LECTURE ELEVEN
MULTI-CRITERIA EVALUATION
Developed = 1  
Undeveloped = 0  

School = 10  
No School = 0  

Undeveloped, or school = 0  
Developed, no school = 1  
Undeveloped, school = 10  
Developed, school = 11
**Raster Overlay**

<table>
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<tr>
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<th>Developed = 1</th>
<th>Undeveloped = 0</th>
<th>School = 10</th>
<th>No School = 0</th>
<th>Hospital = 20</th>
<th>Hospital = 0</th>
</tr>
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<tbody>
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\end{array}\] + \[\begin{array}{ccc}
10 & 0 & 0 \\
0 & 10 & 0 \\
0 & 10 & 0 \\
\end{array}\] + \[\begin{array}{ccc}
0 & 0 & 0 \\
0 & 20 & 20 \\
20 & 20 & 20 \\
\end{array}\] = \[\begin{array}{ccc}
11 & 0 & 1 \\
0 & 31 & 21 \\
20 & 30 & 20 \\
\end{array}\]
RASTER OVERLAY

Developed = 1
Undeveloped = 0

School = 1
No School = 0

\[
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0 & 0 & 0 \\
\end{array}
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\end{array}
= 
\begin{array}{ccc}
1 & 0 & 0 \\
0 & 1 & 0 \\
0 & 0 & 0 \\
\end{array}
\]
## RASTER OVERLAY

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1 & 1 & 1 \\
\end{array}
= 
\begin{array}{ccc}
0 & 0 & 0 \\
0 & 1 & 0 \\
0 & 0 & 0 \\
\end{array}
$$
FROM LAST LECTURE

Developed = 1  
Undeveloped = 0

School = 1  
No School = 0

Hospital = 1  
Hospital = 0
MULTI-CRITERIA EVALUATION

FOR

LAND USE PLANNING
LAND USE/COVER SUITABILITY ANALYSIS

“Land use suitability analysis aims at identifying the most appropriate spatial pattern for future land uses according to specific requirements, preferences or predictions of some activity.”

Malczewski 2004

“Different stakeholders in the design process can be anticipated to have different views about what is important, how that importance should be measured, and how various important factors should be combined.”

Longley et al. 2011
LAND COVER

The physical state of the earth’s surface and immediate subsurface in terms of the natural environment.

LAND USE

The human employment of a land cover type.
SITE SELECTION

RANKS KNOWN SITES

SITE SEARCH

DETERMINES SHAPE AND SIZE OF BEST SITES
GIS and LAND USE/COVER PLANNING

- Land use suitability for species habitat
- Geological favorability
- Suitability for agricultural activities
- Landscape evaluation and planning
- Environmental impact assessment
- Regional planning
WHAT ARE THE LIMITS OF OVERLAY?

Owl Habitat + Forest Type = Output
MULTI-CRITERIA EVALUATION

• A method for combining data according to their importance in making a decision

• Importance is represented as a weight

• Different mathematical operations are used to combine the different variables
GIS & MCE

GIS and MCE are compatible because:

- GIS provides data management and display facilities

- MCE provides the means for evaluating complex multiple criteria decision problems
BINARY MCE

0.5

0.2

0.3

SUITABLE

NON-SUITABLE

SUITABLE

NON-SUITABLE

SUITABLE

NON-SUITABLE
STEPS IN MCE

1. Determine criteria for solving problem

2. Represent all variables as quantitative scales

3. Determine associated weights (%)

4. Perform appropriate operations to combine variables