Correlation of EV between reproduction and survival = 0.5

EV sampled from binomial distributions.

Population specific rates for Population1

Percent of adult females breeding each year: =(100-((100-50)\*((N/K)^0)))\*(N/(1+N))

with EV(SD): 10

Percent of adult males in the pool of breeders: 70

Distribution of number of broods per year:

0 percent 0 broods

100 percent 1 broods

0 percent 2 broods

0 percent 3 broods

0 percent 4 broods

0 percent 5 broods

0 percent 6 broods

0 percent 7 broods

0 percent 8 broods

0 percent 9 broods

0 percent 10 broods

0 percent 11 broods

Normal distribution of brood size with mean: 2.5 with SD: 1

Female annual mortality rates (as percents):

Age 0 to 1: 8 with EV(SD): 10

Age 1 to 2: 8 with EV(SD): 3

Age 2 to 3: 4 with EV(SD): 3

Age 3 to 4: 4 with EV(SD): 3

After age 4: 15 with EV(SD): 3

Male annual mortality rates (as percents):

Age 0 to 1: 8 with EV(SD): 10

Age 1 to 2: 8 with EV(SD): 3

Age 2 to 3: 4 with EV(SD): 3

Age 3 to 4: 4 with EV(SD): 3

Age 4 to 5: 6 with EV(SD): 3

After age 5: 9 with EV(SD): 3

Catastrophe 1: Catastrophe1

Local impact

Frequency (%): 5

Reproduction reduced by severity multiplier: 90

Survival reduced by severity multiplier: 90

Initial population size:

Age 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 Total

Females 0 30 18 11 7 4 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 74

Males 0 30 18 11 7 4 2 2 1 0 0 1 0 0 0 0 0 0 0 0 0 76

Carrying capacity: =(369)\*(1+(MIN((Y-1);5)\*(-10)/100))

with EV(SD): 0

Carrying capacity truncation applied when K is exceeded by: =N

Deterministic projections assume no stochastic fluctuations, no inbreeding depression, no limitation of mates, no harvest, and no supplementation.

Scenario: Yangtze finless porpoise

Population 1: Population1

Deterministic population growth rate:

(Caution: Deterministic growth rate may not be meaningful if functions were used for some demographic rates.)

r = 2.1361

lambda = 8.4666

R0 = 62614435525.7259

Generation time for:

females = 11.64

males = 12.19

Stable age distribution:

Age class females males

0 0.202 0.202

1 0.120 0.120

2 0.071 0.071

3 0.044 0.044

4 0.027 0.027

5 0.015 0.016

6 0.008 0.010

7 0.004 0.006

8 0.002 0.003

9 0.001 0.002

10 0.001 0.001

11 0.000 0.001

12 0.000 0.000

13 0.000 0.000

14 0.000 0.000

15 0.000 0.000

16 0.000 0.000

17 0.000 0.000

18 0.000 0.000

19 0.000 0.000

20 0.000 0.000

Ratio of adult males to adult females: 0.660

Initial population size, N = 150

Initial carrying capacity, K = 369

Results from VORTEX 10.5.5.0

Project: New Project

Scenario: Yangtze finless porpoise

Population 1: Population1

Year 0

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 150.00 (0.00 SE; 0.00 SD)

Means across extant populations only:

Population size = 150.00 (0.00 SE; 0.00 SD)

GD(expected heterozygosity) = 0.9967 (0.0000 SE; 0.0000 SD)

Observed heterozygosity = 1.0000 (0.0000 SE; 0.0000 SD)

Number of extant alleles = 300.00 (0.00 SE; 0.00 SD)

Number of mt haplotypes = 150.00 (0.00 SE; 0.00 SD)

Lethal alleles / diploid = 1.56 (0.00 SE; 0.09 SD)

Year 1

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 158.32 (0.38 SE; 11.92 SD)

Means across extant populations only:

Population size = 158.32 (0.38 SE; 11.92 SD)

GD(expected heterozygosity) = 0.9957 (0.0000 SE; 0.0004 SD)

Observed heterozygosity = 1.0000 (0.0000 SE; 0.0000 SD)

Number of extant alleles = 282.15 (0.33 SE; 10.36 SD)

Number of mt haplotypes = 140.97 (0.17 SE; 5.25 SD)

Lethal alleles / diploid = 1.56 (0.00 SE; 0.11 SD)

Year 2

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 177.08 (0.64 SE; 20.20 SD)

Means across extant populations only:

Population size = 177.08 (0.64 SE; 20.20 SD)

GD(expected heterozygosity) = 0.9945 (0.0000 SE; 0.0005 SD)

Observed heterozygosity = 1.0000 (0.0000 SE; 0.0000 SD)

Number of extant alleles = 269.43 (0.42 SE; 13.42 SD)

Number of mt haplotypes = 134.38 (0.22 SE; 6.81 SD)

Lethal alleles / diploid = 1.56 (0.00 SE; 0.12 SD)

Year 3

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 208.52 (0.95 SE; 30.02 SD)

Means across extant populations only:

Population size = 208.52 (0.95 SE; 30.02 SD)

GD(expected heterozygosity) = 0.9936 (0.0000 SE; 0.0005 SD)

Observed heterozygosity = 1.0000 (0.0000 SE; 0.0000 SD)

Number of extant alleles = 256.46 (0.48 SE; 15.25 SD)

Number of mt haplotypes = 127.46 (0.25 SE; 7.77 SD)

Lethal alleles / diploid = 1.57 (0.00 SE; 0.13 SD)

Year 4

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 241.26 (0.72 SE; 22.83 SD)

Means across extant populations only:

Population size = 241.26 (0.72 SE; 22.83 SD)

GD(expected heterozygosity) = 0.9932 (0.0000 SE; 0.0005 SD)

Observed heterozygosity = 1.0000 (0.0000 SE; 0.0000 SD)

Number of extant alleles = 235.68 (0.39 SE; 12.23 SD)

Number of mt haplotypes = 115.58 (0.20 SE; 6.46 SD)

Lethal alleles / diploid = 1.57 (0.00 SE; 0.14 SD)

Year 5

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 220.30 (0.26 SE; 8.15 SD)

Means across extant populations only:

Population size = 220.30 (0.26 SE; 8.15 SD)

GD(expected heterozygosity) = 0.9927 (0.0000 SE; 0.0005 SD)

Observed heterozygosity = 0.9999 (0.0000 SE; 0.0006 SD)

Number of extant alleles = 204.18 (0.30 SE; 9.54 SD)

Number of mt haplotypes = 95.91 (0.19 SE; 6.11 SD)

Lethal alleles / diploid = 1.56 (0.00 SE; 0.14 SD)

Year 6

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 184.43 (0.23 SE; 7.26 SD)

Means across extant populations only:

Population size = 184.43 (0.23 SE; 7.26 SD)

GD(expected heterozygosity) = 0.9916 (0.0000 SE; 0.0007 SD)

Observed heterozygosity = 0.9996 (0.0001 SE; 0.0016 SD)

Number of extant alleles = 173.90 (0.28 SE; 8.81 SD)

Number of mt haplotypes = 77.90 (0.17 SE; 5.53 SD)

Lethal alleles / diploid = 1.56 (0.00 SE; 0.15 SD)

Year 7

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.69 (0.19 SE; 6.01 SD)

Means across extant populations only:

Population size = 183.69 (0.19 SE; 6.01 SD)

GD(expected heterozygosity) = 0.9905 (0.0000 SE; 0.0008 SD)

Observed heterozygosity = 0.9992 (0.0001 SE; 0.0024 SD)

Number of extant alleles = 159.50 (0.26 SE; 8.36 SD)

Number of mt haplotypes = 69.64 (0.17 SE; 5.35 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.16 SD)

Year 8

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 184.06 (0.19 SE; 5.93 SD)

Means across extant populations only:

Population size = 184.06 (0.19 SE; 5.93 SD)

GD(expected heterozygosity) = 0.9894 (0.0000 SE; 0.0010 SD)

Observed heterozygosity = 0.9986 (0.0001 SE; 0.0029 SD)

Number of extant alleles = 146.75 (0.26 SE; 8.09 SD)

Number of mt haplotypes = 62.46 (0.16 SE; 4.93 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.17 SD)

Year 9

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.99 (0.18 SE; 5.76 SD)

Means across extant populations only:

Population size = 183.99 (0.18 SE; 5.76 SD)

GD(expected heterozygosity) = 0.9885 (0.0000 SE; 0.0010 SD)

Observed heterozygosity = 0.9981 (0.0001 SE; 0.0034 SD)

Number of extant alleles = 135.45 (0.24 SE; 7.69 SD)

Number of mt haplotypes = 56.27 (0.15 SE; 4.72 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.18 SD)

Year 10

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 184.01 (0.18 SE; 5.63 SD)

Means across extant populations only:

Population size = 184.01 (0.18 SE; 5.63 SD)

GD(expected heterozygosity) = 0.9876 (0.0000 SE; 0.0011 SD)

Observed heterozygosity = 0.9975 (0.0001 SE; 0.0039 SD)

Number of extant alleles = 126.15 (0.23 SE; 7.26 SD)

Number of mt haplotypes = 51.15 (0.14 SE; 4.39 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.18 SD)

Year 11

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.98 (0.19 SE; 6.02 SD)

Means across extant populations only:

Population size = 183.98 (0.19 SE; 6.02 SD)

GD(expected heterozygosity) = 0.9867 (0.0000 SE; 0.0013 SD)

Observed heterozygosity = 0.9971 (0.0001 SE; 0.0043 SD)

Number of extant alleles = 118.44 (0.22 SE; 7.10 SD)

Number of mt haplotypes = 46.96 (0.14 SE; 4.28 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.19 SD)

Year 12

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 184.02 (0.18 SE; 5.82 SD)

Means across extant populations only:

Population size = 184.02 (0.18 SE; 5.82 SD)

GD(expected heterozygosity) = 0.9858 (0.0000 SE; 0.0014 SD)

Observed heterozygosity = 0.9964 (0.0002 SE; 0.0050 SD)

Number of extant alleles = 111.72 (0.22 SE; 6.93 SD)

Number of mt haplotypes = 43.35 (0.13 SE; 4.12 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.19 SD)

Year 13

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.85 (0.18 SE; 5.78 SD)

Means across extant populations only:

Population size = 183.85 (0.18 SE; 5.78 SD)

GD(expected heterozygosity) = 0.9849 (0.0000 SE; 0.0015 SD)

Observed heterozygosity = 0.9957 (0.0002 SE; 0.0053 SD)

Number of extant alleles = 105.59 (0.21 SE; 6.57 SD)

Number of mt haplotypes = 40.01 (0.13 SE; 3.98 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.20 SD)

Year 14

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.80 (0.18 SE; 5.76 SD)

Means across extant populations only:

Population size = 183.80 (0.18 SE; 5.76 SD)

GD(expected heterozygosity) = 0.9840 (0.0000 SE; 0.0016 SD)

Observed heterozygosity = 0.9950 (0.0002 SE; 0.0058 SD)

Number of extant alleles = 100.14 (0.19 SE; 6.14 SD)

Number of mt haplotypes = 37.13 (0.12 SE; 3.67 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.21 SD)

Year 15

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 184.10 (0.18 SE; 5.76 SD)

Means across extant populations only:

Population size = 184.10 (0.18 SE; 5.76 SD)

GD(expected heterozygosity) = 0.9830 (0.0001 SE; 0.0017 SD)

Observed heterozygosity = 0.9943 (0.0002 SE; 0.0062 SD)

Number of extant alleles = 95.35 (0.19 SE; 6.01 SD)

Number of mt haplotypes = 34.68 (0.11 SE; 3.55 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.21 SD)

Year 16

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.88 (0.18 SE; 5.59 SD)

Means across extant populations only:

Population size = 183.88 (0.18 SE; 5.59 SD)

GD(expected heterozygosity) = 0.9821 (0.0001 SE; 0.0019 SD)

Observed heterozygosity = 0.9937 (0.0002 SE; 0.0064 SD)

Number of extant alleles = 90.92 (0.18 SE; 5.72 SD)

Number of mt haplotypes = 32.45 (0.11 SE; 3.44 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.22 SD)

Year 17

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 184.14 (0.19 SE; 5.89 SD)

Means across extant populations only:

Population size = 184.14 (0.19 SE; 5.89 SD)

GD(expected heterozygosity) = 0.9811 (0.0001 SE; 0.0021 SD)

Observed heterozygosity = 0.9928 (0.0002 SE; 0.0068 SD)

Number of extant alleles = 86.84 (0.18 SE; 5.65 SD)

Number of mt haplotypes = 30.36 (0.10 SE; 3.24 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.23 SD)

Year 18

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.79 (0.19 SE; 5.94 SD)

Means across extant populations only:

Population size = 183.79 (0.19 SE; 5.94 SD)

GD(expected heterozygosity) = 0.9802 (0.0001 SE; 0.0022 SD)

Observed heterozygosity = 0.9923 (0.0002 SE; 0.0070 SD)

Number of extant alleles = 82.99 (0.18 SE; 5.65 SD)

Number of mt haplotypes = 28.58 (0.10 SE; 3.12 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.23 SD)

Year 19

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.78 (0.17 SE; 5.30 SD)

Means across extant populations only:

Population size = 183.78 (0.17 SE; 5.30 SD)

GD(expected heterozygosity) = 0.9792 (0.0001 SE; 0.0024 SD)

Observed heterozygosity = 0.9915 (0.0002 SE; 0.0075 SD)

Number of extant alleles = 79.63 (0.18 SE; 5.55 SD)

Number of mt haplotypes = 26.85 (0.09 SE; 2.98 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.24 SD)

Year 20

N[Extinct] = 0, P[E] = 0.000

N[Surviving] = 1000, P[S] = 1.000

N[1st extinct] = 0, P[1st extinct] = 0.000

Mean size (all populations) = 183.55 (0.19 SE; 6.01 SD)

Means across extant populations only:

Population size = 183.55 (0.19 SE; 6.01 SD)

GD(expected heterozygosity) = 0.9783 (0.0001 SE; 0.0024 SD)

Observed heterozygosity = 0.9904 (0.0002 SE; 0.0077 SD)

Number of extant alleles = 76.44 (0.17 SE; 5.22 SD)

Number of mt haplotypes = 25.21 (0.09 SE; 2.78 SD)

Lethal alleles / diploid = 1.56 (0.01 SE; 0.24 SD)

In 1000 simulations of Yangtze finless porpoise for 20 years:

0 went extinct and 1000 survived.

This gives a probability of extinction of 0.00000 (0.00000 SE),

or a probability of success of 1.00000 (0.00000 SE).

Means across all populations (extant and extinct) ...

Mean final population was 183.55 (0.19 SE; 6.01 SD).

Age 0 1 2 3 4 Adults Total

0.00 19.25 14.89 12.91 10.56 39.22 96.82 Males

0.00 19.23 15.19 12.77 39.54 86.72 Females

Across all years, prior to carrying capacity truncation,

mean growth rate (r) was 0.1498 (0.0008 SE, 0.1103 SD)

0 of 0 harvests of females could not be completed because of insufficient animals.

0 of 0 harvests of males could not be completed because of insufficient animals.

Genetic statistics across extant populations ...

Final gene diversity (exp. het.) was 0.9783 (0.0001 SE; 0.0024 SD)

Final observed heterozygosity was 0.9904 (0.0002 SE; 0.0077 SD)

Final number of alleles was 76.44 (0.17 SE; 5.22 SD)

Final number of mt haplotypes was 25.21 (0.09 SE; 2.78 SD)

Final lethal alleles / diploid was 1.557 (0.008 SE; 0.245 SD)

Mean Ne calculated from loss of gene diversity in extant populations: 45.63

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