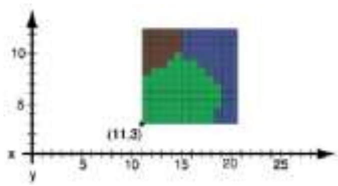
Raster Data Analysis

Raster Data Model

- Cells (Pixels)
- Cell value

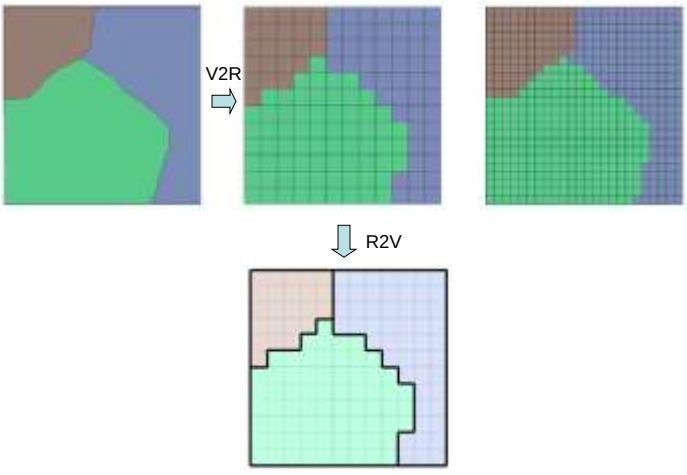
- x, y cell sizes
- Geographic coordinates



Attributes

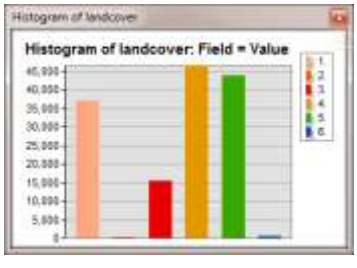
Value	Count	Name	Suitability	Type
1	[illegible]	Cropland and pastureland		5 Agriculture
3	[illegible]	Urban and industrial		0 Urban
16	212	[illegible]		0 Cleared
27	1383	Cottonwood		4 Riparian
463	142	Ash-Cottonwood		3 Woodland
476	235	Oak		3 Woodland
506	1112	Douglas fir		2 Forest
518	8557	Mixed evergreen-broadleaf		3 Forest
512	7943	Douglas fir-Hemlock-Cedar		1 Forest

Raster to Vector / Vector to Raster



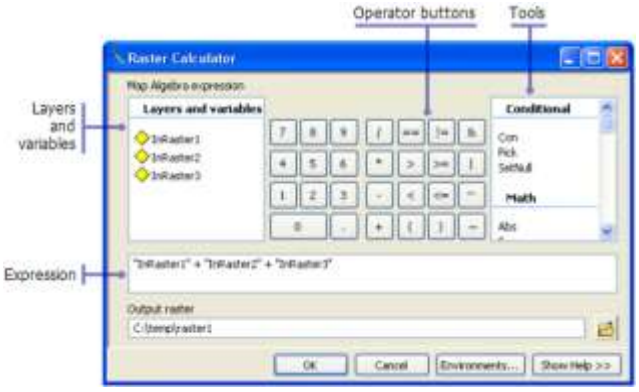
ArcGIS Spatial Analyst

- Mainly for raster data analysis
  - Arctoolbox: Spatial Analyst Tools
  - Spatial Analyst Toolbar
  - Raster Calculator



Raster Calculator

- Single-line map algebraic expression
- Multiple inputs in a single expression.
- Multiple Spatial Analyst tools in a single expression.



Raster Calculator Syntax

- Operators

  ```
  inraster1 + inraster2
  ```

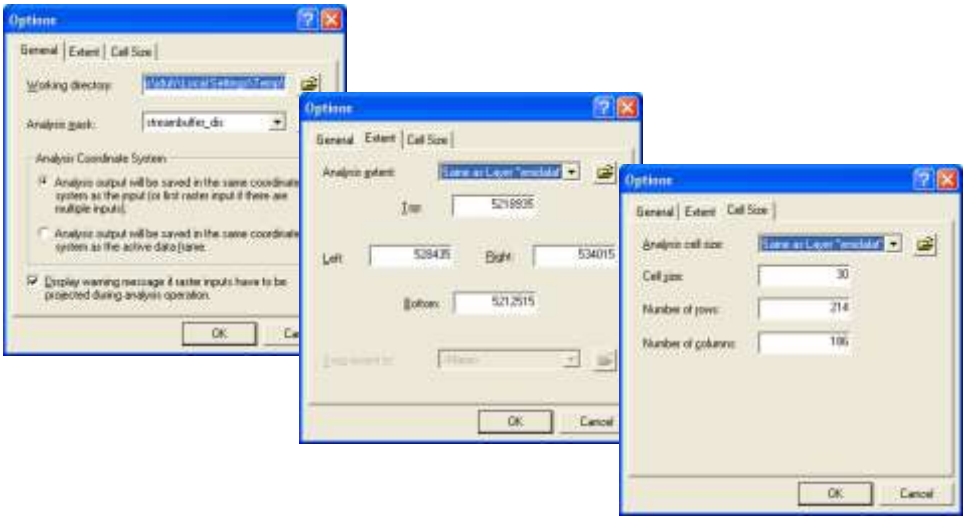
- Tools & Functions (tool names are case sensitive!)

  ```
  Aspect("C:/Datat/inraster")
  ```

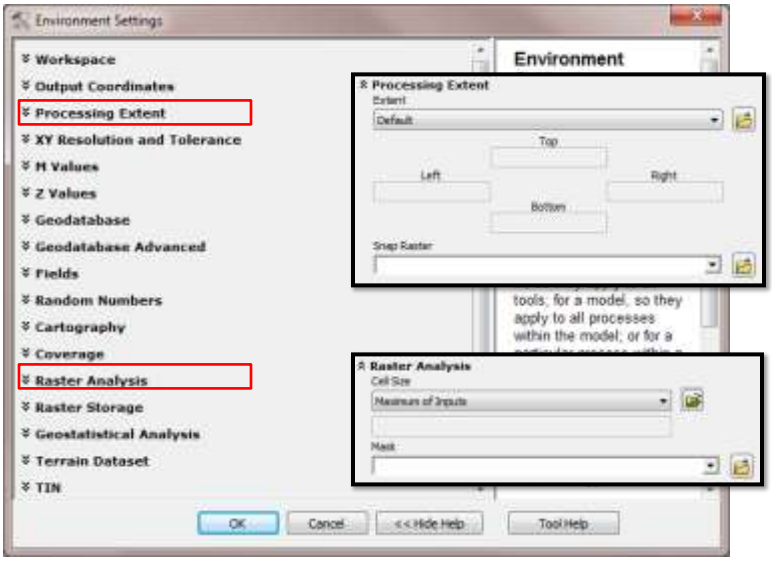
- Tool parameters

  ```
  Slope("dem", "PERCENT_RISE")
  ```

Spatial Analyst Option Menu (ArcGIS 9.x)



Geoprocessing Environment Setting (ArcGIS 10)



Mask & Extent

Raster Calculator Functions

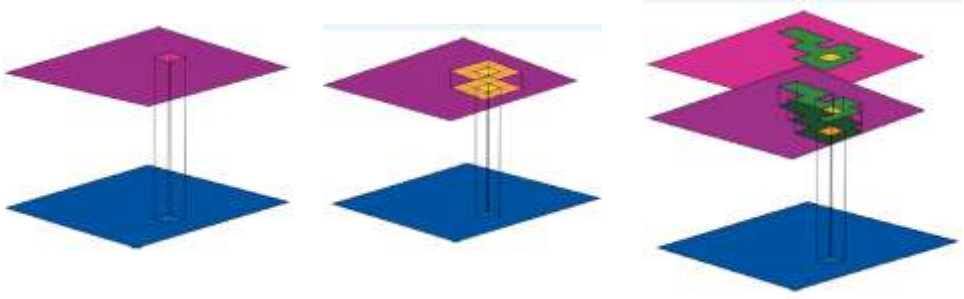
- Arcinfo Workstation / Arcdoc
- > 200 functions

Raster Operations

Local operation
(majority)

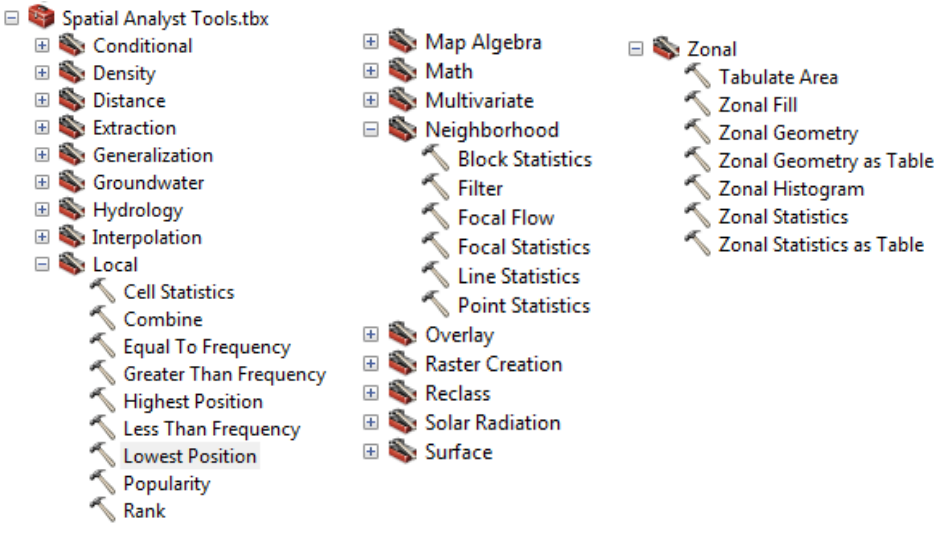
Focal operation
(focalmajority)

Zonal operation
(zonalmajority)

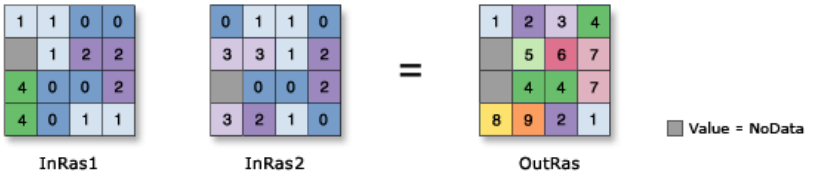


Global operation
(costdistance)

Application functions



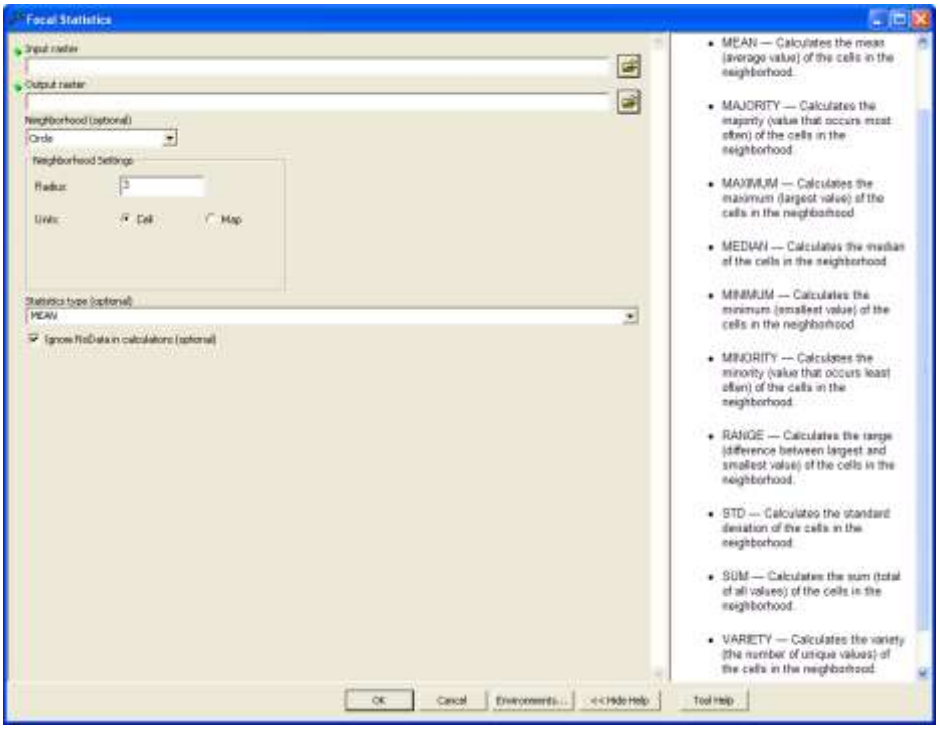
Local Operator: Combine

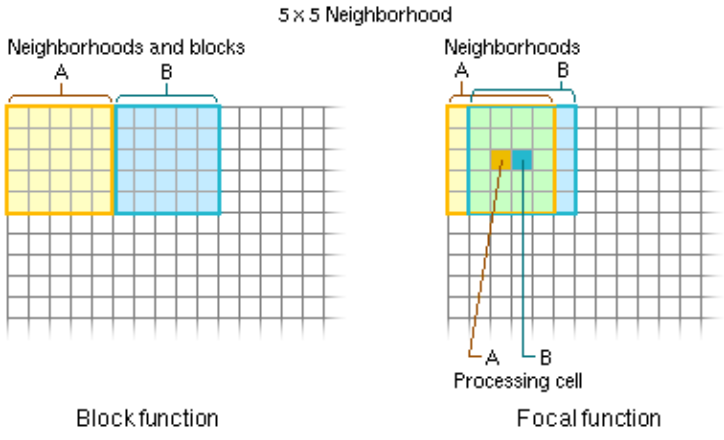


Value	Count	Code
0	5	002
1	5	004
2	3	005
4	2	008

Value	Count	Type
0	5	PAX
1	4	HAR
2	3	WIN
3	3	SAN

Value	Count	InRas1	InRas2
1	2	1	0
2	2	1	1
3	1	0	1
4	3	0	0
5	1	1	3
6	1	2	1
7	2	2	2
8	1	4	3
9	1	0	2





Working with Nodata in RC

- ISNULL: convert Nodata to a value
- SETNULL: set cell value to Nodata
- CON: conditional function

- Examples

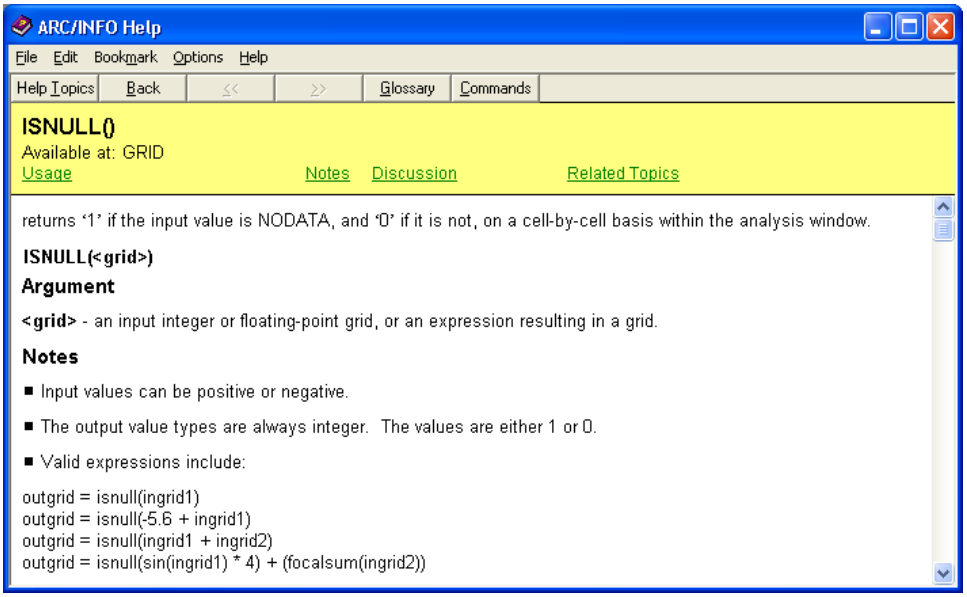
  – Replace Nodata with 0 in a DEM

    `con(isnull([dem]), 0, [dem])`

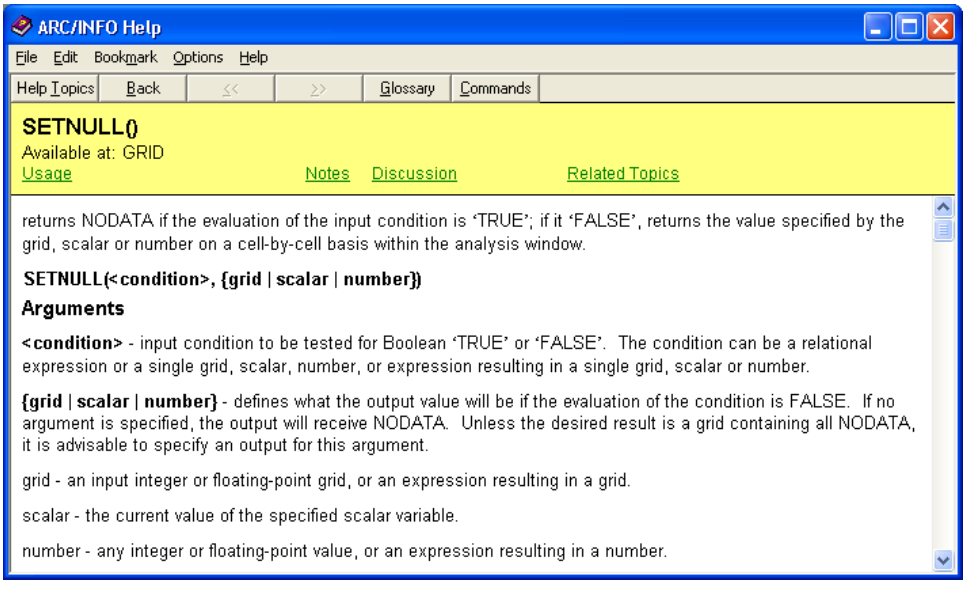
  – Set slope > 15 to Nodata on the DEM

    `setnull([slope]> 15, [dem])`

ISNULL() Function



SETNULL() Function



CON() Function

ARC/INFO Help

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CON()

Available at: GRID

Usage Notes Discussion Related Topics

performs one or more conditional if/else evaluations on a cell-by-cell basis within the analysis window.

CON(<condition>, <true_expression>,
{<condition>, <true_expression>}, ...
{<condition>, <true_expression>}, {false_expression})

Arguments

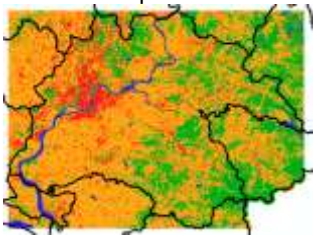
<condition> - any valid Boolean or relational expression involving multiple grids, scalars, numbers, or expressions.

<true_expression> - the value or expression that will be used to compute the output value if the evaluation of the <condition> is TRUE. The input argument can be a grid, scalar or number, or any valid map algebra expression involving operators and functions that results in a valid input. Another CON function is valid input.

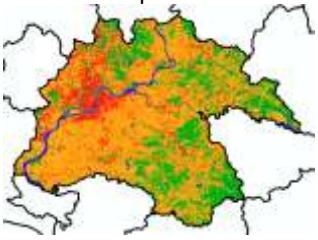
<false_expression> - the value or expression that will be used to compute the output value if none of the evaluations of the conditions is TRUE. The input argument can be a grid, scalar or number, or any valid map algebra expression involving operators and functions that results in a valid input. Another CON function is valid input.

Raster Clip Example

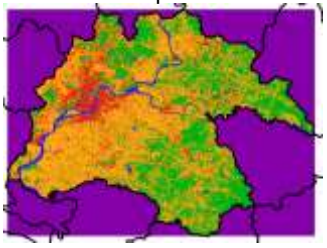
Output A



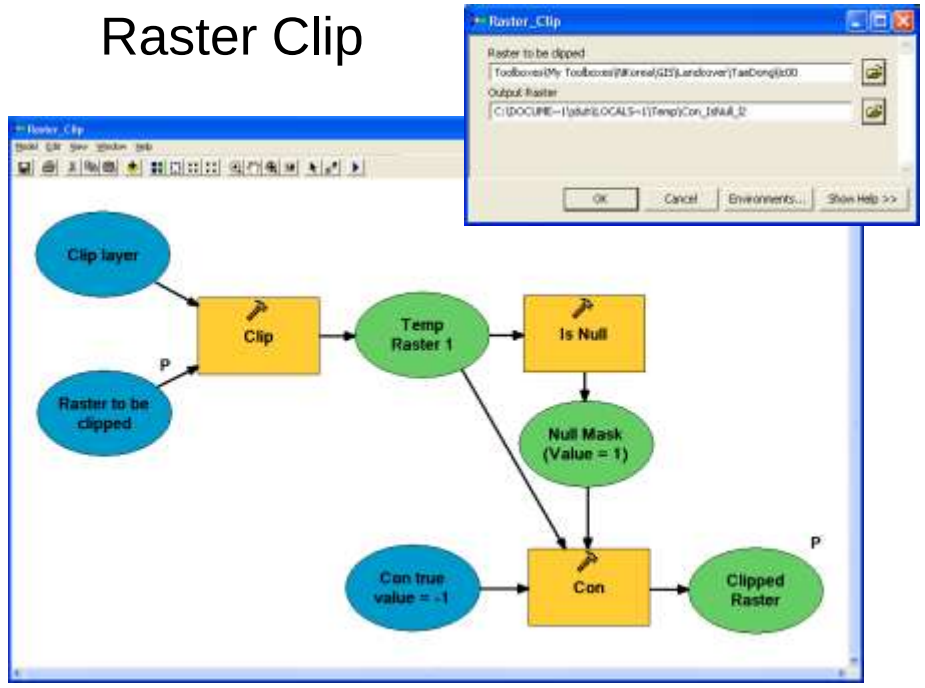
Output B



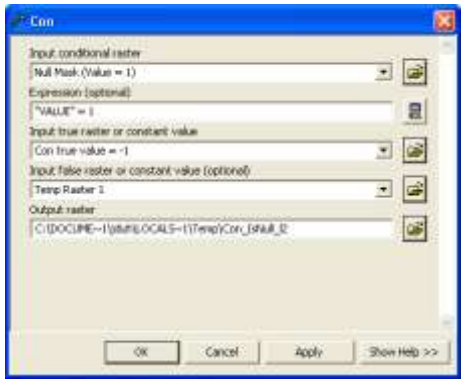
Output C



Raster Clip

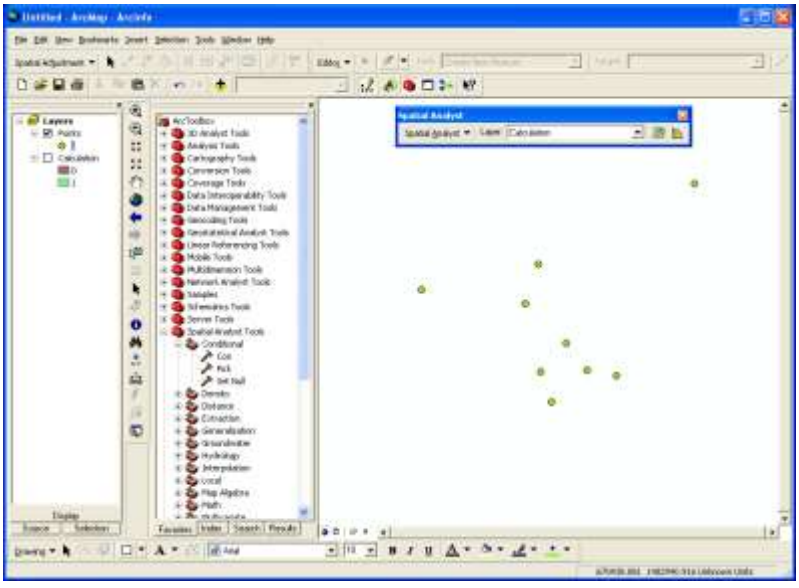

Raster_Clip
Raster to be clipped
Output Raster
OK
Cancel
Environments...
Show Help >>
Clip layer
Clip
Temp Raster 1
Is Null
P
Raster to be clipped
Null Mask (Value = 1)
P
Con true value = -1
Con
Clipped Raster


Is Null
Input raster
Temp Raster 1
Output raster
OK
Cancel
Apply
Show Help >>


Con
Input conditional raster
Null Mask (Value = 1)
Expression (optional)
"VALUE" = 1
Input true raster or constant value
Con true value = -1
Input false raster or constant value (optional)
Temp Raster 1
Output raster
OK
Cancel
Apply
Show Help >>

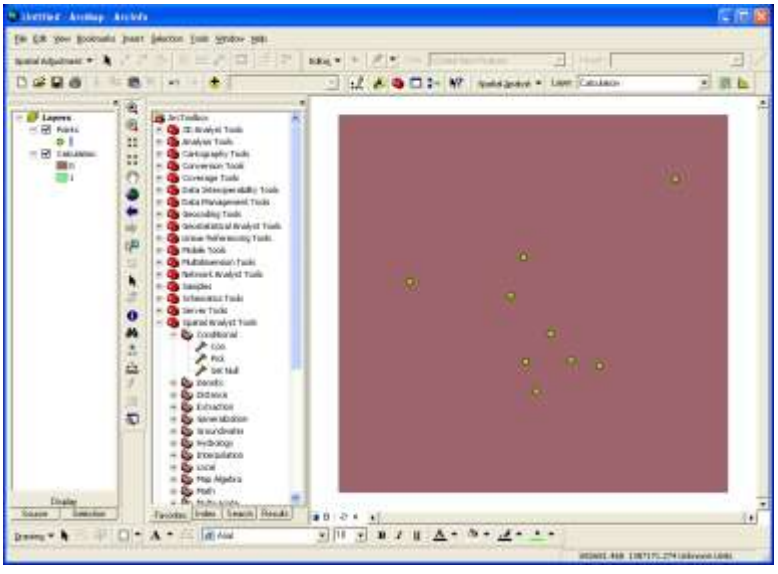

Con true value = -1
Con true value = -1
-1
OK
Cancel
Apply
Show Help >>

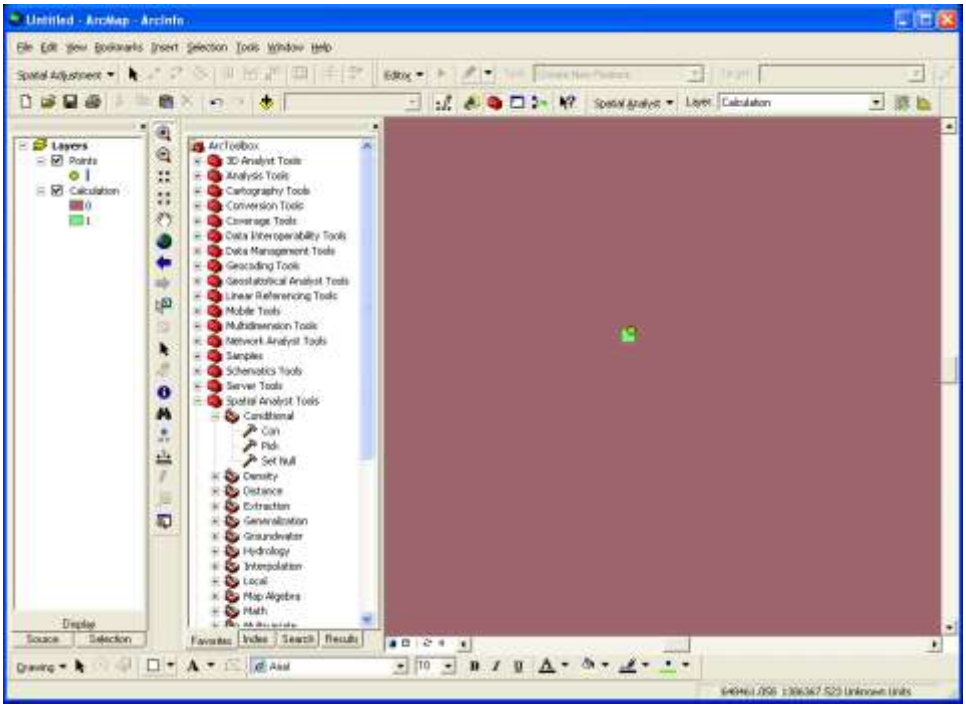
Raster Buffering



Point Features to Raster

- Con(isnull(pointg), 0, 1)




Untitled - ArcMap - ArcInfo
File Edit View Bookmarks Insert Selection Tools Window Help
Layers
Points
Calculation
ArcToolbox
3D Analyst Tools
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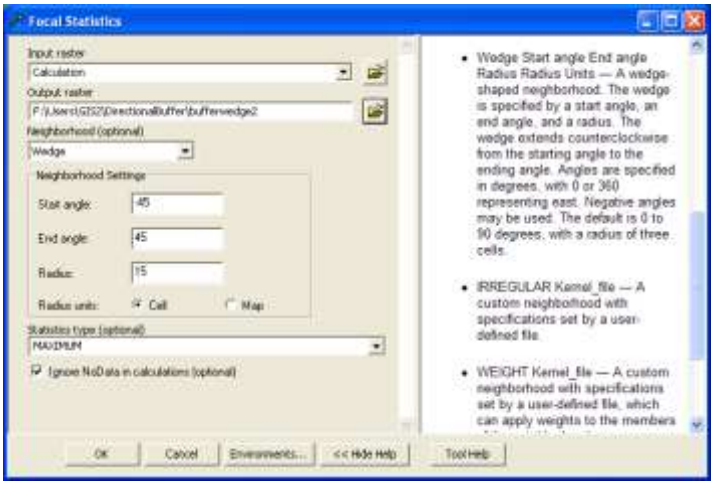
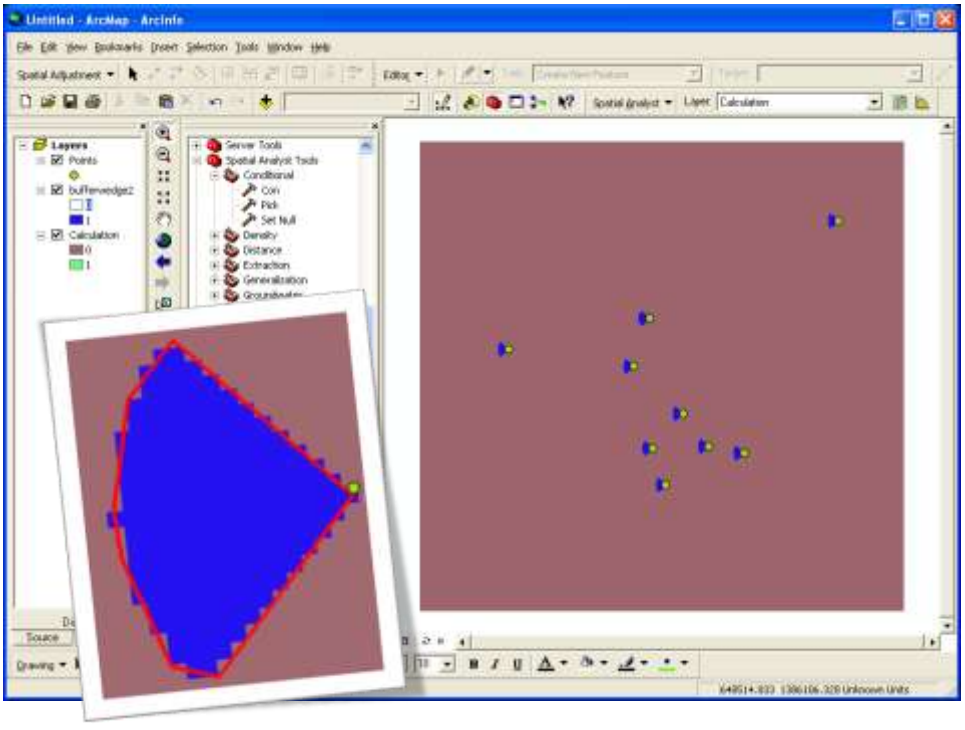
Coverage Tools
Data Interoperability Tools
Data Management Tools
Geocoding Tools
Geostatistical Analyst Tools
Linear Referencing Tools
Mobile Tools
Multidimension Tools
Network Analyst Tools
Samples
Schematics Tools
Server Tools
Spatial Analyst Tools
Conditional
Con
Pick
Set Null
Density
Distance
Extraction
Generalization
Groundwater
Hydrology
Interpolation
Local
Map Algebra
Math
Favorites
Index
Search
Results
Display
Source
Selection
Drawing


Focal Statistics
Input raster
Calculation
Output raster
F:\Users\GIS2\Directionalbuffer\bufferwedge2
Neighborhood (optional)
Wedge
Neighborhood Settings
Start angle:
45
End angle:
45
Radius:
15
Radius units:
Cell
Map
Statistics type (optional)
MAXIMUM
Ignore NoData in calculations (optional)
Wedge Start angle End angle Radius Radius Units — A wedge-shaped neighborhood. The wedge is specified by a start angle, an end angle, and a radius. The wedge extends counterclockwise from the starting angle to the ending angle. Angles are specified in degrees, with 0 or 360 representing east. Negative angles may be used. The default is 0 to 90 degrees, with a radius of three cells.
IRREGULAR Kernel_file — A custom neighborhood with specifications set by a user-defined file.
WEIGHT Kernel_file — A custom neighborhood with specifications set by a user-defined file, which can apply weights to the members
OK
Cancel
Environments...
<< Hide Help
Tool Help



Implementing Ordered Weighted Average in ArcGIS

- Raster Calculator

  r1 = rank(1, [factor1], [factor2], [factor3])

  r2 = rank(2, [factor1], [factor2], [factor3])

  r3 = rank(3, [factor1], [factor2], [factor3])

  owavg = [r1] * 0.5 + [r2] * 0.3 + [r3] * 0.2