

Escaping the Black Box

A Flexible Tool
for Spatial Management of Your Sample
Population



Introduction

- Geographic potential in monitoring programs
- Many tools are built around analyses specific to current needs
- Need for flexibility in field methods



FEAT

- **F**ire **E**cology **A**ssessment **T**ool
- In use for 3 years across the NPS
- Suited to other environmental monitoring programs
- SQL Server 2000 Desktop Engine
- ArcMap 9.1
- Primarily a tabular application
- GIS plays a supporting role

Protocol Manager

- FEAT is not built around a set of methods
- Supports any sampling method

The screenshot shows the 'Method Builder' window with the following details:

- Method Information:**
 - Name: Density
 - Unit System: Metric
 - Method Shape: Belt
- Method Properties:**
 - Attributes (selected tab)
 - Organizations
 - Description
 - References
 - Version History
- Attributes Table:**

Field Name	Caption	Unit	Order	Rolldown	Precision	Del
SP_GUID	Species	Uni	1	<input type="checkbox"/>		
SP_Code	Species	Cod	2	<input type="checkbox"/>		
Tally	Tally	Cou	4	<input type="checkbox"/>		
subBelt	Sub Bel	Cou	5	<input type="checkbox"/>		
- Buttons:**
 - Save & Close
 - Save
 - Cancel
 - Move UP
 - Move Down

Protocol Data Form

Tools

Setup | Data Page

Monitoring Unit: **BARME1D04** Macro Plot: **B:BARME1D0** Subsample: **shrb30p_FMH** Monitoring Event: **00 PR01 : Sep 27, 1** Lifeform Filter: **No Filter**

Common Species: **CEBE1** **ARME1** **BARE1** **QUKE1**


Functions: **Increment [F9]** **Calculate [F10]**

Actions: **Update [F11]** **Cancel [F12]**

Density										
	Subbelt	Species	Height (m)	Tally	Live	Age	Comment	PV_1	PV_2	P
▶	4	CEBE1	0	2	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
	2	ARME1	0	11	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
	0	BARE1	0	0	<input type="checkbox"/>	Not Recorded	covers 'were data taken' shrb FMH 1076			
	5	CEBE1	0	5	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
	2	ARME1	0	2	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
	5	QUKE1	0	2	<input checked="" type="checkbox"/>	Immature-Seedling	From FMH BELT 1061			
	2	ARME1	0	9	<input type="checkbox"/>	Mature	From FMH BELT 1061			
	3	ARME1	0	4	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
	3	CEBE1	0	1	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
	4	ARME1	0	2	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
	2	ARME1	0	1	<input type="checkbox"/>	Mature	From FMH BELT 1061			
	6	CEBE1	0	1	<input checked="" type="checkbox"/>	Mature	From FMH BELT 1061			
*					<input checked="" type="checkbox"/>					

- Auto-generated data collection forms adapt to new methods

- FEAT runs on the PDA too



The background image shows a person wearing a cap and a backpack, standing in a desert landscape with cacti and scrub. They are holding a PDA device, which displays the 'Protocol Data' form.

Protocol Data 10:27 ok

B:FLOTH1D09:01 : tranq4_01 Post
(POINT TRANSECT) : TEST1 - Ju

Point : 1
Tape (m) : 0.3
Order : 1
Height (m) : -1
^ Auto Increment ^

Species Selection

Species :
Match:
of Common: 5
Common:
Use LF:
Lifeform: No Filter

Live : ☒

Comment :

Setup Data View Data CBI Sum

Edit: Save Delete Cancel

Summary Builder

Filter

More Fields

Classify

Group and Calculate

Choose Protocol:

Proto Name

Density

Fuels 1 - 100

Fuels 1000

Fuels LD

Ocular Cover / Observed Species

Overstory and Pole Trees

Point Transect

Post Burn Severity

Monitoring Unit:

Control Plots

Plot Type:

Forest

Plot Purpose:

Control

Subsample name like :

Macro Plot:

B: FPSME3D08:03

B: FPSME3D08:05

B: FPSME3D08:06

B: FPSME3D08:10

C: FPSME3D08:03

C: FPSME3D08:05

C: FPSME3D08:06

C: FPSME3D08:10

Monitoring Event

Min date:

Max date:

Status:

00 PR01

00 PR02

00 PR03

00 PR04

00 PRE

01 Burn

01 Post

01 yr01

01 yr02

01 yr05

01 yr06

Genus:

Ceanothus

Holodiscus

Prunus

Pseudotsuga

Sambucus

☐ Only plants
☐ No plants
☐ Only native
☐ Only exotic
☐ Only spp. concern
☐ No spp. concern
☐ No non-vascular
☐ Live perennials and all annuals
☐ Exclude dead and down trees

Lifeform:

Tree

Shrub

Substrate

Lifecycle:

Not Defined

Perennial

Species:

Sp Code	Scientific Name
BARE	
CEVE	Ceanothus velutinus
HODI	Holodiscus discolor
PREM	Prunus emarginata
PSME	Pseudotsuga menziesii
SACE	Sambucus cerulea var. ce

Filtered Protocol Data:

☒ Show

MonE Date	MonE Stat	MPlot ID	SSamp ID	SSamp Area	SP Code	Subbelt	Height	Tally	Live	Age
8/19/1997	00 PRE	C:FPSME3D08:03	seed_SEED	250	PSME	0	0.6	4	True	
8/19/1997	00 PRE	C:FPSME3D08:03	seed_SEED	250	PSME	0	1	4	True	
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	BARE	0	0	0	False	-1
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	SACE	7	0	1	True	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	PREM	7	0	2	True	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	CEVE	8	0	1	True	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	PREM	8	0	2	True	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	CEVE	8	0	2	False	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	PREM	6	0	7	True	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	CEVE	6	0	1	True	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	PREM	5	0	1	True	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq3_SHRB	500	CEVE	7	0	6	False	2
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq4_SHRB	500	BARE	0	0	0	False	-1
8/19/1997	00 PRE	C:FPSME3D08:03	shrbq4_SHRB	500	HODI	6	0	1	True	2

Use filtered plots from GIS module ☐

Export Filtered

View Report

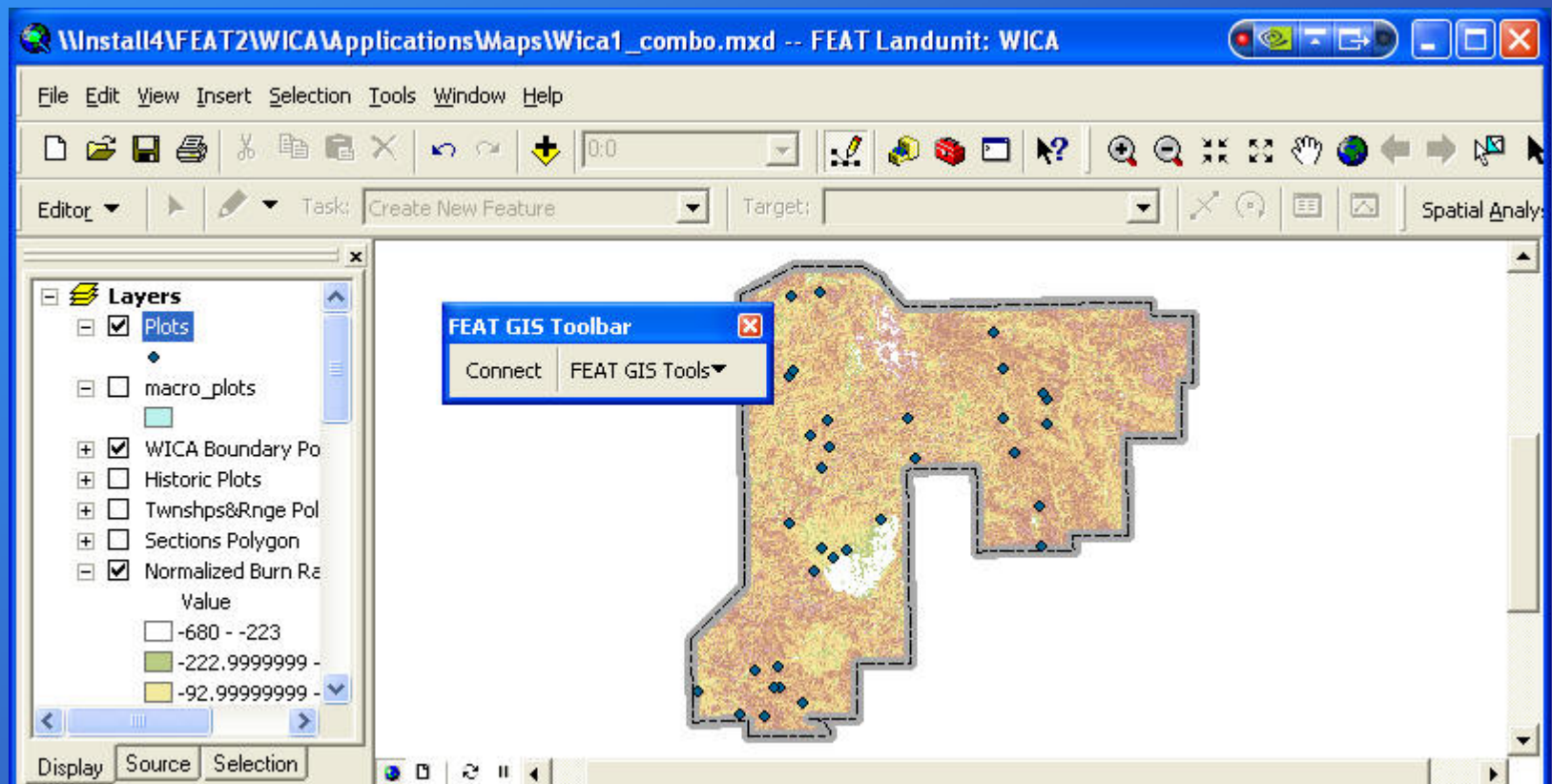
Clear All

Exit

- Ad hoc query tool works with new methods

FEAT toolbar in ArcMap

- Optional component of FEAT
- Assumes the help of a GIS specialist



Stratify the Landscape

- Stratify the landscape into Monitoring Units

Make a Monitoring Unit

Choose a Mon Unit

☐ Existing

☒ New

Objective

Description

Comment

Choose Layer and Field

Raster Layer

- Normalized Burn Ratio
- WICA Boundary Grid
- All Roads Grid
- Road Distance Grid
- Surface Hydrology Grid
- Surface Hydro Distance
- Brun Units Grid
- WICA Facilities Grid
- Facility Distance Grid

Fields

Grid type:

Include a Value Range for Layer

Min Max

Layer	Field	Min	Max

Include Discrete Values for Layer

Value

Layer	Field	Values

Stratify the Landscape

- Stratify the landscape by a range of values

Make a Monitoring Unit

Choose a Mon Unit

☐ Existing

☒ New

PIPOTest

Objective: DNBR over 300, PIPO, shrub

Description:

Comment: DNBR over 300 Ponderosa and shrubland

Choose Layer and Field

Raster Layer

- Normalized Burn Ratio
- WICA Boundary Grid
- All Roads Grid
- Road Distance Grid
- Surface Hydrology Grid
- Surface Hydro Distance
- Burn Units Grid
- WICA Facilities Grid
- Facility Distance Grid

Fields

- Value
- Count

Grid type: Integer
Field type: Number

Include a Value Range for Layer

Min: 300 Max: None

Add Remove

Layer	Field	Min	Max
Normalized Burn ...	Value	300	None

Include Discrete Values for Layer

Value: Remove val -->

Add Remove

Layer	Field	Values

Cancel Execute

Stratify the Landscape

- Stratify the landscape by discrete values

Make a Monitoring Unit

Choose a Mon Unit

☐ Existing

☒ New

Objective

Description

Comment

Choose Layer and Field

Raster Layer

- Brun Units Grid
- WICA Facilities Grid
- Facility Distance Grid
- Facility Proximity Grid
- General Vegetation, 10**
- Elevation Feet
- Slope Degree
- Topography Hill Shade
- WICA Area of Interest

Fields

- Value
- Count
- Gencode
- G_cover**

Grid type: Integer
Field type: Text

Include a Value Range for Layer

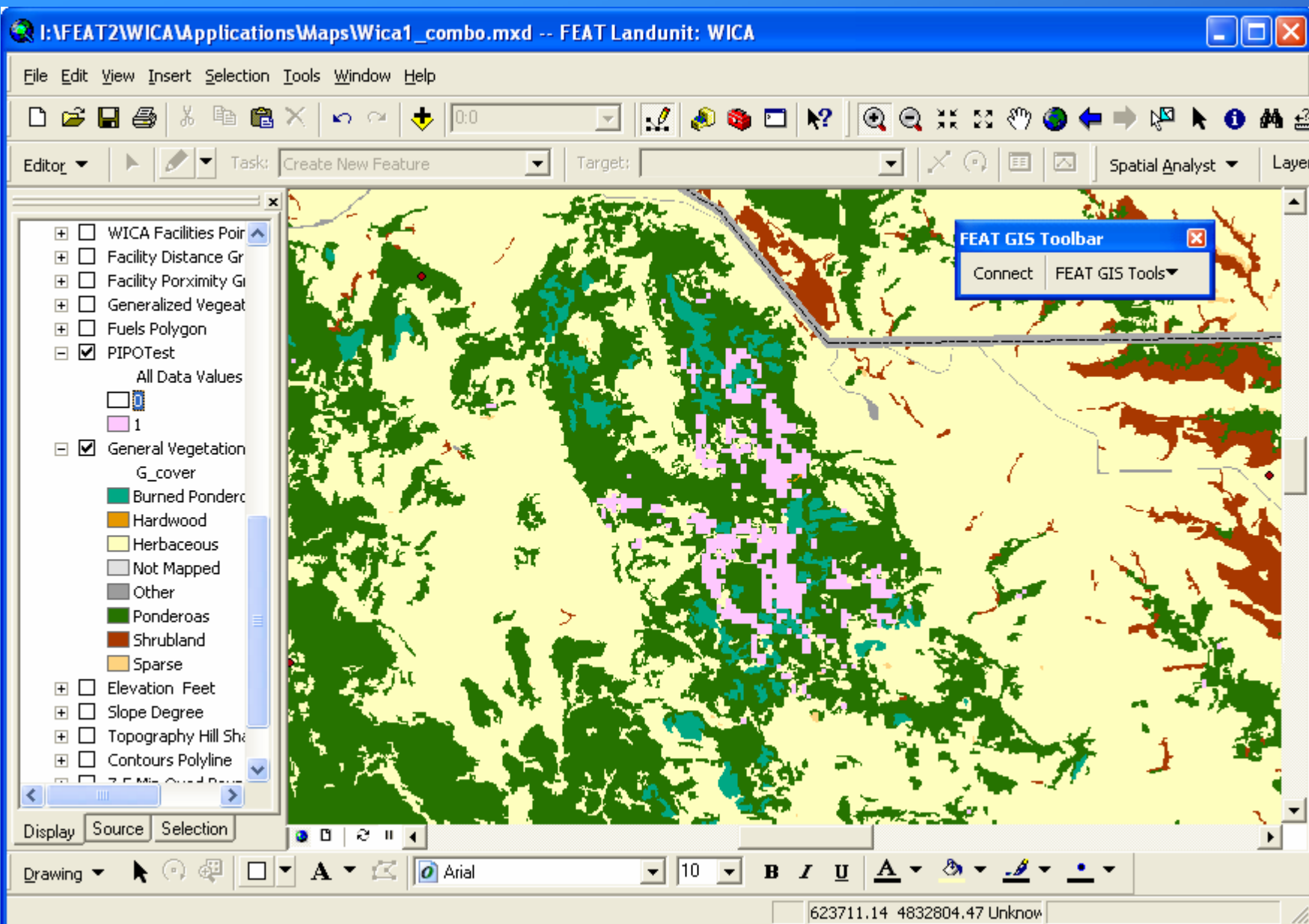
Min Max

Layer	Field	Min	Max
Normalized Burn ...	Value	300	None

Include Discrete Values for Layer

Value

Layer	Field	Values
General Vegetatio...	G_cover	'Ponderosas', 'Shrubla...

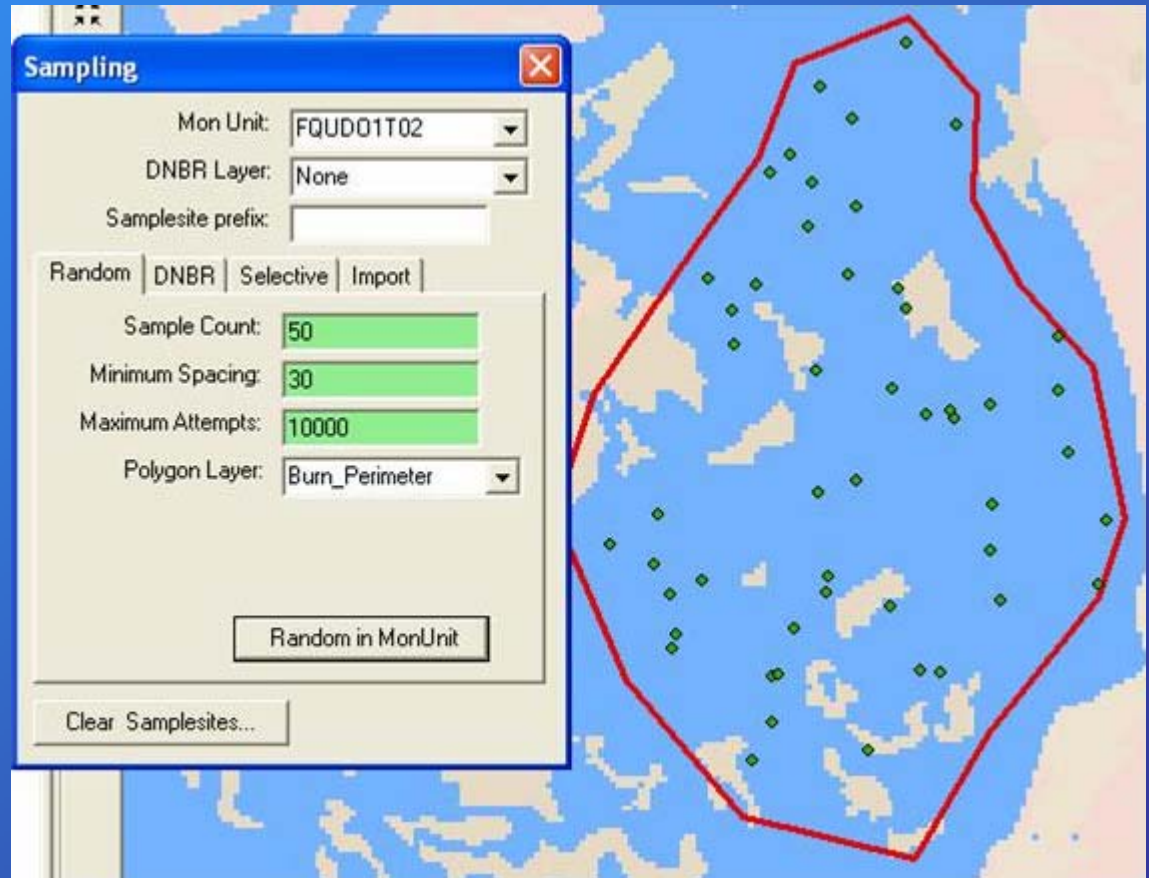


Stratify the Landscape

- Existing plots can be associated with new Monitoring Units
 - In response to pilot sampling
 - In response to new objectives

Sampling Setup

- Locate random points within a Monitoring Unit
- Limit within a polygon
- Import points



Analysis

- Select plots in ArcMap for analysis



Summary Builder

Filter More Fields Classify Group and Calculate

Choose Protocol:

Proto_Name
Biomass
CBI A Substrates
CBI B Herbs
CBI C Tall Shrubs
CBI D Intermediate Trees
CBI E Big Trees
CBI Summation
Cover by Frame
Density
Fuels 1 - 100
Fuels 1000
Fuels LD
Fuels Metric 1 - 100
Fuels Metric 1000
Fuels Metric LD
Line Intercept
Ocular Cover / Observed Species
Ocular Cover / Observed Species

Monitoring Unit:

Plot Type:

Forest
Grassland

Plot Purpose:

FMH Forest Plot
FMH Grass Plot

Subsample name like :

Macro Plot:

AGSM-01
AGSM-02
AGSM-03
PIPO_02-01
POPR-01

Monitoring Event

Min date:

Max date:

Status:

Trt 00 Pre1
Trt 00 Pre2
Trt 01
Trt 01 Imm Po
Trt 01 Pre
Trt 01 Yr 01
Trt 01 Yr 02
Trt 01 Yr 04
Trt 01 Yr 05

Genus:

Amorpha
Andropogon
Antennaria
Artemisia
Astragalus
Bouteloua

- ☐ Only plants
☐ No plants
☐ Only native
☐ Only exotic
☐ Only spp. concern
☐ No spp. concern
☐ No non-vascular
☐ Live perennials and all annuals
☐ Exclude dead and down trees

Lifform:

Not Defined
Tree
Subshrub
Shrub
Grass
Substrate

Lifecycle:

Annual
Biennial
Not Defined
Perennial

Species:

Sp Code	Scientific Name
AMCA6	Amorpha canescens
ANGE	Andropogon gerardii
ANPA4	Antennaria parvifolia
ARFR4	Artemisia frigida
ARLU	Artemisia ludoviciana
ARTEM	Artemisia
ASCR2	Astragalus crassicaule
BARE	
BEWY	Besseyia wyomingensi
BOCU	Bouteloua curtipendula
BRJA	Bromus japonicus
CADU6	Carex duriuscula
CARO2	Campanula rotundifolia
DAPU5	Dalea purpurea
ECAN2	Echinacea angustifolia
ELEL5	Elymus elymoides

Filtered Protocol Data:

☒ Show

MonE_Date	MonE_Stati	MPlot_ID	SSamp_ID	SP_Code	Subbelt	Height	Tally	Live	Age	Age_De
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	ARFR4	4	0	1	True	3	Respro
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	OPUNT	1	0	1	True	1	Immatu
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	ARFR4	6	0	13	True	3	Respro
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	ARFR4	1	0	32	True	3	Respro
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	BARE	0	0	0	False	-1	Not Rec
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	OPUNT	6	0	2	True	2	Mature
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	ARFR4	5	0	22	True	3	Respro
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	OPUNT	4	0	1	True	1	Immatu
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	ARFR4	2	0	1	True	3	Respro
7/1/1997	Trt 01 Pre	AGSM-03	Shrub_Density	UNKN_002	1	0	3	True	1	Immatu
7/2/1997	Trt 01 Pre	AGSM-01	Shrub_Density	ARFR4	4	0	56	True	1	Immatu
7/2/1997	Trt 01 Pre	AGSM-01	Shrub_Density	ARFR4	5	0	51	True	1	Immatu
7/2/1997	Trt 01 Pre	AGSM-01	Shrub_Density	ARFR4	2	0	33	True	2	Mature
7/2/1997	Trt 01 Pre	AGSM-01	Shrub_Density	ARFR4	3	0	85	True	1	Immatu

Use filtered plots from GIS module ☒

Export Filtered

View/Print Report

Clear All

Exit

Fuel Load Calculations

Monitoring Unit

FPIP01T09

Macro Plot

B:FPIP01T09:18

Subsample

- ☒ fuel1_FMH
- ☒ fuel2_FMH
- ☒ fuel3_FMH
- ☒ fuel4_FMH

Monitoring Event

7/15/1983 12:00:00 AM
7/27/2005 4:24:09 PM
9/15/2005 11:45:27 AM

Average Transect Data 4 Transects.

Transect Length: 50.00 feet

Slope: 13.00 percent

Slope Correction Factor: 1.01

1-Hour Tally: 3 particles

10-Hour Tally: 1 particles

100-Hour Tally: 0 particles

Sum of Diameters Squared, 1000-Hr Sound: 178.25 inches squared

Sum of Diameters Squared, 1000-Hr Rotten: 0.00 inches squared

Average Litter Depth: 0.57 inches

Average Duff Depth: 0.27 inches

Constants

☒ Use values recommended by Brown, 1974

	1-Hour	10-Hour	100-Hour	1000-Hr Sound	1000-Hr Rotten
Squared Average Diameter	0.0151	0.2890	2.7600		
Specific Gravity	0.48	0.48	0.40	0.40	0.30
Nonhorizontal Angle Correction Factor	1.13	1.13	1.13	1.00	1.00
Litter Bulk Density	2.75 lbs/ft3				
Duff Bulk Density			6.61 lbs/ft3		

Calculate Fuel Load for Selected Transect(s)

Fuel Loads Calculated
in This Session :

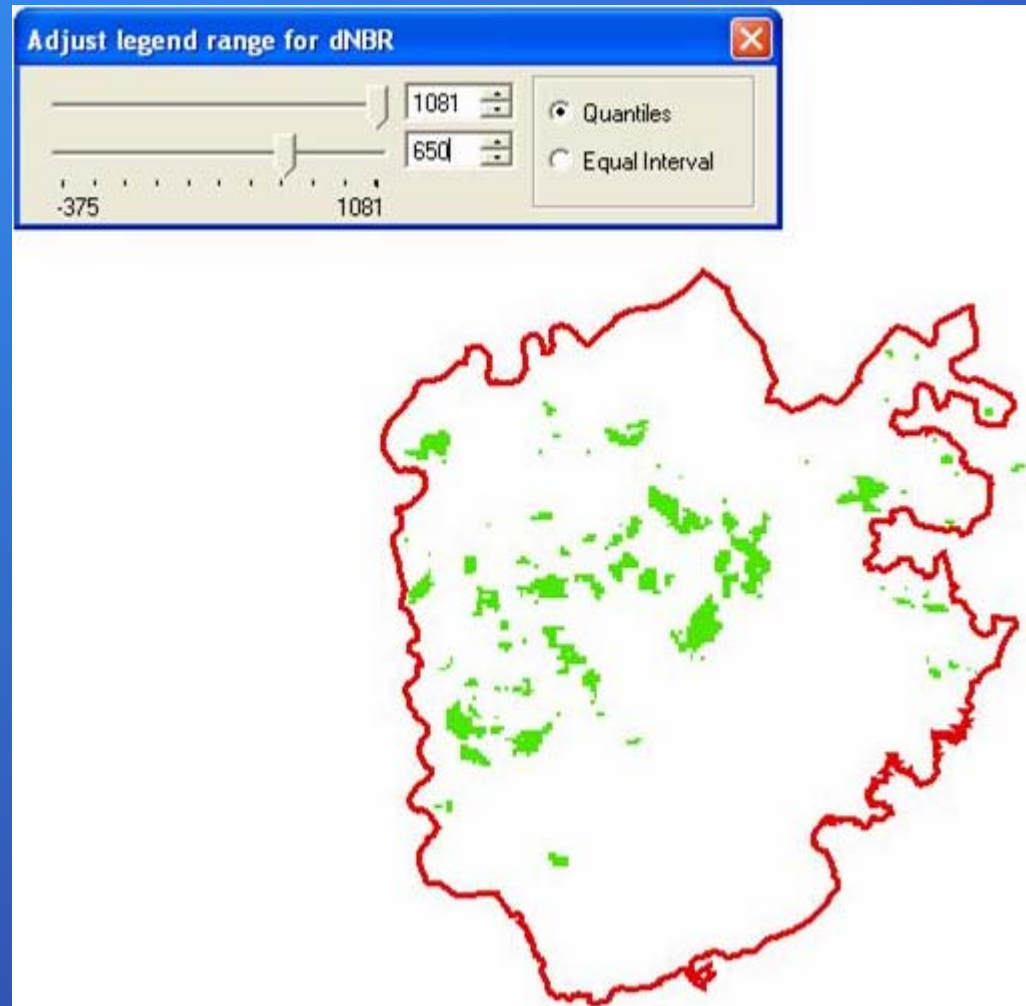
0

CBI Support

- CBI: **C**omposite **B**urn **I**ndex: based on a set of field methods supported by FIREMON and FEAT
- dNBR: **D**elta **N**ormalized **B**urn **R**atio: LANDSAT-based

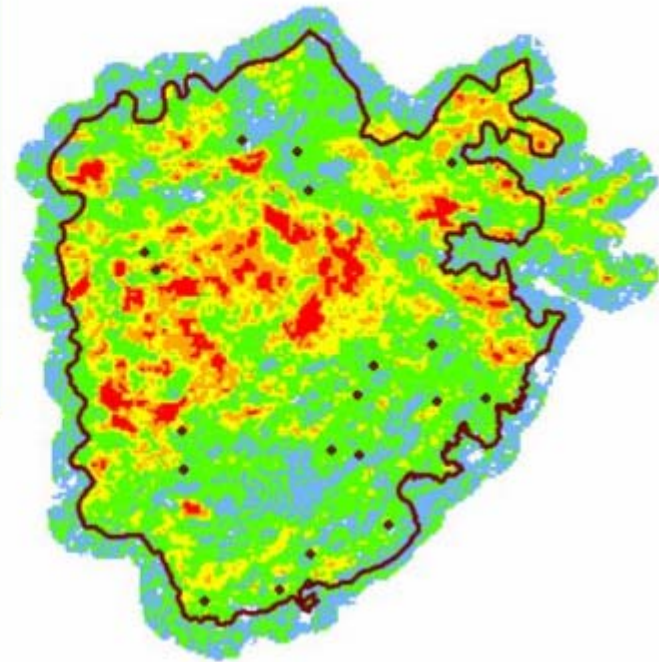
CBI Support

- Adjust legend of dNBR layer to identify severity thresholds

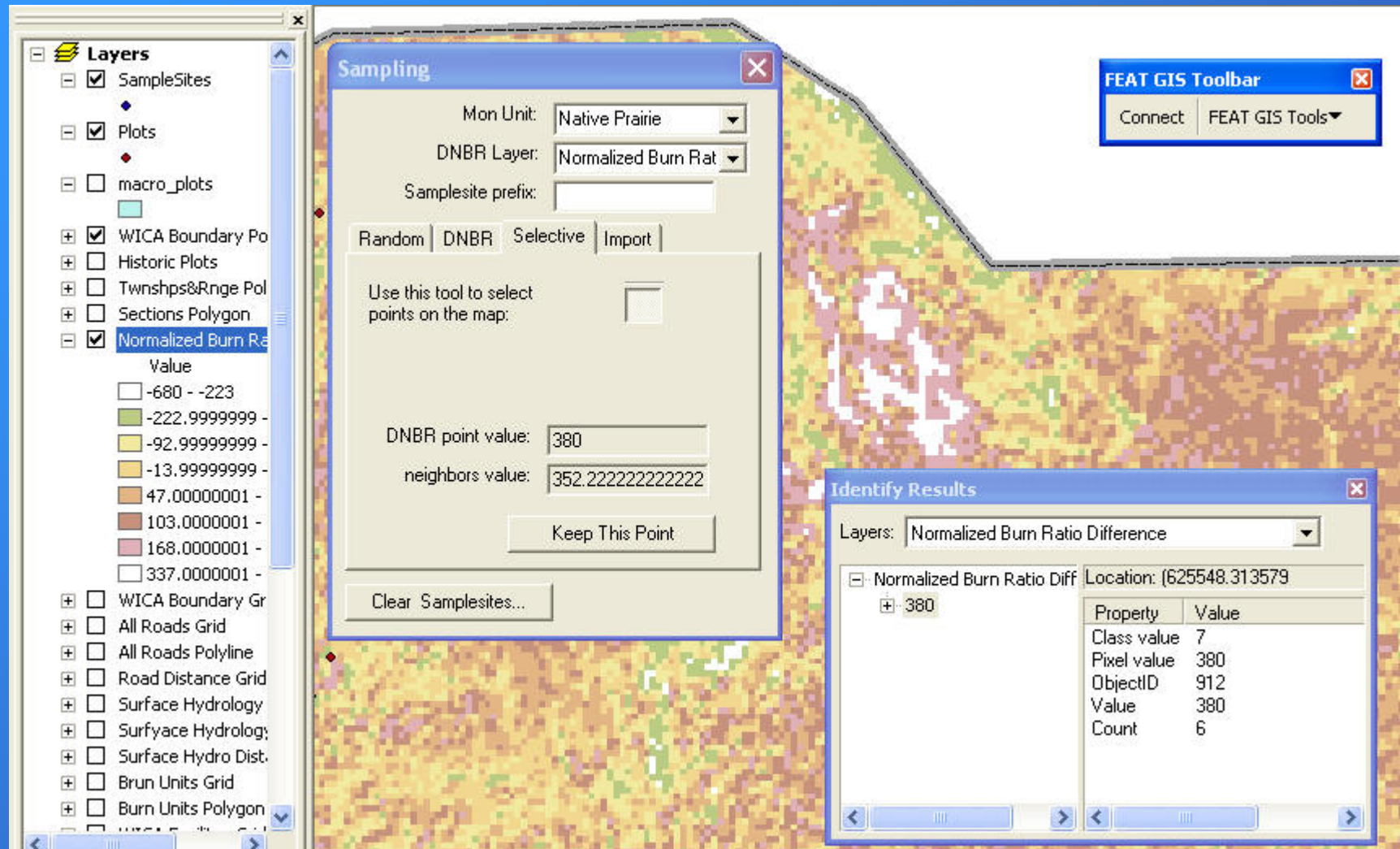


CBI Support

- Sample setup within a value range
- Point and neighbor values stored with points



- Selectively place points



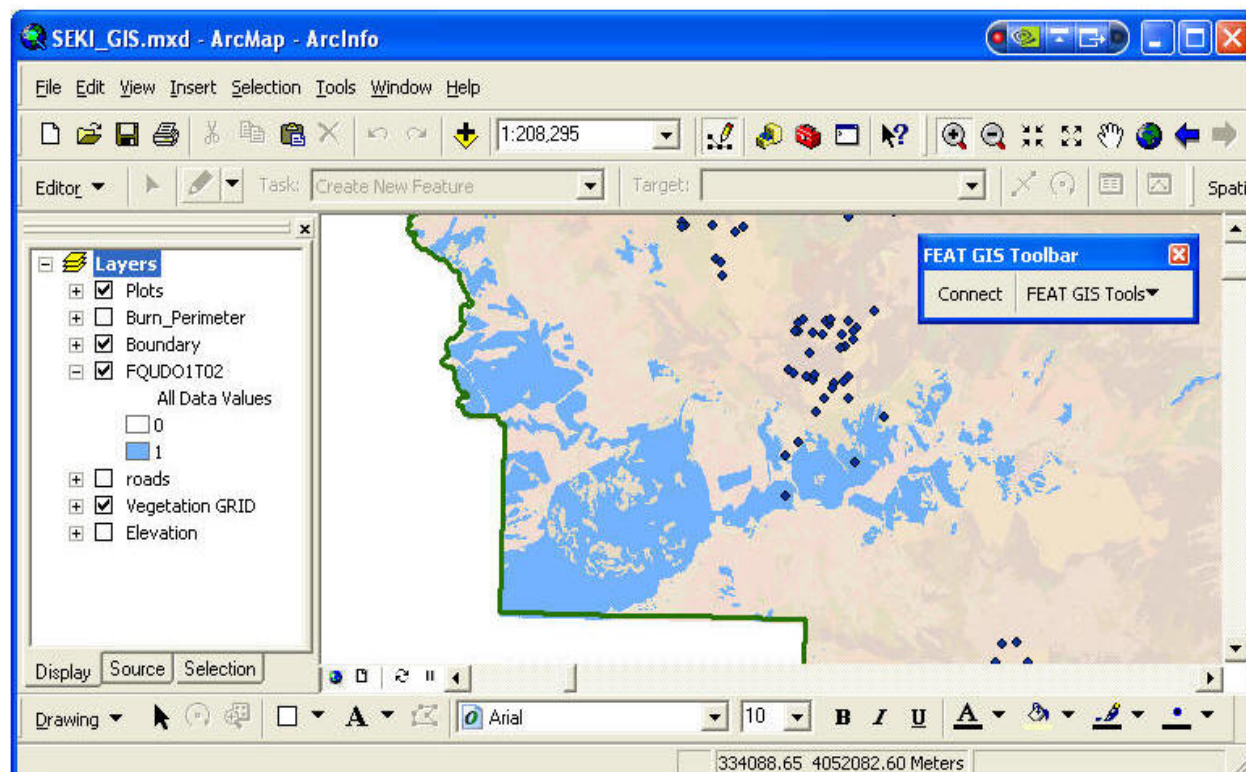
Definition of a Monitoring Unit

A **monitoring unit** is a division of the entire sample population of your **landunit**. Monitoring units are usually defined so that they represent an area on the ground. For example, a monitoring unit could consist of "all areas in the Ponderosa vegetation type between 1500 and 2000 meters above sea level, more than 500 meters from the nearest road and more than 1000 meters from the nearest stream."

Monitoring units provide a means to functionally group macro plots for management and analysis. Monitoring units will often be defined so that they overlap spatially, and macro plots can be associated with multiple monitoring units. Monitoring units can be given a spatial definition by using [FEAT Spatial](#).

Monitoring units are not required to have any spatial meaning. They can be defined for temporary administrative or analysis purposes.

- What You Need to Know to Run FEAT
- Downloading and Installing the Software
- Setting up and Populating a Database
 - Data Management Guidelines
- Landunits
 - Definition
 - Log onto FEAT
 - Create a Landunit
 - Select a Landunit
 - Geographic Coordinates
- Monitoring Units
 - Definition
 - Monitoring Unit Operations
 - Define a Monitoring Unit
 - Assign Macro Plots to a Monitorin
 - Enter or Edit Monitoring Unit Meta
 - Copy Monitoring Unit Metadata
 - Print Monitoring Unit Metadata
- Macro Plots
- Subsamples
- Plot Templates
- Monitoring Events
- Protocol Data Entry
- Manage Species Data
- Manage Plot Photos
- Managing, Analyzing, and Exporting Data
- FEAT Mobile and Using PDAs
- Troubleshooting/Additional Information





Spatial Dynamics Development Forum

Control Panel

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Logged in as: Austin Streetman

Forum Announcements

What is the Fire Ecology Assessment Tool (FEAT)? -- 6/13/2005 10:00:00 AM

The NPS Fire Ecology Monitoring Program developed FEAT to support fire effects monitoring, however, this tool is not limited to fire effects monitoring. It can also be used for other natural resource applications..... (See the About FEAT section for more information on FEAT.)





!!!! ANNOUNCEMENTS !!!! -- 6/13/2005 10:00:00 AM

- 06/12/06 Forum upload problem from the NPS network ([more...](#))
- 04/04/06 [Wait to buy](#) new PDA's with **Windows Mobile 5** ([What if I already did?](#))
 - 03/10/06 Check out this [FEAT compatible PDA](#) running Pocket PC 2003 SE....
- 12/19/05 [Don't use ActiveSync 4](#) (unless you have Mobile 5) ([why?](#))
- 12/19/05 [Don't use](#) the 'IN-ACTIVE' mon unit. ([why?](#))

FEAT USER'S GUIDE -- 6/7/2005 4:00:00 PM

FEAT User's Guide: feathelp.spatialdynamics.com FEAT Spatial User's Guide: featgishelp.spatialdynamics.com

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Forum Description		Topics	Posts	Last Post
[FEAT]				
	How to Use this Forum Helpful information on navigating through this forum Moderators Spatial Dynamics , NPS Moderators Sub-forums: FAQs	9	11	Looking up FEAT error message... 1/27/2006 12:43:52 PM Austin Streetman
	About FEAT General information dealing with FEAT, Business Needs Analysis, Upcoming Features, Link to FEAT documentation Moderators Spatial Dynamics , NPS Moderators Sub-forums: Pictures from the Field	6	6	FEAT Documentation... 7/26/2005 11:00:53 AM Sabrina Beus
	Download/Install FEAT You must register as a member of this forum to download FEAT Moderators Spatial Dynamics	6	6	Summary Builder 2.4 update 1... 2/23/2006 3:10:04 PM Austin Streetman
	FEAT 2.4 User Support Issues, questions, and comments related to FEAT 2.4. This forum covers both the Desktop and Mobile version. Moderators Spatial Dynamics , NPS Moderators	92	238	RE: Datum Change... 7/28/2006 12:01:17 PM Austin Streetman

Future

- FIREMON / FEAT integration Fall 2007
- More vector inputs in stratification
- Legend tool to work with five severity classes
- Display of analysis results
- Plot photos
- GPS integration

Conclusion

- GIS plays a key but supporting role
- Adaptable to new methods and protocols
- Flexible query and export



For more information

- *FEAThelp.SpatialDynamics.com*
- *Forum.SpatialDynamics.com*
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