Ish-Kaysh Tripp

ENGR 115

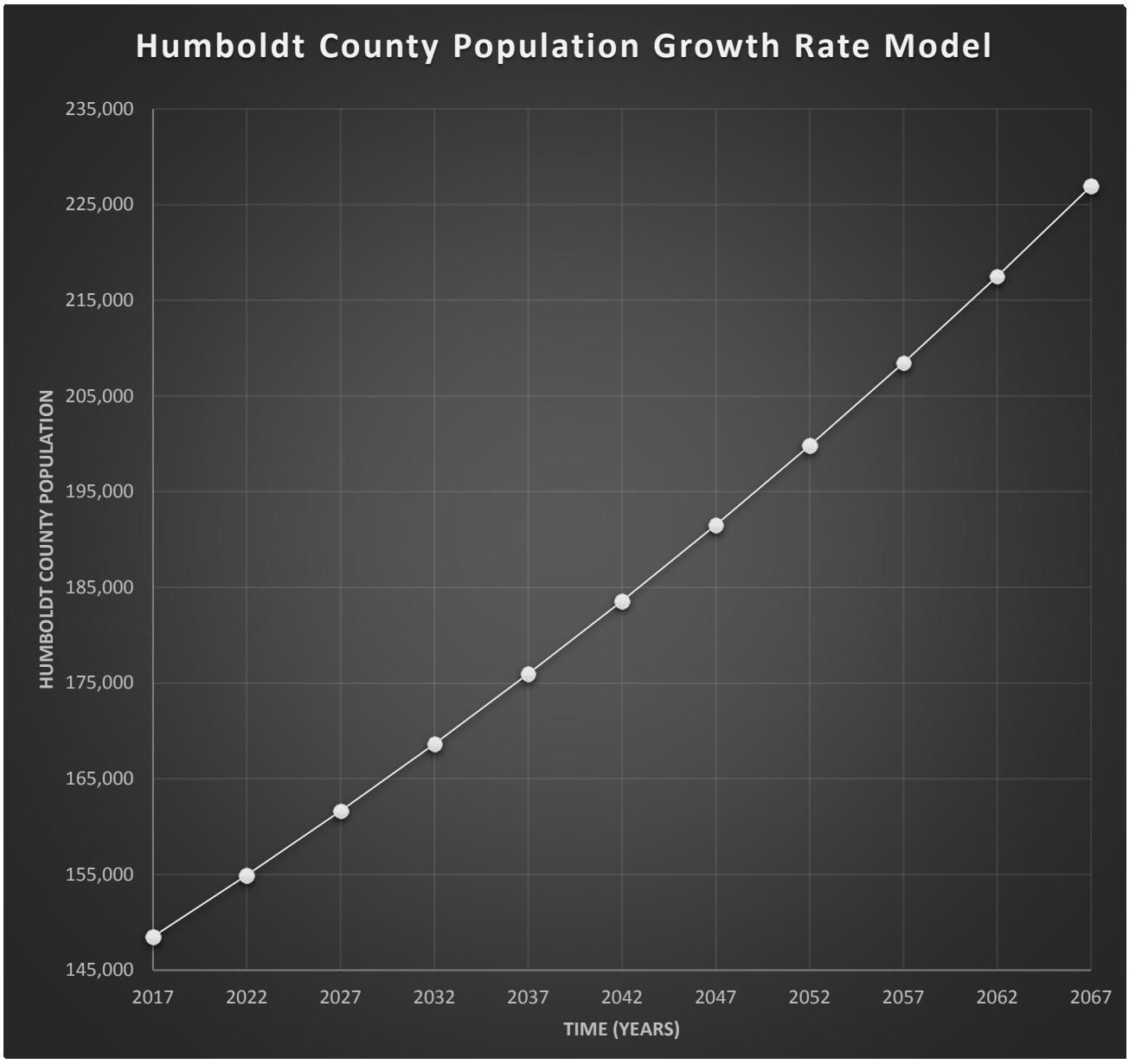
Thursady, Feb 2nd, 2017

Population Growth Model for Humboldt County

Input Parameters		
Location	Humboldt County, CA	
Date Reference	http://population.us/county/ca/humboldt-county/	
Model Start Year	1970	
Population at Start Year (P_O)	99,692	
End Year	1980	
Population at end Year (P)	108,514	
Delta t	10	
Growth Rate (r)	0.00848	
Model Time Increment (years)	5	

Model

Time (actual year)	Time (model year)	Model population
1980	0	108,514
1985	5	113,214
1990	10	118,117
1995	15	123,233
2000	20	128,571
2005	25	134,139
2010	30	139,949
2015	35	146,011
2017	37	148,508
2022	42	154,940
2027	47	161,651
2032	52	168,652
2037	57	175,957
2042	62	183,578
2047	67	191,529
2052	72	199,824
2057	77	208,479
2062	82	217,509
2067	87	226,929


Humboldt County Population Growth Rate Model
235,000
225,000
215,000
205,000
195,000
185,000
175,000
165,000
155,000
145,000
HUMBOLDT COUNTY POPULATION
2017
2022
2027
2032
2037
2042
2047
2052
2057
2062
2067
TIME (YEARS)

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Population Growth Model for Humboldt Co

Input Parameters	
Location	Humboldt County, CA
Date Reference	http://population.us/county
Model Start Year	1970
Population at Start Year (P_O)	99692
End Year	1980
Population at end Year (P)	108514
Delta t	10
Growth Rate (r)	0.00848
Model Time Increment (years)	5

Model		
Time (actual year)	Time (model year)	Model population
1980	0	=$B$13*EXP($B$15*B20)
1985	=B20+$B$16	=$B$13*EXP($B$15*B21)
1990	=B21+$B$16	=$B$13*EXP($B$15*B22)
1995	=B22+$B$16	=$B$13*EXP($B$15*B23)
2000	=B23+$B$16	=$B$13*EXP($B$15*B24)
2005	=B24+$B$16	=$B$13*EXP($B$15*B25)
2010	=B25+$B$16	=$B$13*EXP($B$15*B26)
2015	=B26+$B$16	=$B$13*EXP($B$15*B27)
2017	=B27+$B$16	=$B$13*EXP($B$15*B28)
2022	=B28+$B$16	=$B$13*EXP($B$15*B29)
2027	=B29+$B$16	=$B$13*EXP($B$15*B30)
2032	=B30+$B$16	=$B$13*EXP($B$15*B31)
2037	=B31+$B$16	=$B$13*EXP($B$15*B32)
2042	=B32+$B$16	=$B$13*EXP($B$15*B33)
2047	=B33+$B$16	=$B$13*EXP($B$15*B34)
2052	=B34+$B$16	=$B$13*EXP($B$15*B35)
2057	=B35+$B$16	=$B$13*EXP($B$15*B36)
2062	=B36+$B$16	=$B$13*EXP($B$15*B37)
2067	=B37+$B$16	=$B$13*EXP($B$15*B38)

1. Use your model to determine the doubling time (rounded to the nearest year) at the growth rate you calculated above. You may need to increase the number of years Excel calculates to determine this on your model page. Check your model prediction with the hand calculation you did at the beginning of lab. State the doubling time from your hand calculation and the double time provided by your model. Does the doubling time from your model match the doubling time from your hand calculation?

Hand Calculated Doubling Time= 81.74= 82 years
Doubling Time Provided by Model= 82 years
Both doubling times are the same.

2. What growth rate would you recommend for your chosen place? Justify your recommendation as much as possible using the information you have on your chosen area and simulations you run using your spreadsheet model. One way to start could be by suggesting a carrying capacity for your place and adjusting the growth rate so that the capacity is not exceeded over a 50-year period. Be sure to include this carrying capacity value in your justification.

I would feel comfortable recommending my calculated growth rate of 0.00848 because it is very small. If we assumed that the carrying capacity of Humboldt county is 450,000, which can be justified by the possible future inhabitance of the multiple federally protected forests harbouring many unused resources, it would take well over 100 years to reach the capacity of Humboldt County.

3. Does an exponential growth model seem like a reasonable model for human population growth? Why or why not?

The exponential growth models are very helpful in estimating populations in a given time. Although they can seem helpful, they cannot take mass deaths from war, natural disasters, or deadly sicknesses into account when estimating. Since those factors are common occurances today, it cannot be seen as a reliable source of modeling human population growth.