

ASSIGNMENT I Ecology Fall 2009

This is a take-home, open book assignment.

Goal: To produce a working Excel model of the sustainable yield harvesting of a population of Tamar wallabies.



Yes, I know these are really cute, but not everyone thinks so.

Data: Go to the course website, syllabus page, (<http://faculty.jsd.claremont.edu/dmcfarlane/bio146mcfarlane/syllabus.shtml>) and download to supporting pdf document.

Procedure: Use the pdf document to derive the necessary life history parameters. If a particular piece of information is missing, use the usual internet sources to find it or comparable data from another species.

Code up a logistic growth model in Excel, with the addition of a MSY curve (note: productivity = dN/dt). An example for Impala is attached below.

Questions: What is the annual maximum sustained yield (MSY) for this population of Tamar wallabies? What is your one-time initial harvest yield? How practical would it be to harvest this species sustainably for meat?

Please embed your spreadsheet graphs into your assignment. If you want to embed screen capture images of the spreadsheet itself, use a freeware program like EasyCapture: <http://www.snapfiles.com/get/easycapture.html> (Windows only)

Assignment due Wednesday 21st October.

Example: An impala harvestable meat model:

1) Assemble a life table to calculate r .

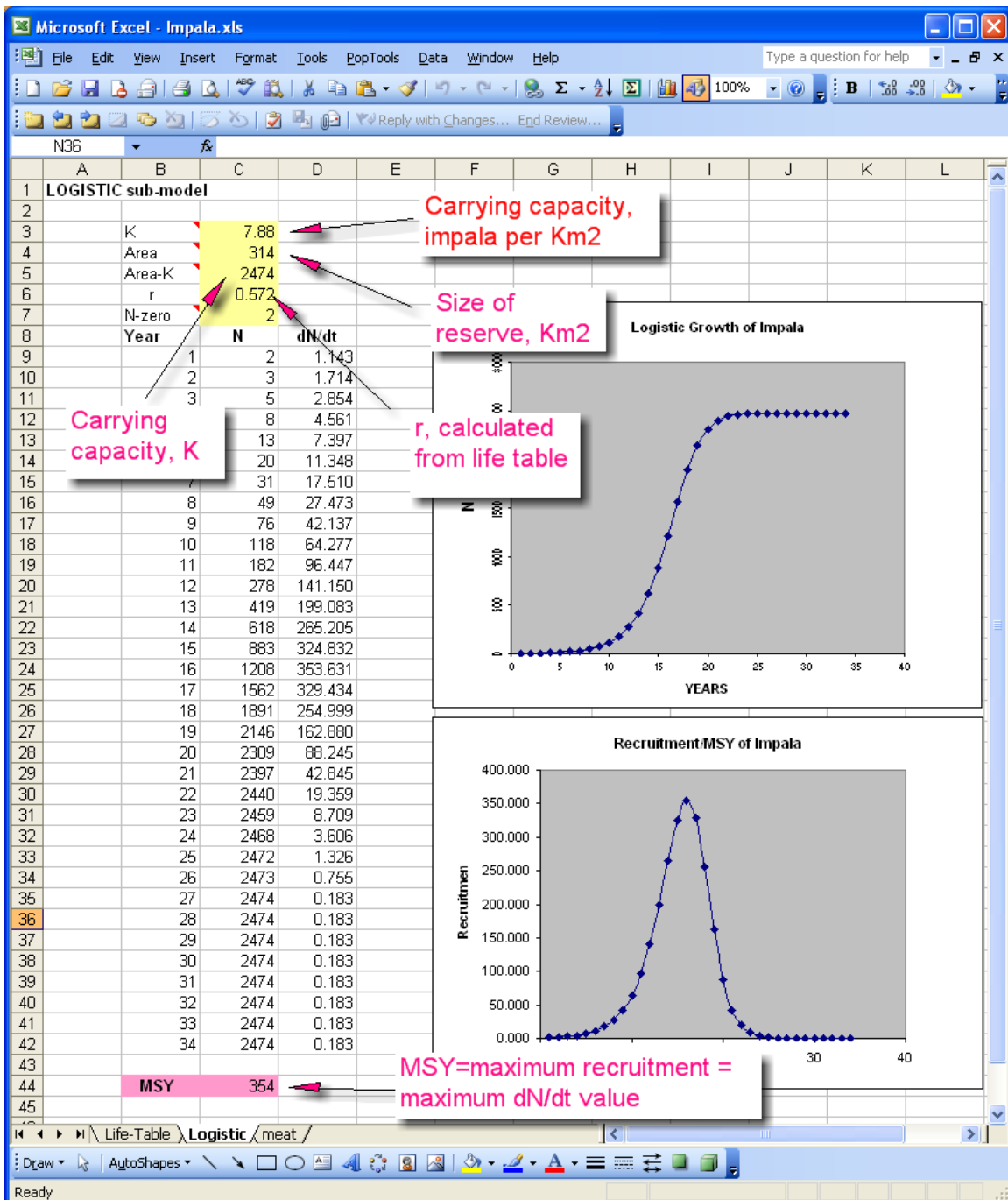
The screenshot shows a Microsoft Excel spreadsheet titled "Impala.xls". The spreadsheet contains a life table for an impala meat model. The data is organized as follows:

Year	births (bx)	Survivorship	lxbx
1	0	1	0
2	0.5	0.81	0.405
3	0.5	0.79	0.395
4	0.5	0.77	0.385
5	0.5	0.76	0.38
6	0.5	0.73	0.365
7	0.5	0.68	0.34
8	0.5	0.64	0.32
9	0.5	0.57	0.285
10	0.4	0.43	0.172
11	0.3	0.25	0.075
12	0.2	0.09	0.018
13	0.1	0.006	0.0006
14	0	0.003	0

Summary values:

R-zero	3.1406
r	0.572

2) Assemble a logistic growth model, and find the maximum recruitment:



3) Convert the MSY(impala) into MSY (meat):

The screenshot shows a Microsoft Excel spreadsheet titled "Impala.xls" with the following data:

	A	B	C	D	E	F	G	H
1	MEAT sub-model							
2								
3		MSY Impala	354					
4		Mean mass Impala (kg)	41.45					
5		% useable meat/animal	58					
6								
7		MSY- Kg/meat/yr	8511					
8								
9								
10								
11								
12								
13								
14								
15								
16								

Annotations in the image:

- Arrow pointing to cell C3 (354): MSY impala from logistic sub-model
- Arrow pointing to cell C4 (41.45): From literature (Google search) - could have used deer if impala data not available!
- Arrow pointing to cell C5 (58): From literature (Google search)
- Arrow pointing to cell C7 (8511): ANSWER in kg of meat per year