Reserve Design Activity

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Materials provided by:

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Pacific Marine Analysis & Research Association

Based on materials developed by:

Matthew Watts, Lindsay Kircher, and Hugh Possingham

aeda
Applied Environmental Decision Analysis
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Exercise 1

Objectives:

- Represent target amount for feature 1, 2, 3
- Minimize cost
- Consider spatial configuration: Try to ensure that most of the selected planning units are adjacent to at least one other planning unit

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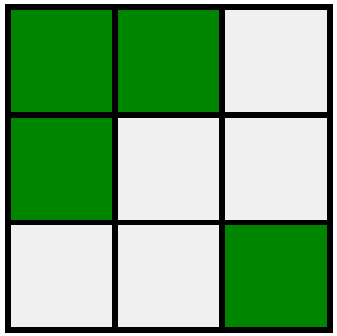
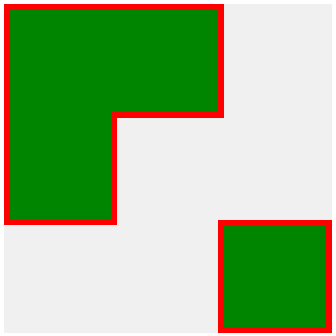
Consider clumping

- Count the number of outside edges
- Each edge counts * 100

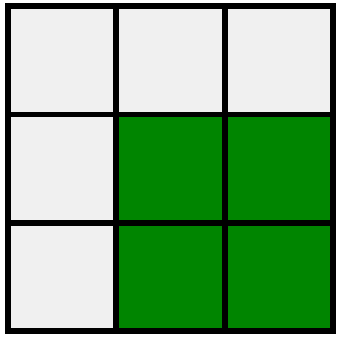
Portfolio A

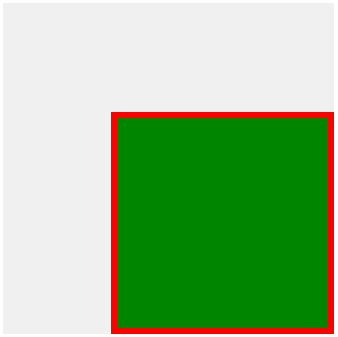




12 edges * 100 = 1200

Portfolio B





8 edges * 100 = 800

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Webpage computes “target gap” and “cost”

Conservation Planning Excercise

Systematic conservation planning involves many steps including identifying stakeholders and identifying critical information and developing realistic conservation targets. Marxan is designed to solve the minimum set problem - selecting areas to meet targets with the lowest possible cost. Below is a simple exercise to help you understand this process.

Click on the squares below to select or deselect a planning unit. The goal is to select planning units that total to meet the target values with lowest possible cost. On the right is a list of three conservation features, the targets for those features, and their current totals. When a target is reached for a feature, a check mark will appear to far right.

To understand the effects of clumped vs dispersed solutions try the exercise first without trying to clump or group the planning units and then do it again keeping them clustered into a few groups.

On this simple problem can you do as well as Marxan? How about if you had 500,000 planning units?

0 0 0 $347	0 0 0 $52	0 0 1 $985	0 0 0 $207	89 0 12 $276	30 48 0 $821	69 4 9 $122	0 0 0 $404	0 0 0 $300	0 0 91 $681
0 0 0 $813	0 0 0 $537	0 0 0 $931	0 0 0 $653	71 43 12 $919	99 0 1 $826	0 0 0 $455	17 0 0 $983	0 0 35 $731	31 0 0 $875
0 0 0 $247	55 40 0 $462	0 0 0 $287	0 2 27 $988	70 0 0 $85	37 0 56 $736	0 0 0 $681	0 0 33 $479	0 41 0 $459	54 0 0 $615
0 0 0 $378	80 8 0 $986	0 47 0 $887	0 0 0 $392	0 78 0 $526	0 0 87 $783	66 0 38 $224	0 0 0 $149	0 0 0 $268	0 91 0 $90
0 0 0 $977	0 0 73 $74	0 60 0 $53	25 79 0 $390	0 0 0 $619	11 0 8 $773	0 0 0 $952	0 0 0 $738	0 0 0 $897	0 0 53 $580
76 34 0 $969	0 90 0 $76	0 84 0 $147	0 0 82 $870	0 72 26 $350	0 0 0 $543	0 0 21 $607	58 0 0 $375	0 0 0 $903	0 54 59 $790
75 0 60 $729	0 0 0 $492	0 0 0 $303	0 0 0 $289	0 0 0 $490	0 0 0 $599	91 0 0 $407	0 0 57 $651	0 42 97 $709	0 0 7 $365
0 0 0 $571	0 37 0 $931	0 0 0 $353	0 0 0 $64	0 0 0 $955	0 0 0 $950	0 0 0 $855	0 23 0 $886	0 41 0 $840	81 0 37 $598
0 0 12 $422	0 0 0 $252	0 0 0 $941	0 53 24 $152	0 72 0 $353	0 93 0 $123	0 0 0 $716	0 23 59 $587	0 0 0 $346	0 0 0 $318
0 0 0 $682	11 0 0 $891	0 14 50 $815	0 0 0 $818	0 0 88 $726	0 0 0 $372	0 0 0 $197	48 0 0 $89	0 0 0 $417	0 76 0 $975

Your Results:

Features	Target	Current	
A	267.4	0	
B	251.2	0	
C	243.0	0	
Total Cost:		$0	

Marxan Results:

Achieve all three targets to compare with Marxan

www.aproposinfosystems.com/media/marxan-demo.html

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You can start now.
You have 10 min to find the best solution.
Good luck !!

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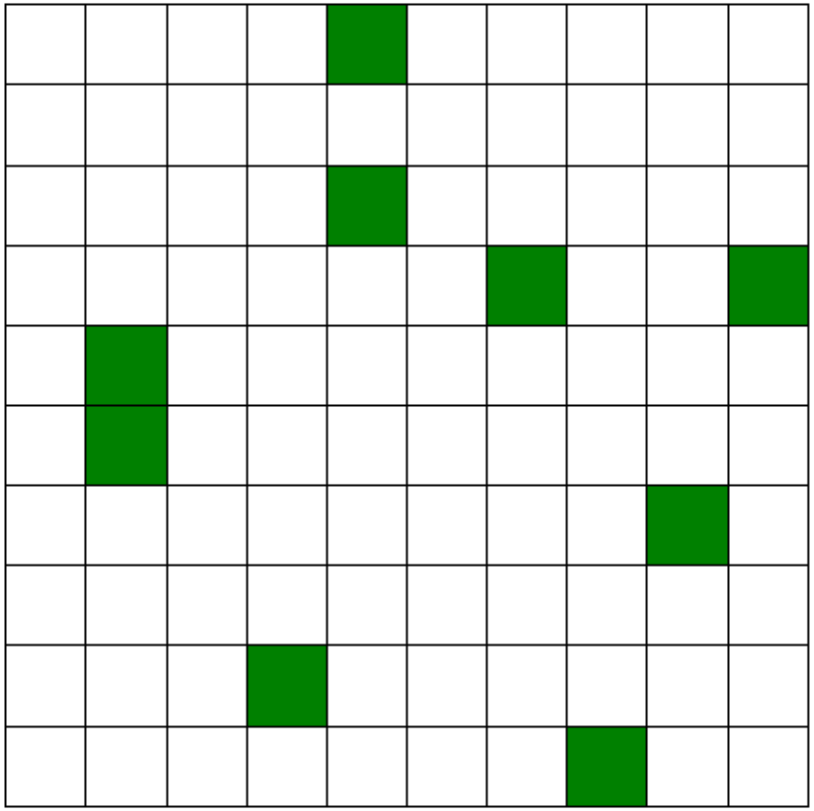
Results of Marxan



Lowest cost solution = **1775**

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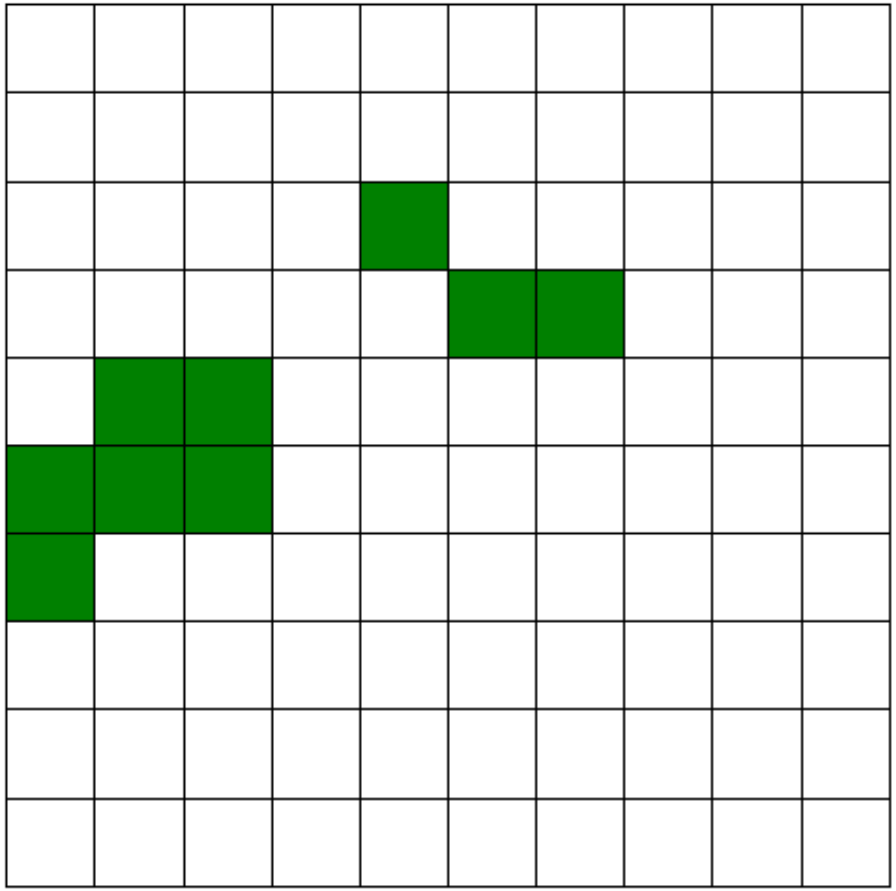
Results of Marxan



Lowest cost clumped solution

Cost= 3140

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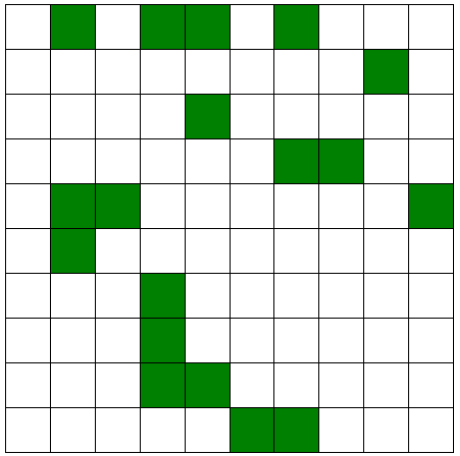
Now consider…

- More features (a few hundred?)
- More spatial constraints
- The problem gets so large that it is impossible to find a good solution in reasonable amount of time



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