Site Selection and the Reduction of Biodiversity Impact

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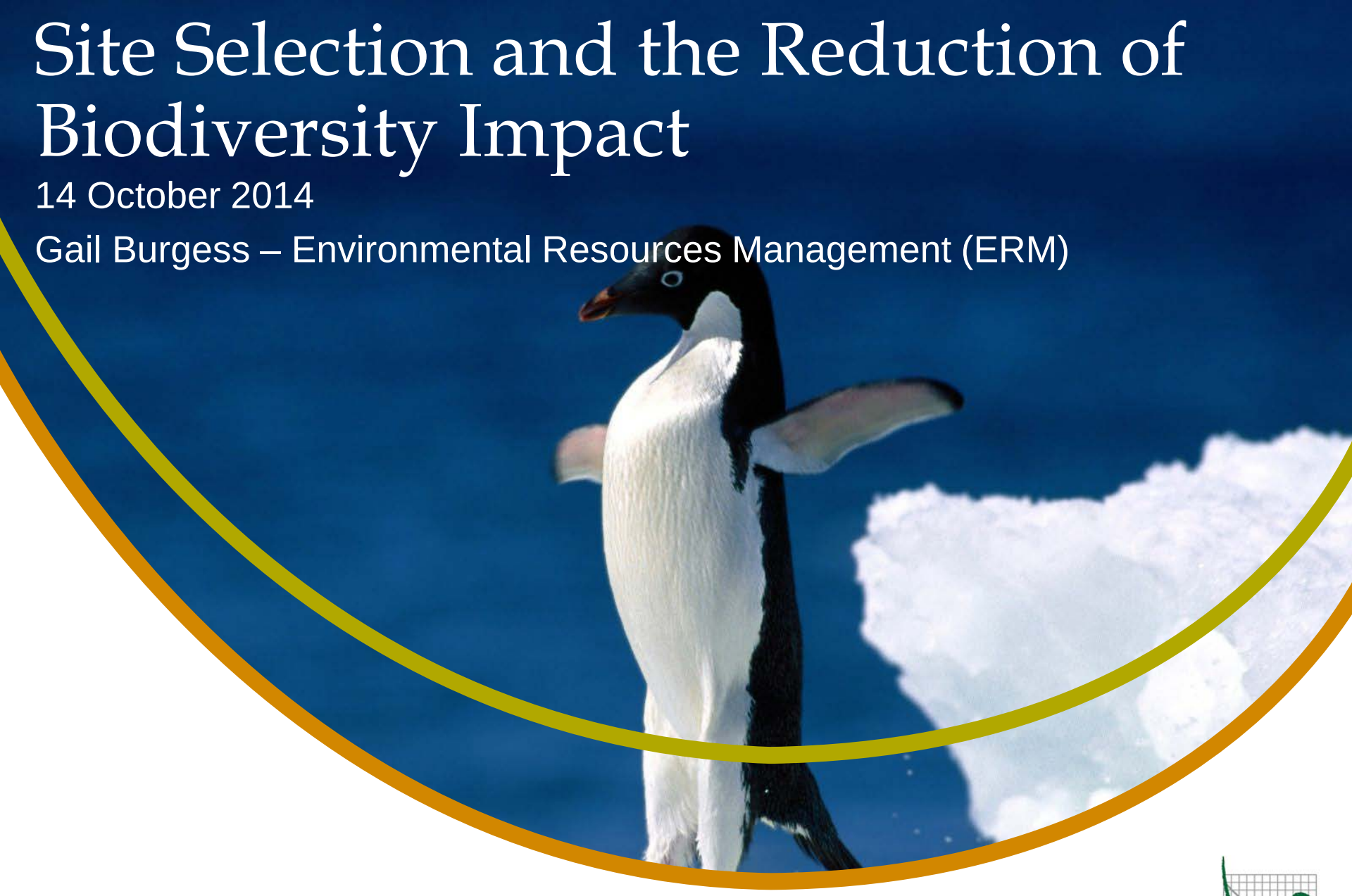
Gail Burgess – Environmental Resources Management (ERM)



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Outline

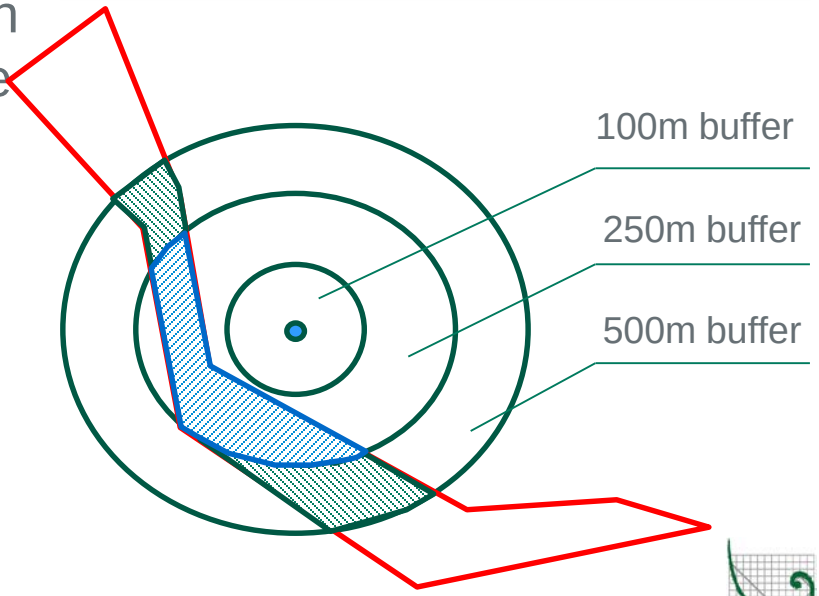
- Introduction
- The problem
- Process
- Results
- Challenges and Solutions
- Future Benefits

Introduction

- Gail Burgess – GIS Consultant
- Impact Assessment and Planning -Environmental and Social Impact Assessments
- Produce supporting maps and figures for the specialist teams including Biodiversity, Air, Noise and Marine
- Spatial Analysis of data gathered, on site, from client or Open Source
- Create mobile mapping solutions, and support the teams.
- Also support other teams within ERM, such as contaminated site management and risk analysis teams.
- Educate other teams on the potential of GIS

The Challenge

- Inherently there can be a perception that the GIS team just produce maps.
- A complex proposed development with a high potential of Great Crested Newts with over 500 potentially impacted ponds.
- Natural England has set guidance which we decide to use to determine where the likely impact of the ponds would be.
- The guidance set parameters for the area of intersection of the development and each buffer of each bond



The Challenge

- Ultimately we need to reduce loss of habitat.
- Based on the guidance we could analyse the data spatially and steer the planning of the development to mitigate these.
- Worked a process which took approximately a day and a half, which included creating buffers, using tabulate intersect, analysing the data in excel, importing back to arcmap, and visualising the score.
- Similar to other process and analysis for other habitats. We could set parameters advised by the biodiversity team, and create a dynamic model that we could use.

The Process

THE BRIEF

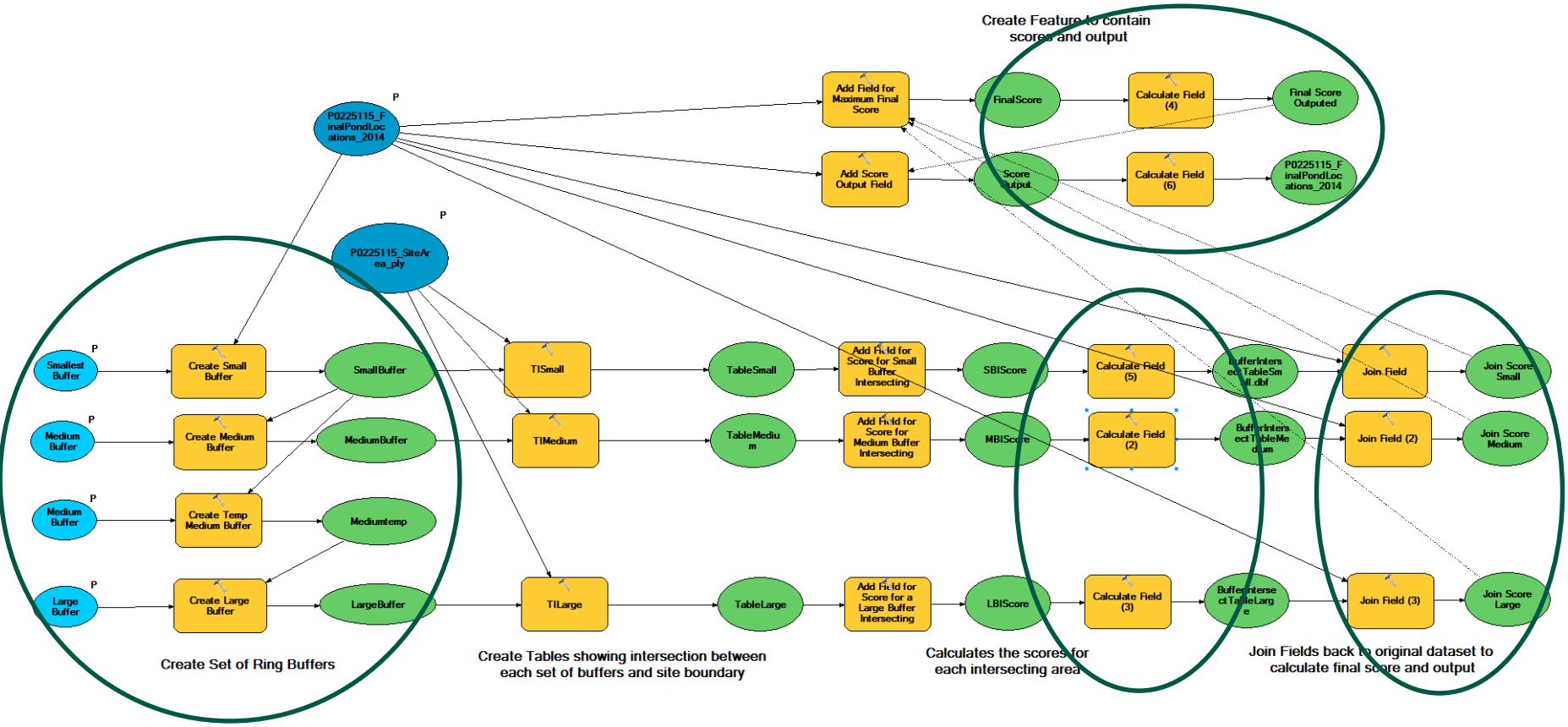
Build a tool that can automate a process for the following:

- Input a set of features
- Input a site layout
- Create a set of buffers for the features
- Create a table showing the intersecting area for each pond, between the buffer and the site layout
- Automate the score for each intersecting area
- Join tables and features
- Visualise the score of the features, as well as having the ability to create a table output.

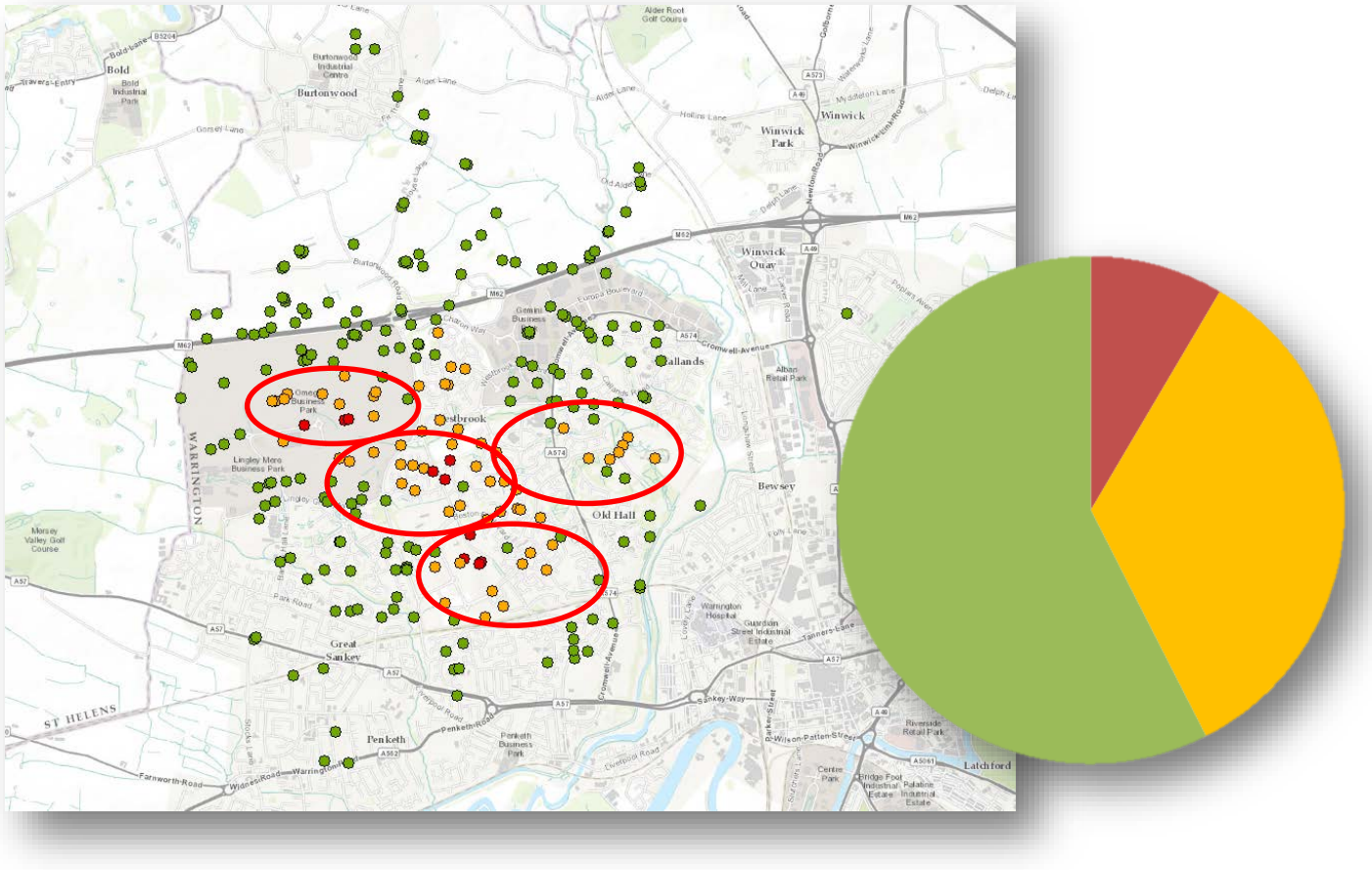
Additional “Wish List”

- Have the ability to input different scoring/weightings to be used for other habitats and projects.

Results

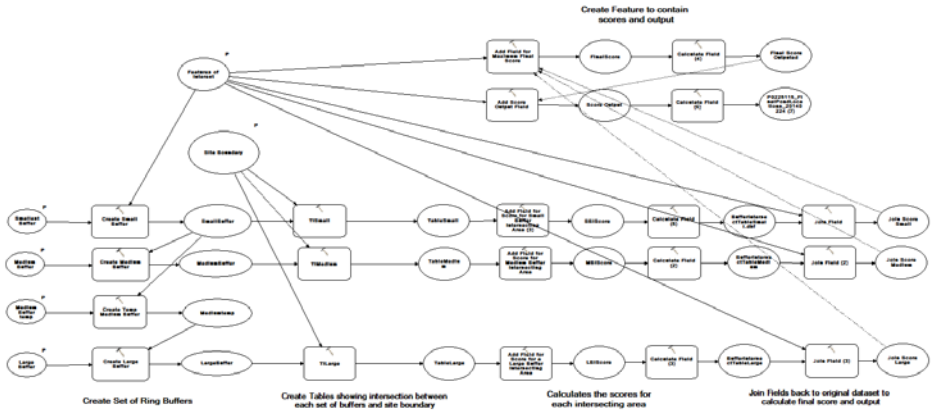

Create Feature to contain scores and output
P0225115_FinalPondLocations_2014
Add Field for Maximum Final Score
FinalScore
Calculate Field (4)
Final Score Outputed
Add Score Output Field
Score Output
Calculate Field (6)
P0225115_FinalPondLocations_2014
P0225115_SiteArea_ply
Smallest Buffer
Create Small Buffer
SmallBuffer
TISmall
TableSmall
Add Field for Score for Small Buffer Intersecting
SBIScore
Calculate Field (5)
BufferIntersect TableSmall.dbf
Join Field
Join Score Small
Medium Buffer
Create Medium Buffer
MediumBuffer
TIMedium
TableMedium
Add Field for Score for Medium Buffer Intersecting
MBIScore
Calculate Field (2)
BufferIntersect TableMedium
Join Field (2)
Join Score Medium
Medium Buffer
Create Temp Medium Buffer
Mediumtemp
Large Buffer
Create Large Buffer
LargeBuffer
TILarge
TableLarge
Add Field for Score for a Large Buffer Intersecting
LBIScore
Calculate Field (3)
BufferIntersect TableLarge
Join Field (3)
Join Score Large
Create Set of Ring Buffers
Create Tables showing intersection between each set of buffers and site boundary
Calculates the scores for each intersecting area
Join Fields back to original dataset to calculate final score and output

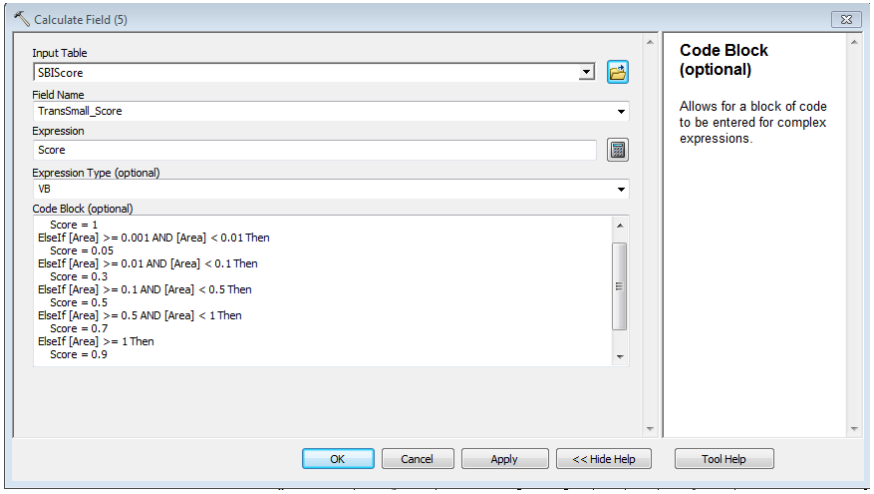
Results



- Illustrates the results spatially
- Reduce survey time
- Illustrates where the problem areas are

Challenges and Solutions





- Inputting different scoring systems
  - Can be done straight into model builder
  - Can create inputs to enter the values
  - May be easiest for the first option as it could become a long and complicated tool when opening
- Polygons/Lines/Points
  - Already able to take any other input
- More than one data set
  - Can right click on the tool, and batch process this to work on multiple datasets

Challenges and Solutions

1. According to my brief the process has now been automated. The model took 1 hour to do the full process of data for 500 locations.
   - More than a quarter of the time it took to process it manually
   - Did not need to transfer data back and forth between excel
   - With a layer set up the data showed automatically
   - As all developments the site boundary changed and I could update the process within an hour instead of another day

2. Brief wanted the ability to amend the parameters
   - We can easily amend the model and parameters, and add the option to input the score scales for each buffer.
   - We can input not only points, but polygons, and polylines

Benefits

1. Using simple GIS we can quickly analyse large sets of data
2. We can automate the process to reduce repetitive tasks
3. Could be used at the initial stage of the process to show find out where the most sensitive areas of impact are
4. Help the specialist to focus on certain areas during surveys
5. Reduce the impact on biodiversity
6. Educate other people on the benefits of GIS by using simple tools in model builder, decreasing working time and opening up the opportunity to work on other projects.
7. Personally, reaffirmed that GIS is not such a dark art