

Geography 3842:376
GIS II

**Topic 4:
Vector Data Analysis**

Chapter 11: Chang
(DeMers Chapters 9 & 12)

Buffers and Setbacks

- Analysis of _____
- Results in new output polygon
 - So different than select by location

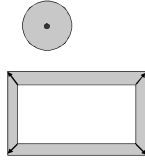
When to Buffer

- Three applications of buffers:
 - 1.
 - 2.
 - 3.

Buffers and Setbacks

● Buffers can be applied to:

- _____
- _____
- _____
- and selected graphics



● Setbacks can be applied to:

- _____



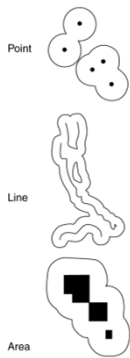


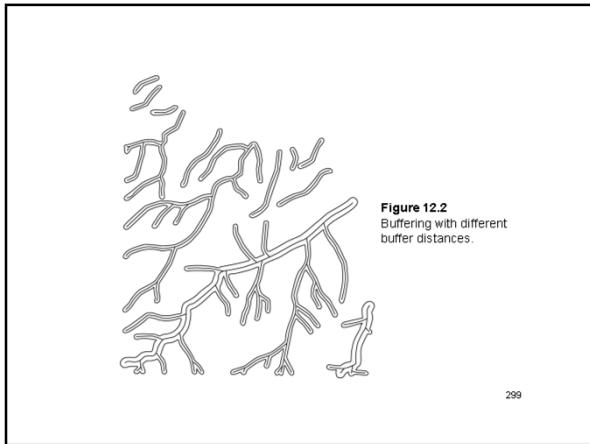
Figure 12.1
Buffering around points,
lines, and areas.

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Buffers and Setbacks

● Buffer/setback distance can be set:

- By user
- Based on features attribute value
- Single ring
- Multiple rings



Buffers and Setbacks

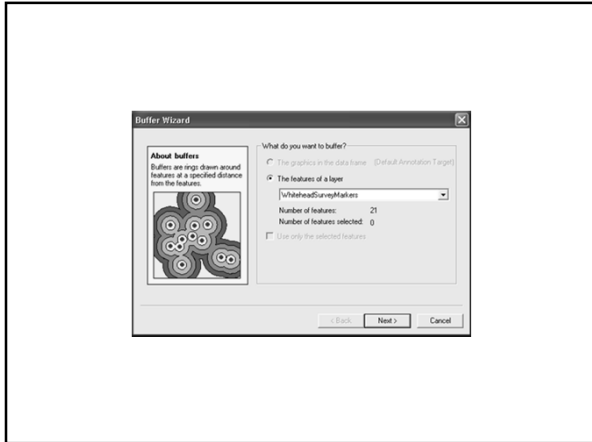
- Special line buffers include:
 - Side Buffers
 - _____
 - _____
 - _____
 - Ends Types
 - _____
 - _____

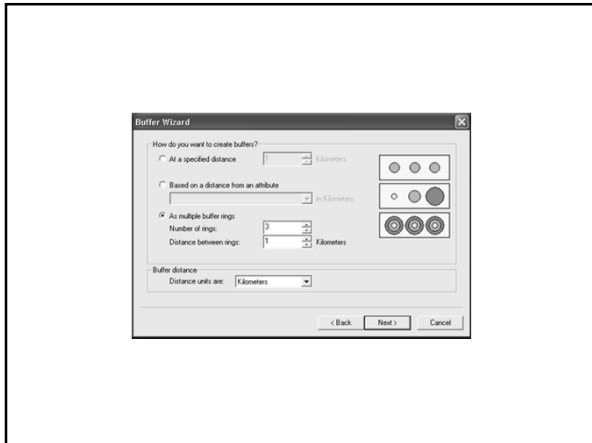
Buffers and Setbacks

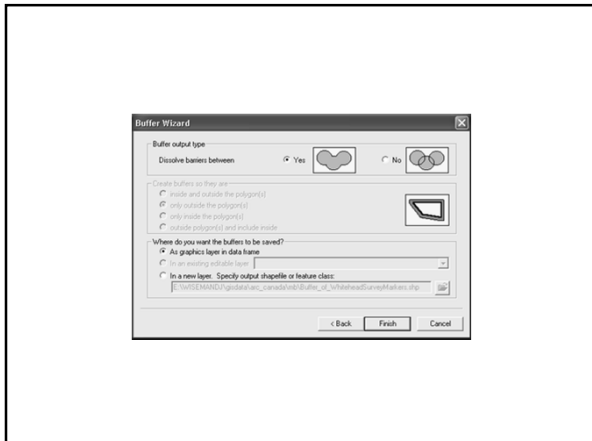
- What about overlapping areas?
 - Dissolve options:
 - None
 - All
 - List
- Result in multipart polys

Figure 12.4
Buffer areas not dissolved (top)
or dissolved (bottom).

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Map Overlay Analysis

- Manual map overlay has been used in various fields since the turn of the last century
- Used:
 - Tracing paper
 - Velum
 - Mylar
 - and photographic techniques
- . . . to combine thematic map data

Map Overlay

- Combines:
 - _____
- AND**
- _____
- of two or more input data layers

Map Overlay

- Requirements of input data layers:
 - 1.
 - 2.
 - 3.

Map Overlay

- Type determined by feature geometry:
 - Point in Polygon
 - Line in Polygon
 - Polygon on Polygon
 - Never point on point or line on line
- First layer is referred to as _____
- Second layer is the _____
 - Always a polygon

Map Overlay

- Point in Polygon
 - Input = point layer
 - Overlay = poly layer
 - Output = pt layer w/ attributes of both pts & polys

combines feature geometry AND attributes

Map Overlay

- Line in Polygon
 - Input = line layer
 - Overlay = poly layer
 - Output = line layer w/ lines dissected by polys & attributes of both lines and polys

combines feature geometry AND attributes

Map Overlay

- Polygon on Polygon
 - Input = poly layer
 - Overlay = poly layer
 - Output = poly layer w/ intersecting polys & attributes of both polys

combines feature geometry AND attributes

Map Overlay

- Two ArcGIS overlay operations achieve all three:
 - Union
 - Intersection
- They differ only in terms of:
 - _____
 - _____
- Other overlay operations are just variations:
 - Symmetrical Difference
 - Identity

Map Overlay

- Union
 - Combines extents of _____
 - Both inputs must be polygon
 - Note how tables are combined, empty fields

Map Overlay

- Intersection
 - Combines extents of _____
 - Input may be pt, line or poly, overlay is poly

1
2

AND

A	B
---	---

→

1A	1B
2A	2B

INPUT
OVERLAY
RESULT

Map Overlay

- Symmetrical Difference
 - Combines extents of _____
 - Both inputs must be polygon

1
2

XOR

A	B
---	---

→

	A	B	
1			1
2			2
	A	B	

INPUT
OVERLAY
RESULT

Map Overlay

- Identity
 - Preserves extent of _____
 - Input may be pt, line or poly, overlay is poly

1
2

(Input
AND
Overlay)
OR Input

A	B
---	---

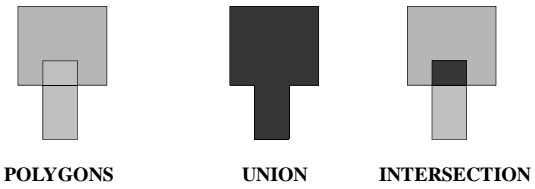
→

1	1A	1B	1
2	2A	2B	2

INPUT
OVERLAY
RESULT

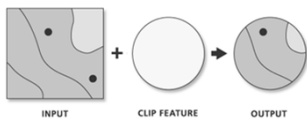
Editing Tools

- By the way:
 - Union and intersection are both editing tools in addition to overlay functions



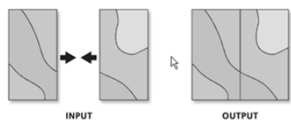
Other Vector Operation

- Clip



Other Vector Data Analysis Tools

- Merge



Other Vector Data Analysis Tools

- Dissolve

INPUT OUTPUT

Other Vector Data Analysis Tools

- Eliminate

INPUT OUTPUT

— BORDERS TO BE ELIMINATED
□ SLIVER POLYGONS

Other Vector Data Analysis Tools


- Update

INPUT OUTPUT

UPDATE FEATURE

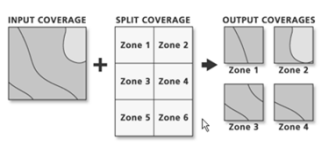
Other Vector Data Analysis Tools

- Erase



Other Vector Data Analysis Tools

- Split



Sources of Error

- Datum/projection errors
- Poor registration
- Topological errors - slivers and gaps
- Incompatible levels of accuracy/detail

