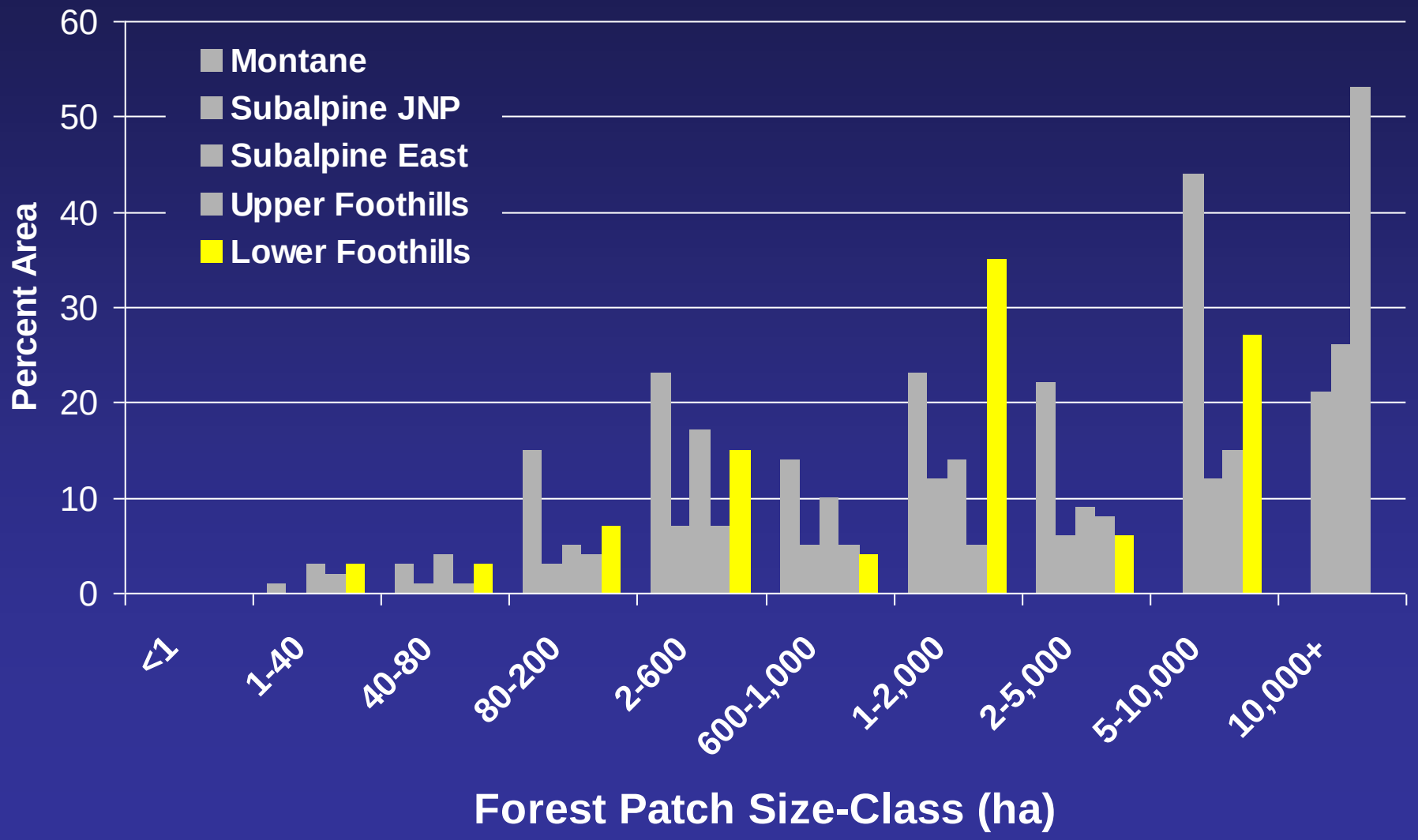
# Young Forest Patch Size Distribution on FMF Landscapes



# Young Forest Patch Size Distribution on FMF Landscapes

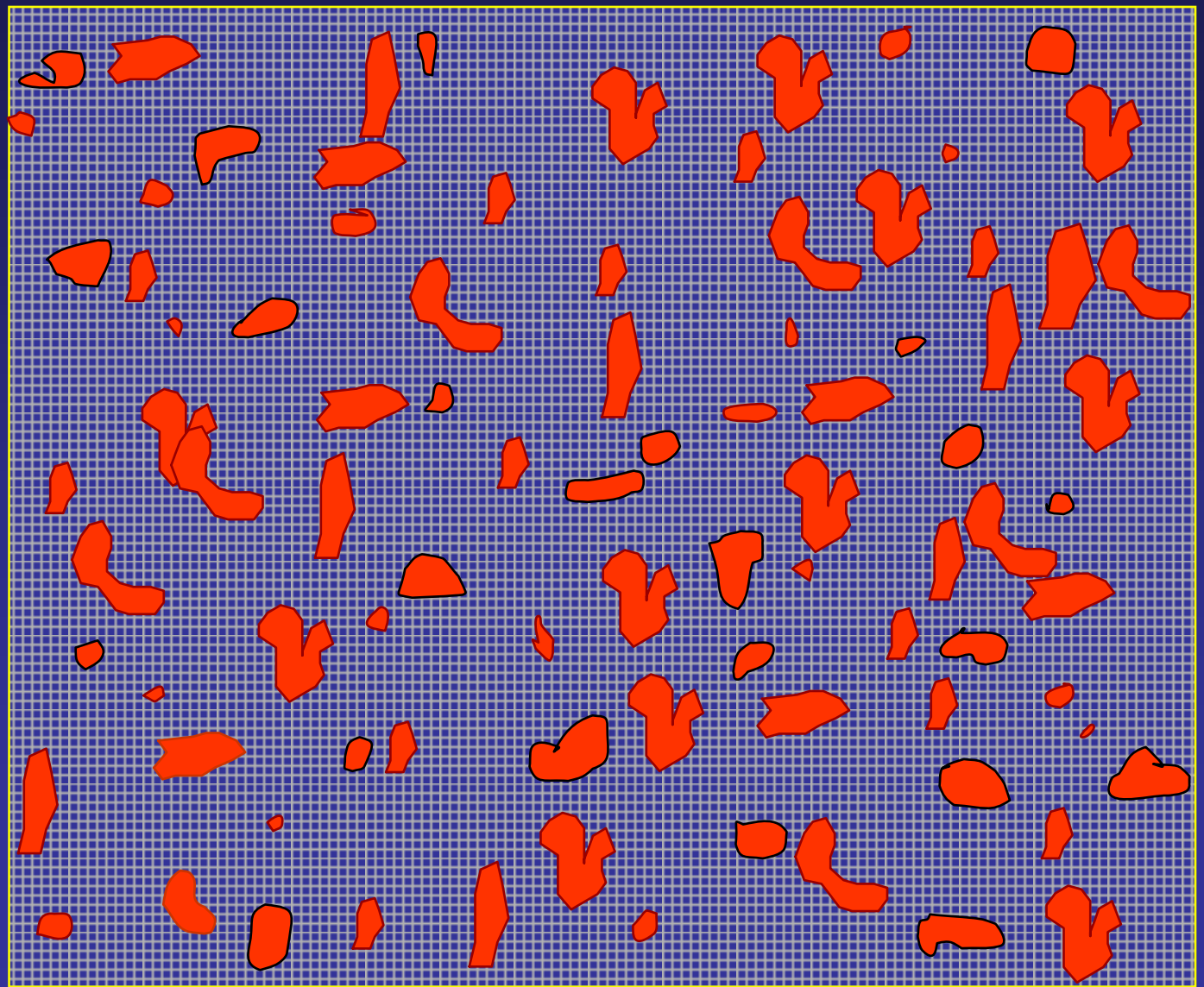


# Young Forest Patch Size Distribution on FMF Landscapes



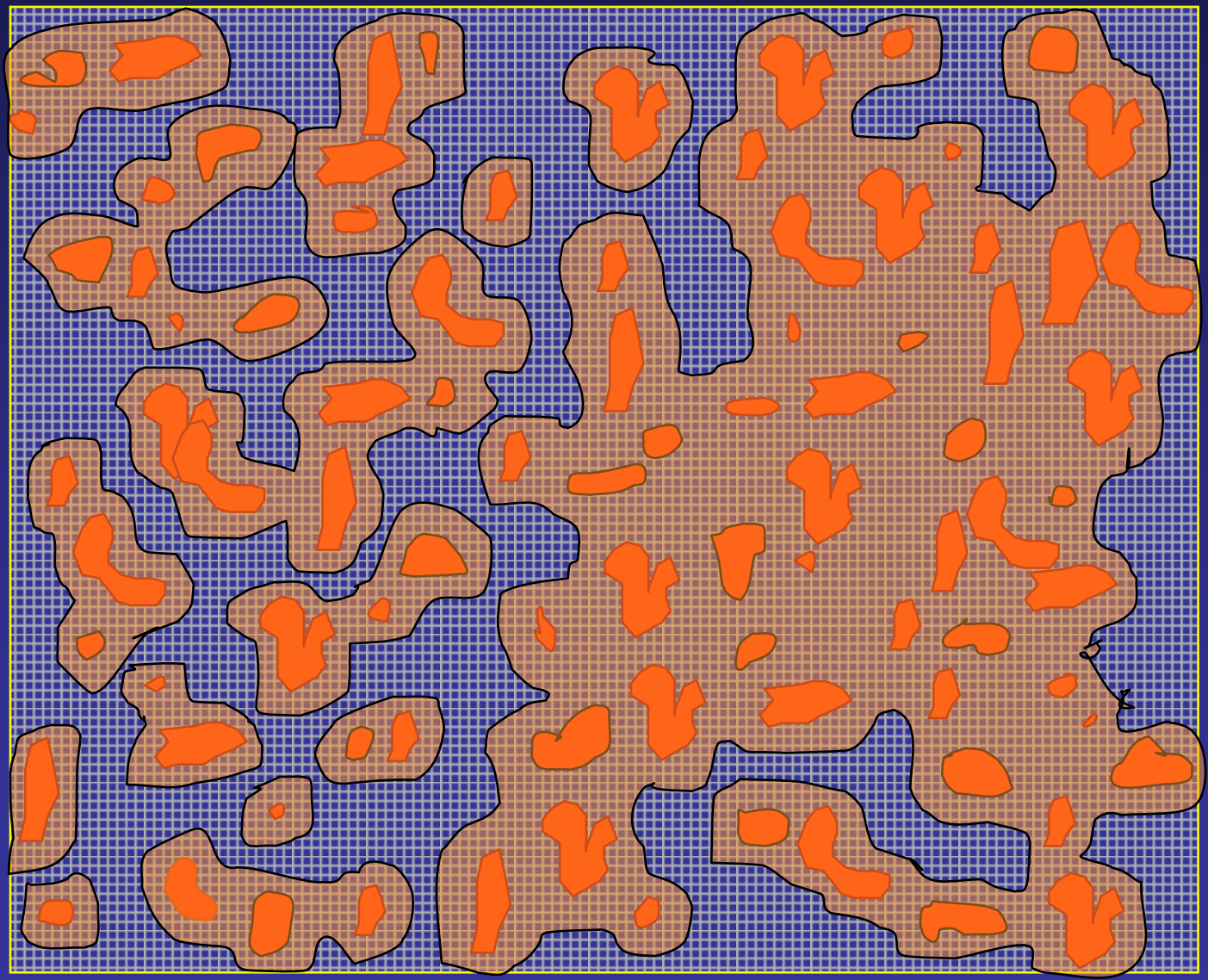
# Patch Sizes, Event Sizes: An Example

# Dispersed Blocks, Low Maximum Size



**15% by Area Disturbed**

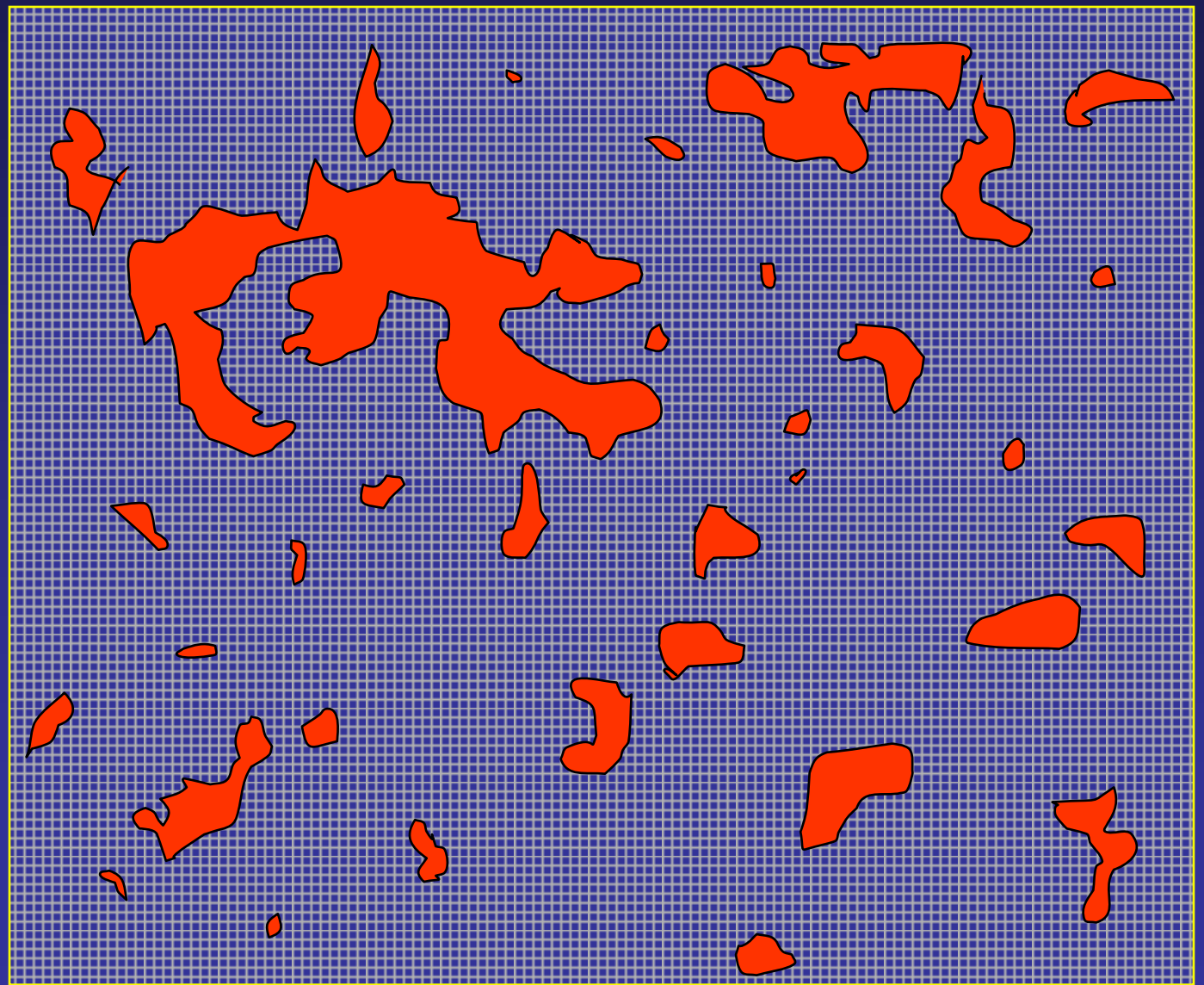
# Dispersed Blocks, Low Maximum Size



**15% by Area Disturbed**

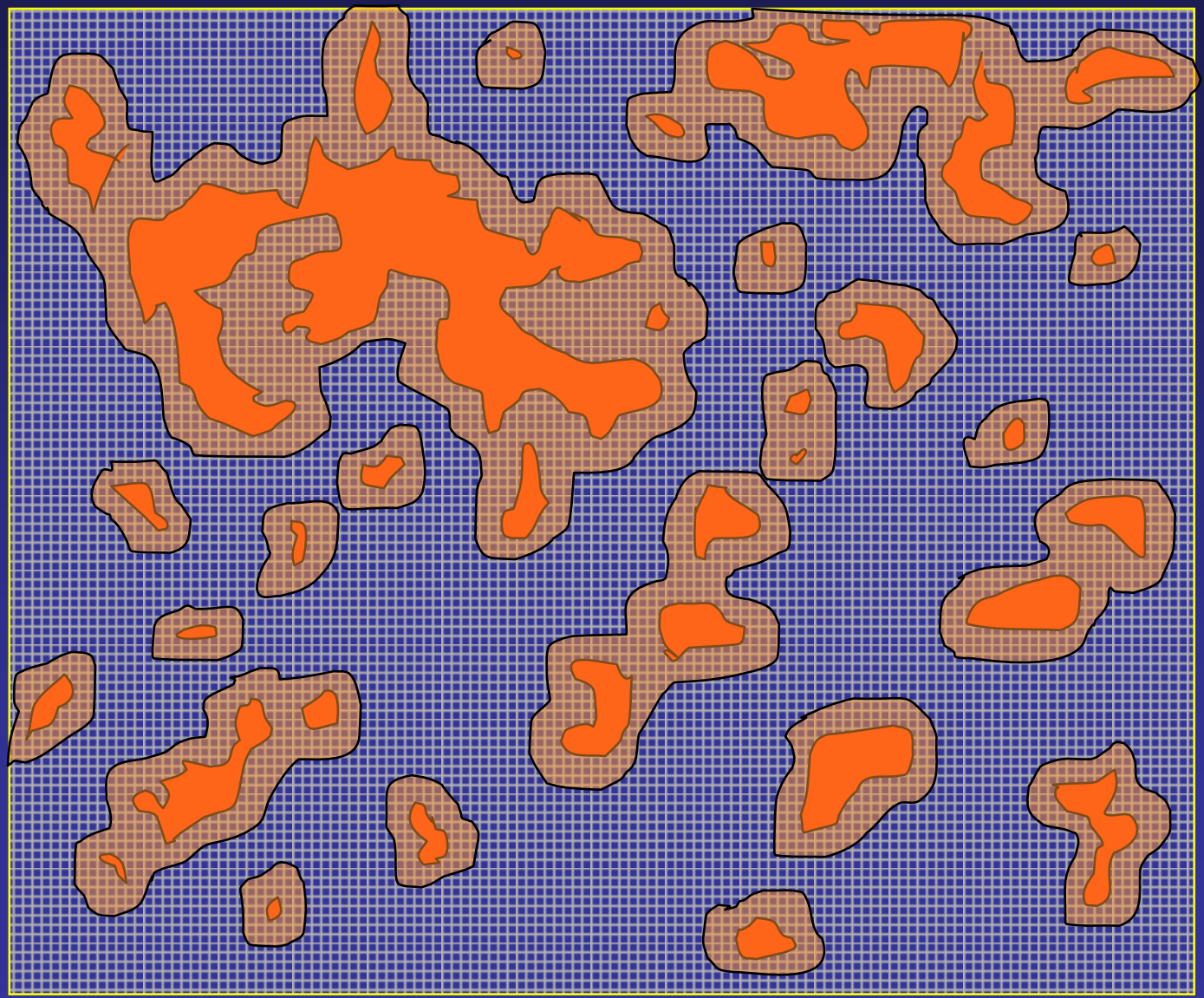
**25% Interior Forest Remaining**

# Dispersed Blocks, High Maximum Size



**15% by Area Disturbed**

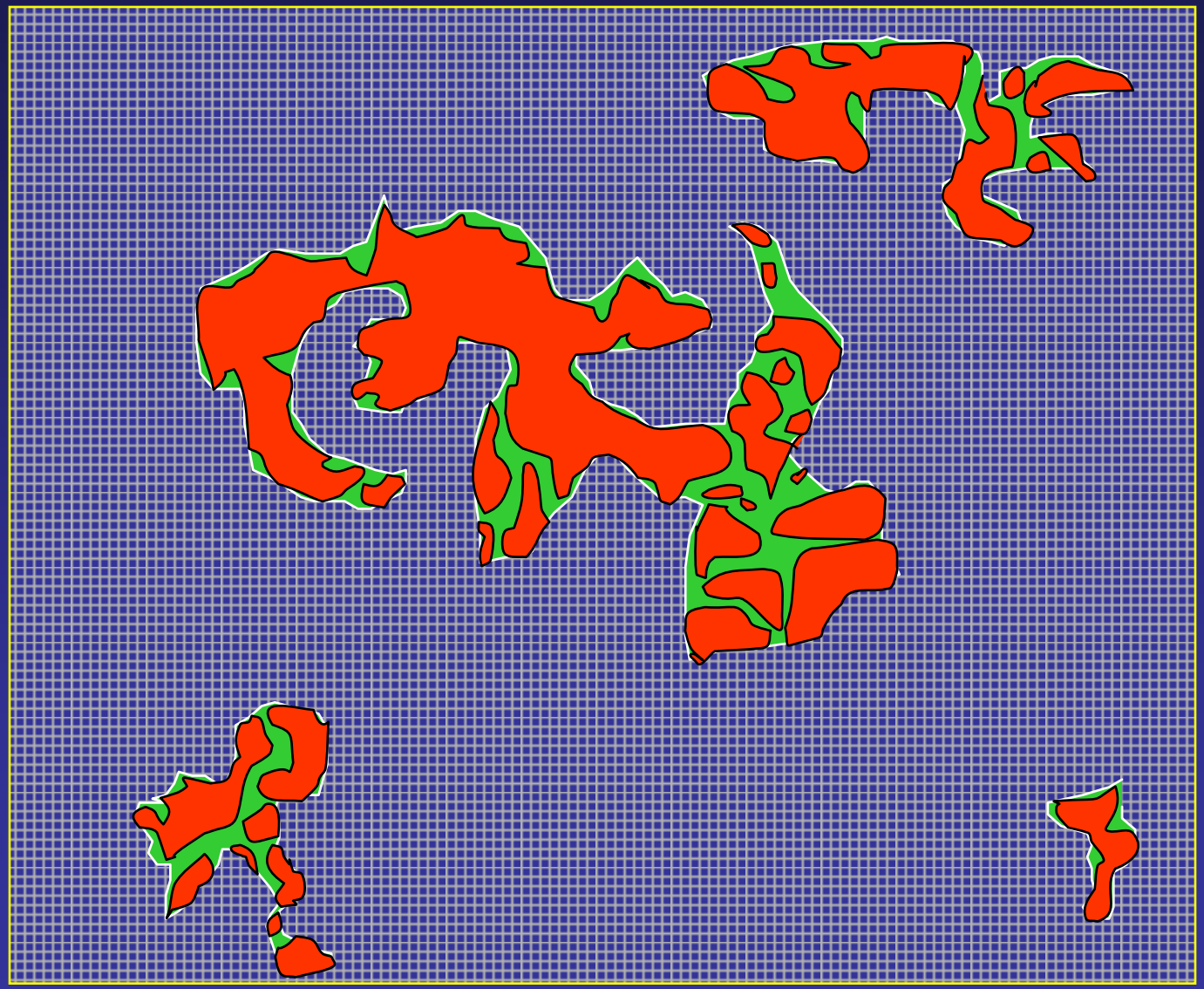
# Dispersed Blocks, High Maximum Size



**15% by Area Disturbed**

**50% Interior Forest Remaining**

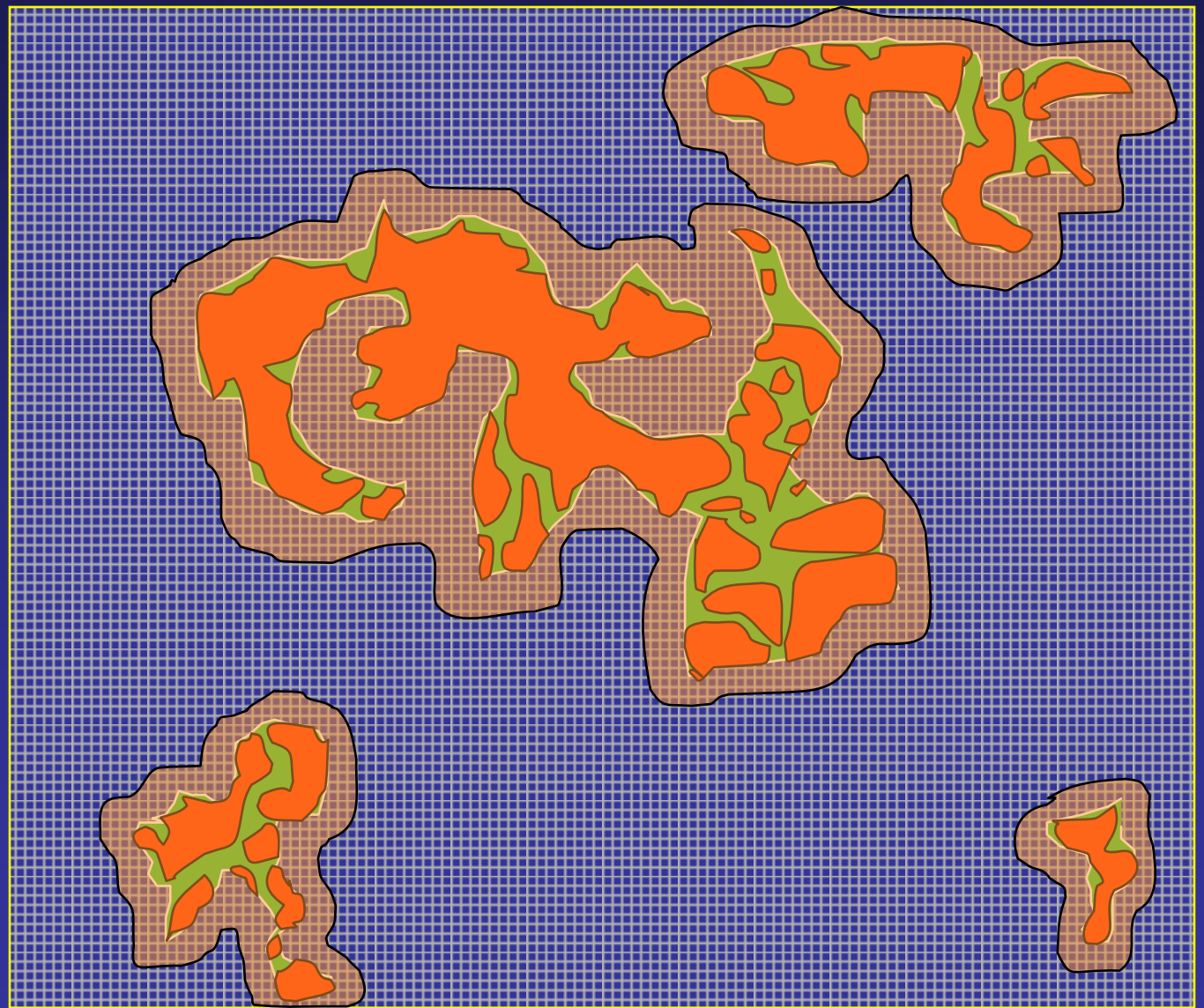
# Clustered Blocks, High Maximum Size



**15% by Area Disturbed**

**“Event” areas are outlined in green**

# Clustered Blocks, High Maximum Size

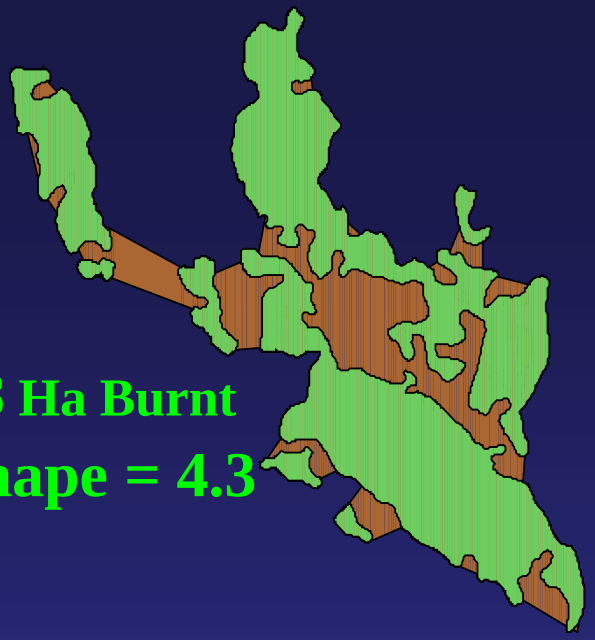


**15% by Area Disturbed**

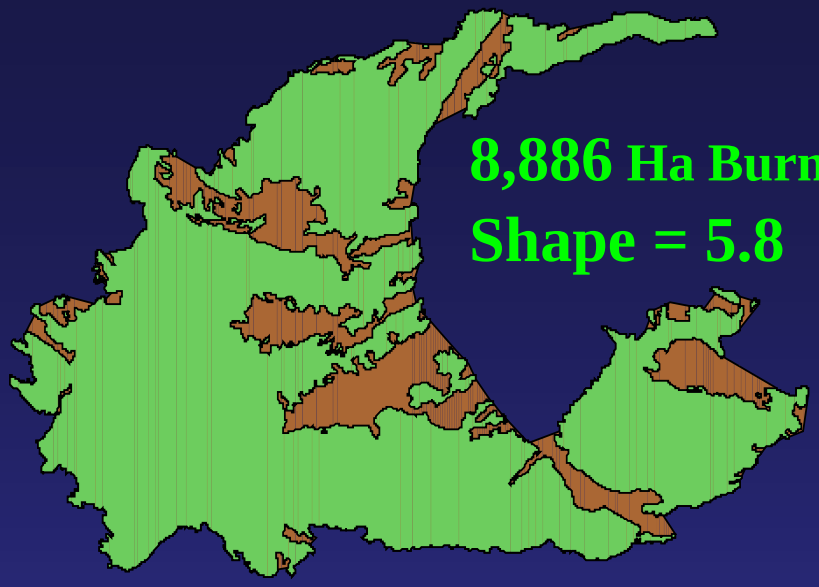
**65% Interior Forest Remaining**

# At First Glance

- Sizes range from very small to very large
- One disturbance has many patches
- Burn boundaries are not straight
- Material is left over in the middle (islands)
- Burns do not always respect riparian zones

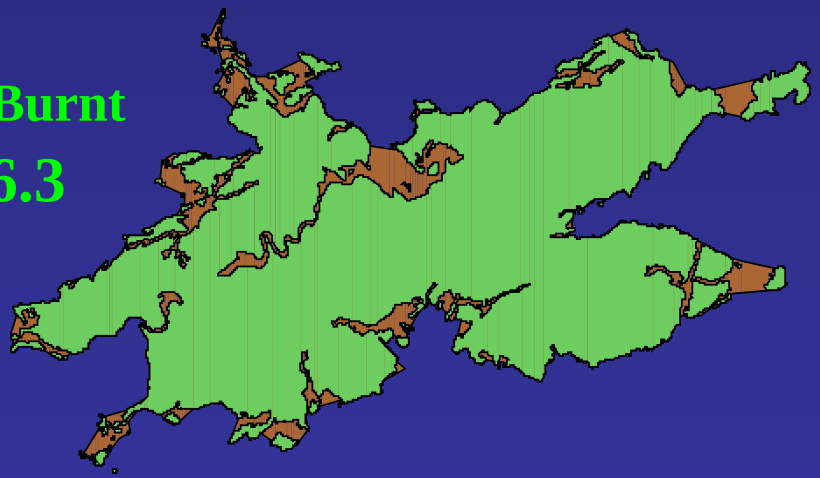


28 Ha Burnt
Shape = 4.3



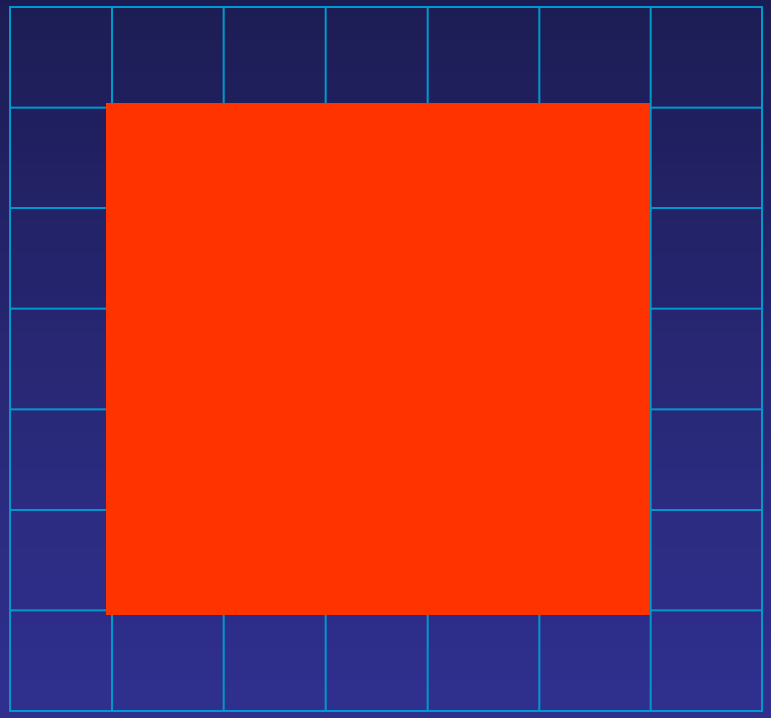
8,886 Ha Burnt
Shape = 5.8

697 Ha Burnt
Shape = 11.1



1,163 Ha Burnt
Shape = 6.3

# Simplest Shape = A Square or Circle

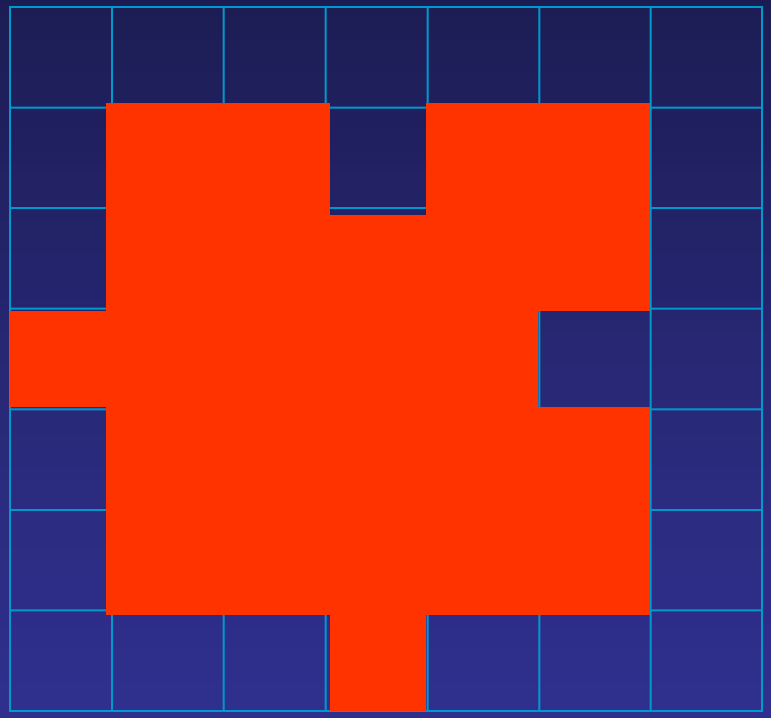


**Patch = 25 squares**

**Shape = 1.0**

**Rectangle Area Required = 25 squares**

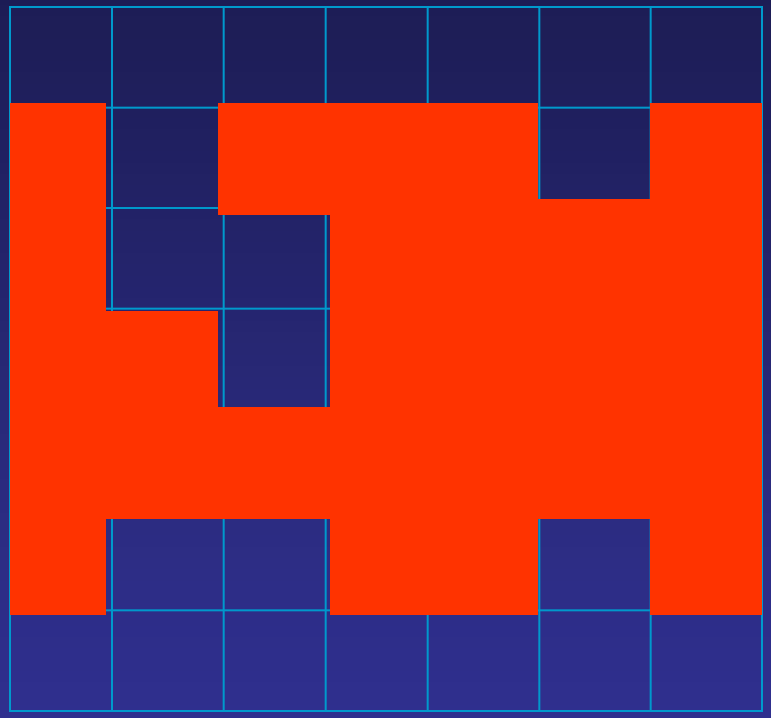
# As shape increases, so does the gross area (Event) required



**Patch = 25 squares**

**Shape = 1.4**

**Rectangle Area Required = 36 squares**

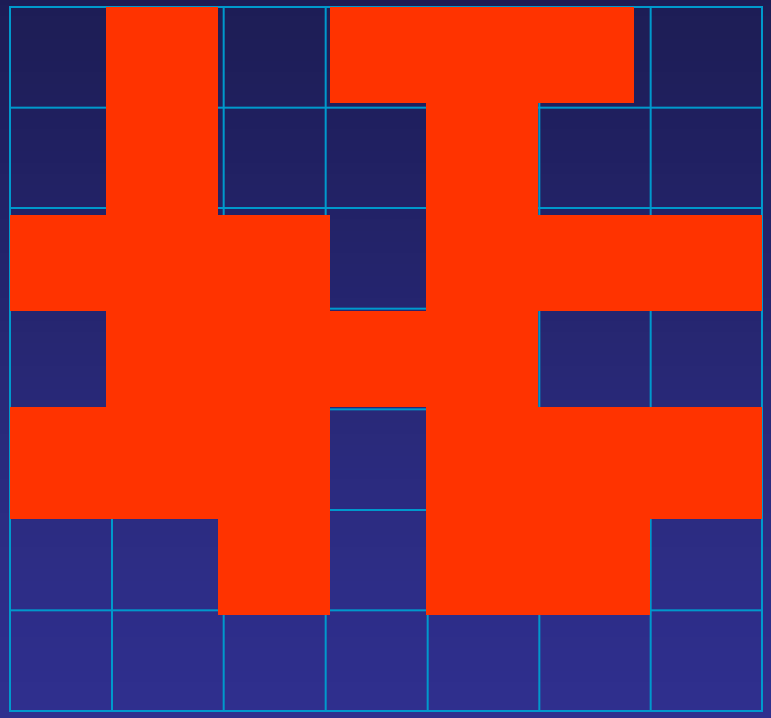


**Patch = 25 squares**

**Shape = 1.9**

**Rectangle Area Required = 35 squares**

# Limit of shape complexity at this resolution

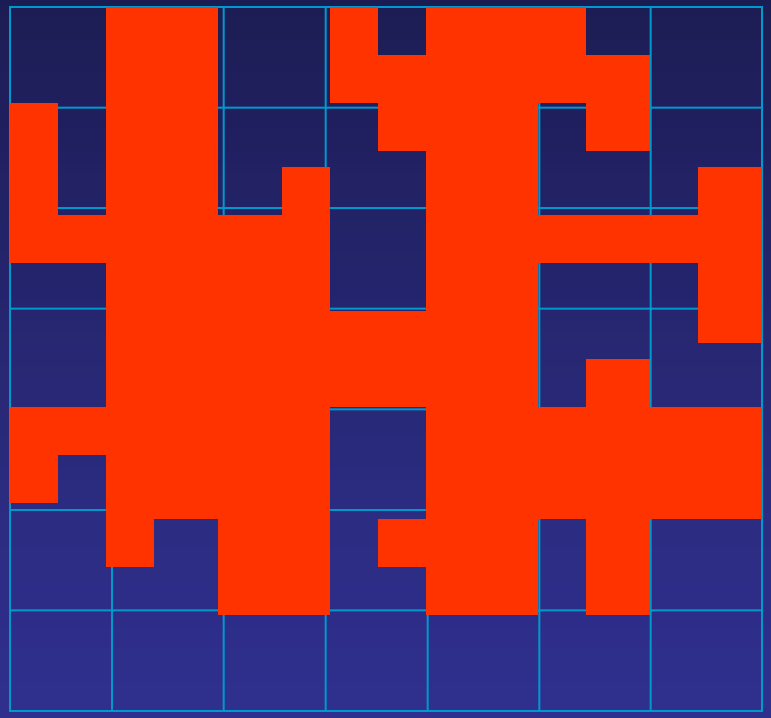


**Patch = 25 squares**

**Shape = 2.3**

**Rectangle Area Required = 42 squares**

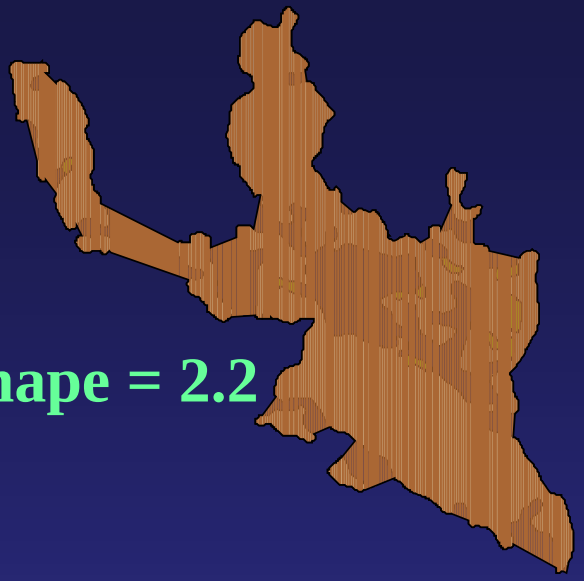
# By increasing resolution, shape increases



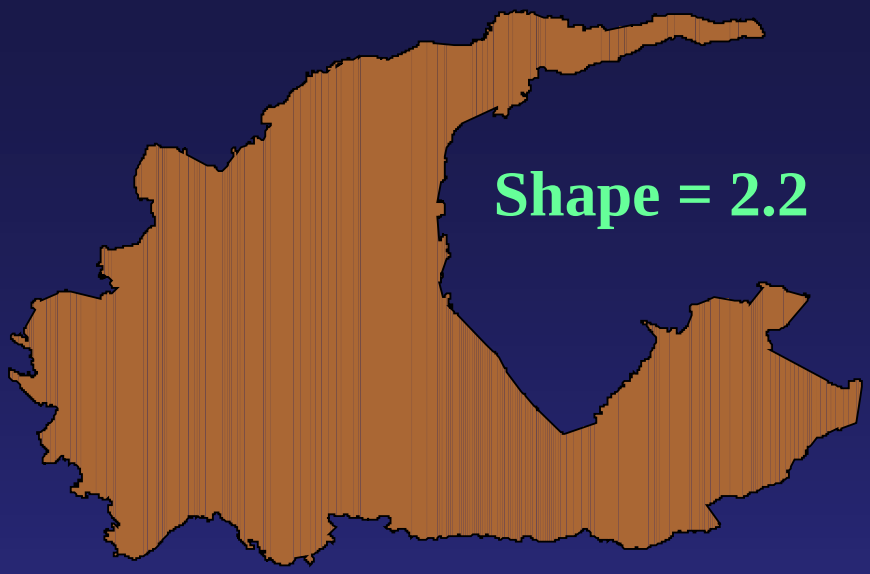
**Patch = 25 squares**

**Shape = 3.2**

**Rectangle Area Required = 42 squares**

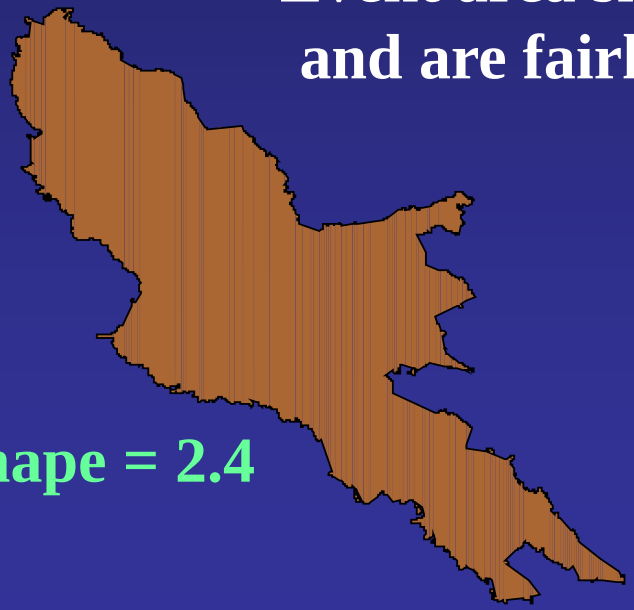


Shape = 2.2



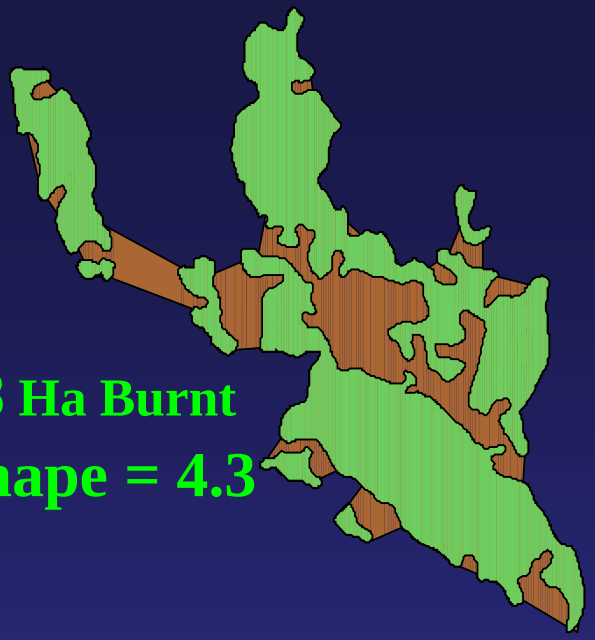
Shape = 2.2

**Event area shapes are not that complex, and are fairly constant with event size.**

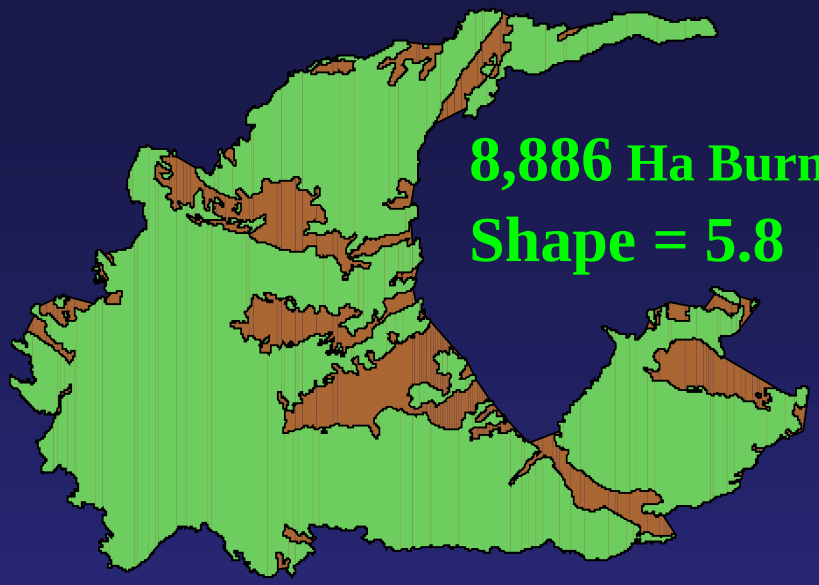


Shape = 2.4

Shape = 2.8



28 Ha Burnt
Shape = 4.3

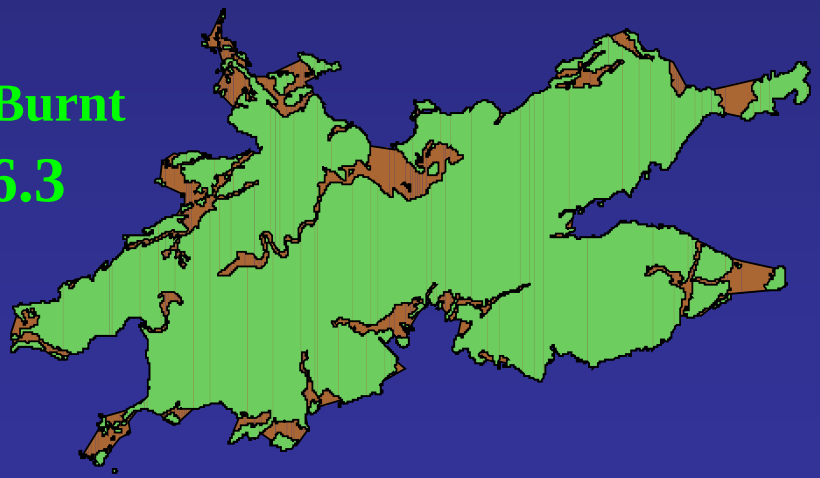


8,886 Ha Burnt
Shape = 5.8

On the other hand, disturbance shapes are highly complex.

697 Ha Burnt
Shape = 11.1

1,163 Ha Burnt
Shape = 6.3

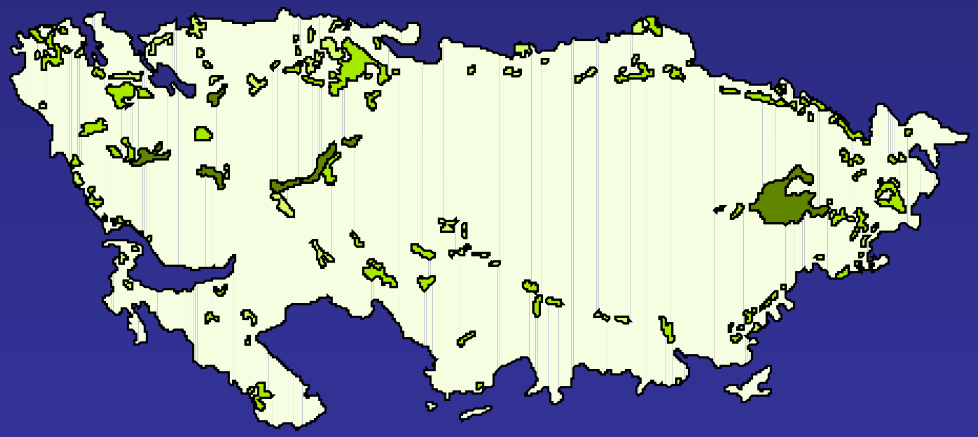


# At First Glance

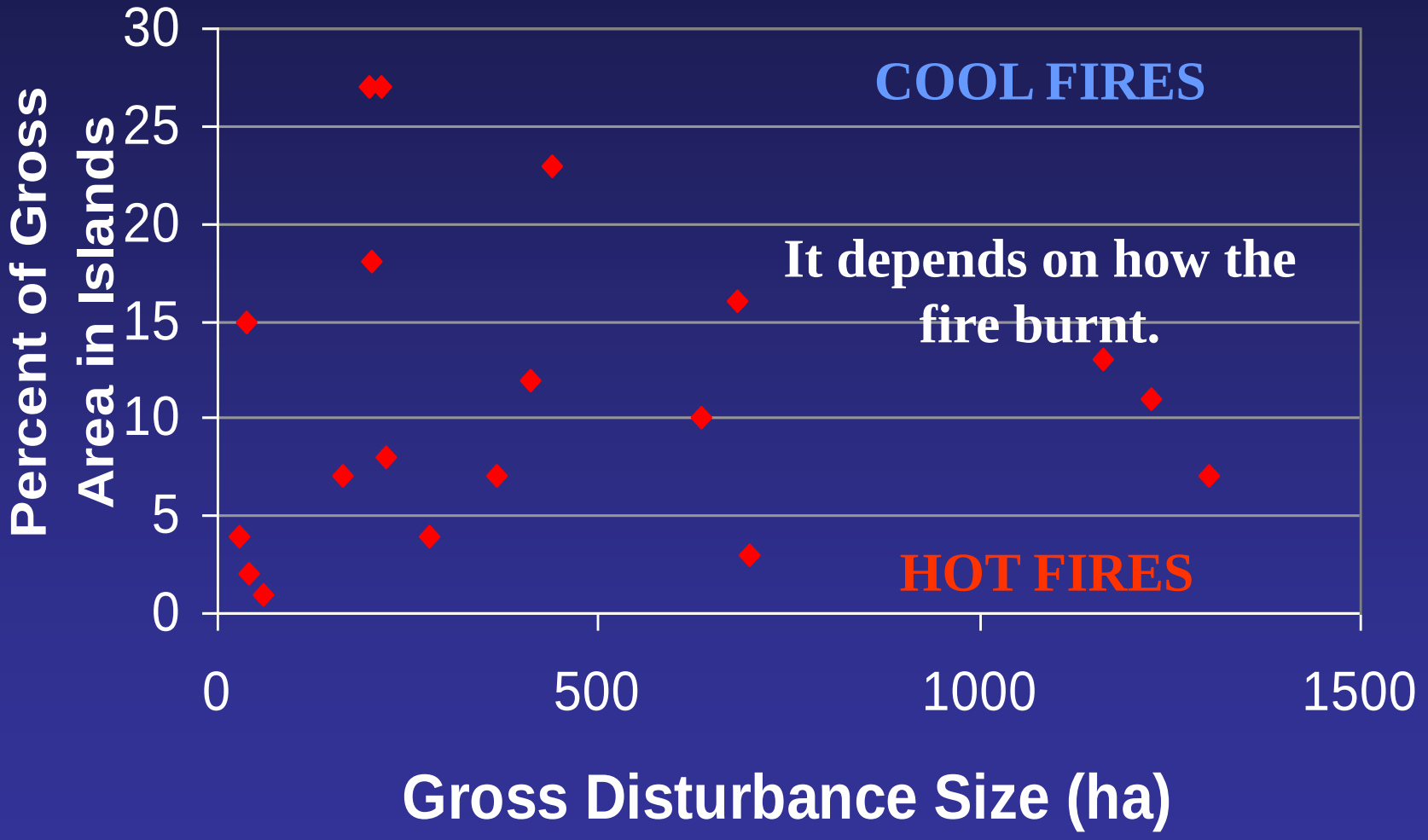
- Sizes range from very small to very large
- One disturbance has many patches
- Burn boundaries are not straight
- Material is left over in the middle (islands)
- Burns do not always respect riparian zones

There may be a lot of leftover material…

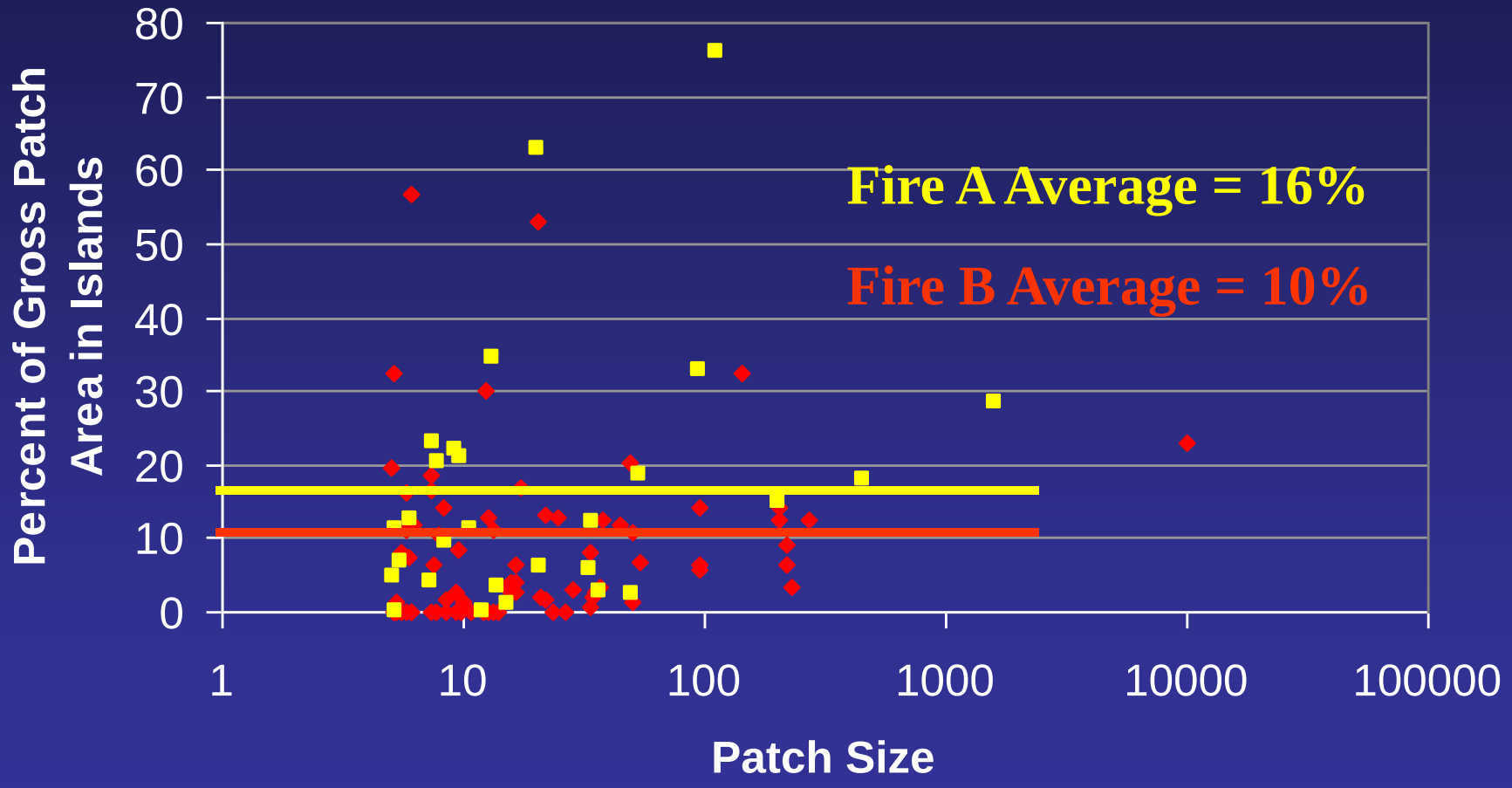
… or very little.



# Total Area Left Within the Disturbance



# Remnant Fire Material by Patch for 2 Disturbances



# Unburnt Material Summary

- Occurs at several scales

- Varies between fires, consistent within fires (relates to burn intensity & resident time)

- Not discussed further in this workshop

# At First Glance

- Sizes range from very small to very large
- One disturbance has many patches
- Burn boundaries are not straight
- Material is left over in the middle
- Burns do not always respect riparian zones, non-forested zones, or non-merchantable forests.

# Pattern Demonstration

- Berland 21 operating area of Weldwood FMA
- About 8,400 ha
- Planned, first pass cut
- Experimental Area