# BIOE-172. Population Genetics

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## Assignment 4

1. A population geneticist studying salmons is requested to use historical information about the heterozygosity loss using a variable and informative locus. She is interested in providing feedback to agencies about the differences in population size among different regions along the Pacific Coast. She receives historical estimates of Heterozygosity for 3 locations and wants to use the changes in heterozygosity to have an approximate estimate of the effective population size for those. Assume that the generation time is approximately 2 years for salmon.

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| --- | --- | --- |
| Populations | 1989 | 2023 |
| Nor Cal | 0.65 | 0.43 |
| Central Oregon | 0.59 | 0.54 |
| Alaska | 0.76 | 0.74 |

1. Estimate the effective population size that could explain the changes in heterozygosity observed in these populations. Use the following equation:



Remember that you can look at the ration of Ht/H0 = x to solve this equation and



I would like you to try solve this equation and get an expression that gets at estimating N.

N = ???

HINT: ln(x) and N will exchange places.. I just want you to see if you can figure out why. Remember that these estimations require time (t) to be in generations (not years!!!)

1. Based on the performed analysis, what would you tell the management agency in terms of what populations have lower effective numbers and if the numbers are different enough to make considerations about different levels of conservation or management efforts