INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

COMMISSION INTERNATIONALE POUR LA CONSERVATION DES THONIDES DE L´ATLANTIQUE

COMISION INTERNACIONAL PARA LA CONSERVACION DEL ATUN ATLANTICO

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ASSESSMENT PROGRAM DOCUMENTATION

Program: **VPA-2BOX (ver. 3.01)**

Fits age-structured population equations to catch, effort, abundance and tag-recapture data; accommodates two intermixing populations and sex-specific analyses.

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Cataloguing Committee

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NOTE: As part of its efforts to carry out Quality Management, ICCAT´s Standing Committee on Research and Statistics is developing a catalog of stock assessment applications. The purpose of the catalog is not to evaluate the relative merits of various assessment methods, but rather whether the software implementing the method works as intended and is adequately documented.

1. PROGRAM NAME

VPA-2BOX

2. VERSION (DATE)

Version 3.01, dated March, 2003

3. LANGUAGE

Fortran 90

4. PROGRAMMER / CONTACT PERSON

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5. DISTRIBUTION LIMITATIONS

Only executable code can routinely be distributed, along with the manual and example files. Source code is available from the author upon written request and with agreement to certain restrictions.

6. COMPILER NEEDS / STAND-ALONE

Does not require software other than an operating system with DOS-emulating capabilities such as Windows (Windows 9x, 2000 or NT). Users must be able to print and edit ASCII files.

7. PURPOSE

Assesses the abundance and mortality of animal populations by fitting age-structured population equations to catch, effort, abundance and tag-recapture data. An observation-error estimator is used with numerous options available. Accommodates two intermixing populations and sex-specific analyses.

8. DESCRIPTION

NOTE: Version 3.01 replaces Version 3.00. See Section 18 for a description of changes.

The program uses backwards recursions to fit age-structured models for one or two intermixing populations to catch, effort, abundance and tag-recapture data. The following is a brief description of the basic method.

Population dynamics

The program includes two types of intermixing: diffusion and overlap (**Table 1**). The former assumes a fraction of the population in management zone *j* transfers to zone *k* whereas the latter assumes a fraction $\widetilde{T}_{jk}$ of stock *s* transfers to zone *k*. Both models reduce to single-stock VPA's when the T (or $\widetilde{T}$) are set to zero. For convenience T and $\widetilde{T}$ are both referred to as transfer coefficients, but the two are not directly comparable because the diffusion model allows fish born in one zone to accumulate in the other.

For example, if the transfer fractions for both stocks were both 10% (ignoring for the moment mortality), the diffusion model would calculate that 10% of the fish born in stock 1 will be living with stock 2 after one year, 18% after two years and 24.4% after three years.

Table 1. Overlap and diffusion model equations describing population dynamics (stock: s, age: a, year: y, zone: j or k, A: age of plus-group, Y: most recent year in analysis).

Equations and variables	**Description**
$C_{kay} = \tilde{N}_{kay} \dfrac{F_{kay}\left(1-e^{-Z_{kay}}\right)}{Z_{kay}}$	Catch at age *a* in year *y* from all stocks in management zone *k*
$Z_{kay} = F_{kay} + M_{kay}$	Total mortality rate in zone *k*
F_{kay}	Fishing mortality rate in zone *k*
M_{kay}	Natural mortality rate in zone *k*
Overlap model	
$N_{s,a+1,y+1} = N_{say} \sum_{k} T_{skay} e^{-Z_{kay}}$	Number of fish from stock *s* that are age *a*+1 at the beginning of year *y* (*a*+1<*A*)
$N_{s,A,y+1} = \sum_{a=A-1}^{A} N_{say} \sum_{k} T_{skay} e^{-Z_{kay}}$	Number of fish from stock *s* that are age *A* or older at the beginning of year *y*
$\tilde{N}_{kay} = \sum_{s} T_{skay} N_{say}$	Number of fish in zone *k* that are age *a* at the beginning of year *y* (all stocks combined)
T_{skay}	Fraction of stock *s* residing in zone *k* at the beginning of year *y*
Diffusion model	
$\tilde{N}_{k,a+1,y+1} = \sum_{j} \tilde{N}_{jay} \tilde{T}_{jkay} e^{-Z_{kay}}$	Number of fish in zone *k* that are age *a*+1 at the beginning of year *y* (*a*+1<*A*)
$\tilde{N}_{k,A,y+1} = \sum_{a=A-1}^{A} \sum_{j} \tilde{N}_{jay} \tilde{T}_{jkay} e^{-Z_{kay}}$	Number of fish in zone *k* that are age *A* or older at the beginning of year *y*
$\tilde{T}_{kjay}$	Fraction of population in zone *j* that moves to zone *k* at the beginning of year *y*

The equations in *Table 1* contain numerous variables representing the transfer coefficients, natural mortality rates, fishing mortality rates, catches and population abundances. Of these, it is often only the catches that are actually observed. The VPA approach to this problem is to develop a backwards recursion that determines the historical abundance and fishing mortality rate of each cohort from the observed catches and prescribed values for *M*, *T*, and the fishing mortality rate on the last age observed for the cohort (F_{Ay} or F_{aY}). This is illustrated for the overlap model in **Appendix 2** (A User's manual for VPA-2BOX).

The challenge that remains is to choose appropriate values for *M*, *T*, F_{aY} and F_{Ay}. One alternative is to fix those parameters to several values that seem plausible and compare the resulting solutions. Another is to estimate them by maximizing the model fits to auxiliary information such as indices of abundance or tag recovery data.

Estimation from indices of abundance

The parameters may be estimated from the indices of abundance by maximizing the log-likelihood function described in **Table 2**. This introduces several new variables that need to be accounted for-- the index standard error σ, catchability q, and relative selectivity S. The values for σ may be estimated internally or fixed to values determined externally such as might be obtained from the index standardization procedures (see appendix for details). The values of q are usually assumed to be constant through time and estimated along with the other parameters. The values of S may be determined from the partial catches corresponding to each index (e.g., Powers and Restrepo, 1992; Butterworth and Geromont, 1999). Note that provisions are also made for tuning to indices of mortality (see appendix and Porch, 2000).

Table 2. Model for indices of abundance (index series: *i*, zone: *k*, age: *a*, year: *y*)

Equations and variables	Description
$\mathcal{L}(\vec{I}) = -\sum_i \sum_k \sum_y 0.5\left(\frac{\ln\left(I_{iky}/\hat{I}_{iky}\right)}{\sigma_{iky}}\right)^2 - \ln\sigma_{iky}$	log-likelihood term for lognormally distributed indices of abundance
$\hat{I}_{iky} = q_{iky}\sum_a s_{ika}\, w_{ikay}\, \tilde{N}_{kay}$	predicted value of index
$s_{ika} = \dfrac{\sum_y C_{ikay} F_{kay}/C_{kay}}{\underset{a}{\mathrm{MAX}}\left\{\sum_y C_{ikay} F_{kay}/C_{kay}\right\}}$	availability at age (see Butterworth and Geromont, 1999)
I_{iky}	observed value of index
σ_{iky}	standard error of index on log scale
q_{ikay}	catchability coefficient
w_{ikay}	adjustment for weight and time of year (if needed)
C_{ikay}	catch associated with index *i* in zone *k*

Estimation from tag recoveries

The temporal and spatial distribution of tag recoveries from a given group (cohort) of releases are assumed to be multinomial-distributed (Schweigert and Schwarz, 1993; Anganuzzi et al., 1994) as described in **Table 3**. The tag attrition model includes terms for the reporting rate (ρ), immediate loss of tags owing to misapplication or tagging-induced mortality (d), and chronic loss of tags owing to shedding or fouling (λ). The first two terms always occur together as the product $(1-d)\rho$ and cannot be distinguished using tag recovery data alone; therefore only one of the terms may be estimated and the other must be fixed. The chronic tag loss rate λ is similarly confounded with the natural mortality rate M, but independent estimation becomes possible when abundance indices are available in addition to the tagging data.

Table 3. Model for tag recoveries. The subscript τ denotes a unique group (cohort) of tag releases distinguished by the age (α), year (ψ) and zone (κ) of release. The remaining subscripts are as defined previously (stock: *s*, zone: *k*, year: *y*, age: $a = \alpha + y - \psi$).

Equations and variables	Description
$\mathcal{L}(\vec{r}) = \sum_\tau (R_\tau - \sum_{k,y} r_{k\tau y}) \ln\left[1 - \sum_{k,y}\frac{\hat{r}_{k\tau y}}{R_\tau}\right] - \sum_{k,y} r_{k\tau y} \ln\left[\frac{\hat{r}_{k\tau y}}{R_\tau}\right]$	log-likelihood for tag recoveries from all cohorts
R_τ	number of tag releases in cohort τ
$r_{k\tau y}$	observed recoveries from cohort τ
$\hat{r}_{k\tau y} = \rho_{kay}\, \tilde{n}_{k\tau y} \frac{f_{k\tau ay}}{z_{k\tau ay}}\left(1 - e^{-z_{k\tau ay}(1-t_{\tau y})}\right)$	expected recoveries from cohort τ

Equations and variables	Description
$z_{k\tau ay} = f_{k\tau ay} + M_{kay} + \lambda_{\tau y}$	total loss rate of cohort τ
$f_{k\tau ay} = \gamma_{\tau y} F_{kay}$	fishing mortality rate of cohort τ
$\gamma_{\tau y}$	pre-mixing adjustment for cohort τ
$\lambda_{\tau y}$	immediate tag loss of cohort τ
d_τ	immediate tag loss of cohort τ
$t_{\tau y}$	release date of cohort τ (= 0 for $y > \psi$)
ρ_{kay}	reported fraction of recaptured tags
Overlap tag attrition model	
$\tilde{n}_{k\tau y} = \begin{cases} R_\tau(1\text{-}d_\tau) & (y = \psi,\ k = \kappa) \\ \sum_s T_{skay}\, n_{s\tau y} & (y > \psi) \end{cases}$	number of survivors with tags from cohort τ in zone k at start of year y
$n_{s,\tau,y+1} = \begin{cases} R_{s\tau}(1\text{-}d_\tau)\, e^{-z_{\kappa\tau ay}(1-t_{\tau y})} & (y = \psi) \\ n_{s\tau y} \sum_k T_{skay}\, e^{-z_{k\tau ay}} & (y > \psi) \end{cases}$	number of survivors with tags from cohort τ and stock s at start of year y ($R_{s\tau}$ is the number of releases by stock)
Diffusion tag attrition model	
$\tilde{n}_{k,\tau,y+1} = \begin{cases} R_\tau(1\text{-}d_\tau)\, e^{-z_{\kappa\tau ay}(1-t_{\tau y})} & (y = \psi) \\ e^{-z_{k\tau ay}} \sum_j T_{jkay}\, \tilde{n}_{j\tau y} & (y > \psi) \end{cases}$	number of survivors with tags from cohort τ in zone k at start of year y

The model in **Table 3** also allows for the possibility that the effective fishing mortality on the tagged population may differ from that on the untagged population by use of pre-mixing adjustment factors $\gamma_{\tau y}$. The values of $\gamma_{\tau y}$ can be difficult to distinguish precisely from *F* when only tag recovery data are available (Hoenig et al., 1998), but the task is made easier when catch and abundance data are included because *F* is largely determined from them.

Finally, it usually will not be possible to distinguish members of the two stocks during the tagging process. In the case of the diffusion model this is unimportant because the two stocks are defined by area or management zone (rather than by origin)--fish born in zone 1 and tagged in the zone 2 are considered to be members of the zone 2 stock and vice versa. In the case of the overlap model, where the two stocks are defined by origin, fish from each stock are assumed to be tagged in proportion to their relative abundance in each management zone, i.e.,

$$R_{s\tau} = R_\tau \frac{T_{s\kappa ay} N_{say}}{\sum_s T_{s\kappa ay} N_{say}}$$

where the *N* and *T* values are the estimates from the VPA.

Sex-specific analyses

If the abundance of each sex were completely independent of the other, then it would be reasonable to conduct separate appraisals for each sex. The parameters for each sex would be estimated as discussed above by minimizing an objective function of the sex-specific indices of abundance and setting the transfer coefficients to zero. It could be argued however, that the sex ratio for many stocks is fixed at birth and changes with age in response to various selection factors. This is modeled by adding a term to the objective function that penalizes solutions where the predicted ratio of males (*m*) to females (*f*) at birth differs from its expectation (R):

$$0.5\sum_{y=1}^{Y}\left(\frac{\log(R\,{}^{f}N_{y,0}/{}^{m}N_{y,0})}{\sigma_R}\right)^2$$

(see Restrepo and Porch, 1998). This of course necessitates that both sexes be analyzed simultaneously. The influence of the penalty can be increased by decreasing σ_R (the expected deviation of R from one year to the next). Both R and σ_R must be specified.

Series weighting

Provisions are made whereby the indices of abundance can be de-emphasized relative to one another in the objective function. This may be done manually by fixing the σ to prescribed values or the program may be allowed to estimate them in various ways. The weight ascribed to the tagging data depends on the number of recoveries since a multinomial distribution is assumed, however the influence of the tagging data may be changed relative to the indices of abundance by a weighting multiplier.The estimation of variances for weighting different types of data is a controversial topic and there are many ways to do it, therefore the reader is referred to the user's guide in the appendix for more details.

Penalties

An autocorrelated stock recruitment penalty is available to discourage deviations from the Beverton and Holt stock-recruit relationship as described by Porch (1998). It is also possible to penalize year to year variations in recruitment, the most recent fishing mortality rates on each age group, and any estimated parameter (see the User's manual in **Appendix 2**).

Methods of estimation

In typical applications one minimizes the sum of the negative log-likelihood expressions pertaining to each type of data, and the parameters that correspond to the minimum are referred to as maximum likelihood estimates. However, it is also possible to impose Bayes priors on the parameters and incorporate various penalties. In that case the parameter estimates that minimize the objective function (likelihood terms + penalties + priors) are referred to as highest posterior density estimates (see Porch, 1998b or the User's manual in the appendix for more details).

The simplex algorithm AMOEBA (Press et al., 1992) is employed to find the values of the parameters that minimize the objective function (i.e., the maximum likelihood or highest posterior density estimates). The algorithm is restarted at multiple locations in the parameter space to avoid being fooled by local minima in the solution surface. The restarts continue until the solution for three consecutive restarts varies by less than one percent for all parameters.

Estimates of the bias and variance of each parameter may be obtained via either a parametric or nonparametric bootstrap (but see the cautions discussed in the manual, **Appendix 2**). The parametric bootstrap entails the following steps:

(1) Fit the model to the actual data;
(2) Create new "bootstrap" indices of abundance, ${}^{b}I_{ky}$, by drawing at random with replacement from normal or lognormal distributions with mean and standard deviation equal to the model expectations of I and σ, e.g., for lognormal-distributed indices,

$${}^{b}I_{ky} = \hat{I}_{ky}\, e^{{}^{b}\pi_{ky}}$$
$${}^{b}\pi_{ky} \sim \text{Normal}(0, \hat{\sigma}_{ky})$$

(3) Fit the model to the bootstrap data set created in step 2;
(4) Repeat steps 2 and 3 until the required number of replications is obtained.

The nonparametric bootstrap is similar, but steps 1 and 2 become:

(1b) Fit the model to the actual data and standardize the residuals of the fits to each index of abundance by dividing the yearly values with their respective standard deviations, e.g, for lognormal-distributed indices—

$$r_{ky} = \frac{\log_e I_{ky} - \log_e \hat{I}_{ky}}{\sigma_{ky}}$$

$$\sigma_{ky} = \sqrt{\log_e(CV_{ky}^2 - 1)}$$

(2b) Create new "bootstrap" indices of abundance, ${}^bI_{ky}$, by drawing at random with replacement from the index-specific sets of standardized residuals, rescaling the sampled residuals by the standard deviation for that year and index (equations above), and adding the rescaled residual to the expected value from the original fitting–

$$\log_e {}^bI_{ky} = \log_e \hat{I}_{ky} + {}^b\pi_k \sigma_{ky}$$

$${}^b\pi_k \sim \{r_{ky}\}$$

The bias and variance of the point estimate $\hat{\phi}$ are computed via the estimators suggested by Efron (1990):

$$\text{bias}_B(\hat{\phi}) = \frac{\sum {}^b\phi}{B} - \phi(\bar{I})$$

$$V_B(\hat{\phi}) = \frac{\sum_{b=1}^{B} \left({}^b\phi - \frac{\sum {}^b\phi}{B}\right)^2}{B-1}$$

Summary of major assumptions

The assumptions required by the VPA in its most general form are enumerated below. Further assumptions, such as constant catchability through time, may be required with sparse data.

1. One closed population or two intermixing populations
2. Rapid mixing throughout the home range of each population or random fishing
3. A constant fraction of each age group moves outside their home range at the beginning of each year (transfer coefficients do not change through time)
4. The natural mortality rate on each age group is constant through time
5. The catch of each age group is known with negligible error
6. The abundance, mortality, and tagging data, however imprecise, accurately represent the population

9. REQUIRED INPUTS

1. Complete catch at age matrix (all ages for all years) for each stock considered
2. Starting guesses and constraints on parameters
3. Some control parameters are required (e.g., convergence criteria), but the sample input files provide values that are sufficient, and most changes result in worse results.
4. Items for user convenience, such as run title and text description of each data series.
5. As available, indices of abundance (e.g., CPUE series), tag recaptures, indices of mortality rate, weights at age

10. PROGRAM OUTPUTS

ASCII files are written after each run containing the following information:

For all runs:

1. Log file with program status information (i.e., did the program seem to converge on estimates?)
2. Estimates of all parameters with CV's and correlation coefficients retrieved from the asymptotic covariance matrix (inverse of the Hessian matrix of numerical second derivatives)
3. Estimated population trajectory through time for each age
4. Estimated F trajectory through time for each age
5. For each data series, trajectories of estimated and observed values through time.

For bootstrapped runs:

1. ASCII File with variances, correlation coefficients, and bias-corrections for all parameters, population abundance at age and fishing mortality rate at age.
2. Binary files with estimates from each bootstrap data set for all parameters, population abundance at age and fishing mortality rate at age. Used for projections and constructing certain types of bias-corrected confidence intervals.

11. DIAGNOSTICS

1. Goodness-of-fit criteria (AIC, AIC_c , Likelihood and posterior density values for all parameters and data components.
2. Limits on number of iterations allowed for convergence.
3. Warning messages if any parameter estimates are at constraints.
4. Optionally: Retrospective analyses and likelihood profiling.

12. OTHER FEATURES

1. VPA-2BOX does not include facilities for drawing graphs, however a separate file is created that outputs the results in a format that is easy to import into spreadsheets for further analysis
2. Can set any parameter constant, rather than estimating it
3. Can apply constraints to any parameter
4. Accommodates Bayesian priors

13. HISTORY OF METHOD PEER REVIEW

The basic recursive approach of VPA was described by Gulland (1965) and Murphy (1965). Parks (1976) appears to have been the first to estimate the terminal fishing mortality parameters using auxiliary data (F's derived independently from tagging experiments) and least squares. Subsequently, Doubleday (1981) and Parrack (1986) did the same with various types of abundance indices. The present program is based on the ADAPT framework, which is basically a suite of extensions to Parrack's model (see Gavaris, 1988; Conser and Powers, 1990; Powers and Restrepo, 1992; Butterworth and Geromont, 1999). Various implementations of ADAPT have been widely used in several different arenas, including ICCAT, the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC), the Convention for the Conservation of Southern Bluefin Tuna (CCSBT), the Bluefin WG of the Interim Scientific Committee (ISC), the North Pacific Albacore Workshop, and the Northwest Atlantic Fisheries Organization (NAFO). The approach has also been used in the United States for many of its domestic stocks.

Aldenberg (1975) was the first to apply VPA methods to two intermixing stocks. He examined the potential effect of various transfer rates on VPA appraisals of stock status, but did not attempt to estimate the transfer parameters for any stock in particular. Butterworth and Punt (1994) developed a similar model, hereafter referred to as the 'diffusion' model, and applied it to data for Atlantic bluefin tuna. They did not attempt to estimate the transfer coefficients, but did note that different assumed values gave different results, both in terms of stock status and least-squares fits to the indices of abundance. Subsequently, several versions of the diffusion VPA have been applied to Atlantic bluefin tuna (NRC, 1994; Porch et al., 1995; Punt and Butterworth, 1995) and to simulated data (Porch, 1995; Porch et al., 1998).

The present algorithm includes the original diffusion model as well as the overlap model described by Cooke and Lankester (1996), which assumes that fish migrate outside their home range only temporarily, coming back at the end of the year (see description above). The first VPA implementation of the overlap model was developed relatively recently by Porch and Turner (1998), therefore it has not undergone as much scrutiny as the diffusion model. However, both the original paper and a subsequent paper, Porch et al. (in press), have been reviewed by the SCRS.

Several methods of estimating the transfer coefficients have been developed (Punt and Butterworth, 1995; Porch and Turner, 1998), but these have all proven unsatisfactory for various reasons. The present algorithm, detailed in Porch et al. (in press) does so by use of a tag-recapture model that is rooted in well-established statistical principles (Brownie et al., 1985; Hilborn, 1990; Schwarz et al., 1993; Anganuzzi et al., 1994).

Other papers detailing specific capabilities of VPA-2BOX have been reviewed by the SCRS, including bootstrapping (Porch, 1999a), random-walk parameters (Porch, 1999b), stock-recruitment penalties (Porch, 1998), indices of mortality rate (Porch, in press), and sex-specific analyses (Restrepo and Porch, 2000).

14. STEPS TAKEN BY PROGRAMMER FOR VALIDATION

The author has written several spreadsheet programs to generate numerous simulated data sets without imposed errors. These were then analyzed by VPA-2BOX to verify that the routine performs as expected. This testing procedure has been applied to all of the options available in the program where it was possible to do so. However, it is not possible to test some of the options in this way. For example, a test of the model's ability to estimate the variance of an index requires a large number of data sets be generated with the assumed error structure (this was done for the concentrated-likelihood method, which is analogous to iterative reweighting, by Legault and Porch, 2000).

15. TESTS CONDUCTED BY OTHERS

Most of the available options have also been tested by comparing the results of VPA-2BOX with those of similar, but independently coded algorithms. The core single-stock computations and fitting procedures have been verified in this manner during every bluefin tuna (BFT) assessment since 1993 by comparisons with the outputs from code held by either J. E. Powers (STAATS), A. E. Punt or H. F. Geromont. This was also done during the 1996 yellowfin tuna assessment by duplicating results obtained with FADAPT (Restrepo, 1996) and during the1996 swordfish assessment by duplicating the results obtained with APL code held by S. Gavaris. The calculations for the random-walk routine for the F-ratio have been confirmed by Y. Takeuchi (during the1998 assessment of yellowfin tuna) and H. F. Geromont (during the 2000 assessment of BFT). The estimation of the overall variance parameter for equally-weighted indices of abundance has been verified by H. F. Geromont (BFT,2000). The estimation of index-specific variances by maximum likelihood has been verified by A. E. Punt (BFT,1994), H. F. Geromont (BFT, 1996), and C. Legault (USA domestic king mackerel assessment, 1999). Part of sex-specific analyses made during the 1999 ICCAT swordfish assessment was verified by Y. Takeuchi.

16. NOTES BY ICCAT

None.

17. SOURCES CITED

ALDENBERG, T. 1975. Virtual population analysis and migration; A theoretical treatment. ICES C.M> 1975/F: 32.

ANGANUZZI, A., Hilborn, R. and Skalski, J. R. 1994. Estimation of size selectivity and movement rates from mark-recovery data. Can. J. Fish. Aquat. Sci. 51: 734-742

BROWNIE, C., Anderson, D. R., Burnham, K. P., and Robson, D. S. 1985. Statistical inference from band recovery data: a handbook. 2nd ed. U.S. Fish and Wildl. Serv. Resour. Publ. No. 156.

BUTTERWORTH, D. S., and H. F. Geromont. 1999. Some aspects of Adapt VPA as applied to North Atlantic bluefin tuna. ICCAT Coll. Vol. Sci. Pap. 49(2):233-241

BUTTERWORTH, D. S., and A. E. Punt. 1994. The robustness of estimates of stock status for the western north Atlantic bluefin tuna population to violations of the assumptions underlying the associated assessment models. ICCAT Coll. Vol. Sci. Pap. 42(1): 192-210.

CONSER, R. J., and J. E. Powers. 1990. Extensions of the ADAPT VPA tuning method designed to facilitate assessment work on tuna and swordfish stocks. ICCAT Coll. Vol. Sci. Pap. 32: 461-467.

COOKE, J. G., and K. Lankester. 1996. Examination of alternative stock distribution models for the interpretation of bluefin tuna (Thunnus thynnus) tag-recovery data. ICCAT Coll. Vol. Sci. Pap. 45(2): 135-138.

CONSER, R. J., and J. E. Powers. 1990. Extensions of the ADAPT VPA tuning method designed to facilitate assessment work on tuna and swordfish stocks. ICCAT Coll. Vol. Sci. Pap. 32: 461-467.

DOUBLEDAY, W. G. 1981. A method for estimating the abundance of survivors of an exploited fish population using commercial catch-at-age and research vessel abundance indices. Can. Spec. Pub. Fish. Aquat. Sci. 58:164-178.

GAVARIS, S. 1988. An adaptive framework for the estimation of population size. Can. Atl. Fish. Sci. Adv. Comm. (CAFSAC) Res. Doc. 88/29. 12 pp.

GULLAND, J. A. 1965. Estimation of mortality rates. Annex to Arctic Fisheries Working Group Report. ICES CM 1965, Doc. No. 3, 9 pp.

HILBORN, R. 1990. Determination of fish movement patterns from tag recoveries using maximum likelihood estimators. Can. J. Fish. Aquat. Sci. 47: 635-643.

HOENIG, J. M., Barrowman, N. J., Pollock, K. H., Brooks, E. N., Hearn, W. S., and Polacheck, T. 1998. Models for tagging data that allow for incomplete mixing of newly tagged animals. Can. J. Fish. Aquat. Sci. 55: 1477-1483.

LEGAULT, C. M. and Porch, C. E. 2000. Comparisons of Index Weighting Schemes for Tuned Virtual Population Analyses. ICCAT Collective Volume of Scientific Papers SCRS/00/35.

MURPHY, G. I. A solution of the catch equation. J. Fish. Res. Bd. Canada 22(1):191-202.

NRC. 1994. Report of the National Research Council review of Atlantic bluefin tuna. National Academy Press. Washington, D.C. 148 pp.

PARKS, W. W. 1976. Cohort analysis, equilibrium yield per recruit analysis and predicted effects of minimum size limit regulation in the Atlantic bluefin tuna fisheries system. ICCAT Coll. Vol. Sci. Pap. 5: 313-331

PARRACK, M. L. 1986. A method of analyzing catches and abundance indices from a fishery. ICCAT Coll. Vol. Sci. Pap. 24:209-221.

PORCH, C. E. 1995. A two-area VPA with discrete mixing: Can we discriminate between mixing rates given the present condition of the data? ICCAT Coll. Vol. Sci. Pap. 44(1): 198-208.

PORCH, C. E. 1998. Autocorrelated stock recruitment penalties applied to the 1996 SCRS assessment of West Atlantic bluefin tuna. ICCAT Collective Volume of Scientific Papers 48(1):43-46.

PORCH, C. E. 1999a. Bootstrap estimates of the precision and bias of the 1996 base case assessment of West Atlantic bluefin tuna. ICCAT Collective Volume of Scientific Papers 49(2):306-313.

PORCH, C. E. 1999b. A Bayesian VPA with randomly walking parameters. ICCAT Collective Volume of Scientific Papers 49(2):314-326.

PORCH, C. E. In press. Still another option for ADAPT: Tuning to independent estimates of mortality rate with applications to West Atlantic bluefin tuna. ICCAT Collective Volume of Scientific Papers. SCRS/00/99

PORCH, C. E. and S. C. Turner. 1998. Virtual population analyses of Atlantic bluefin tuna with alternative models of trans-Atlantic migration. ICCAT Coll. Vol. Sci. Pap. 49:291-305.

PORCH, C., P. Kleiber, S. Turner, J. Sibert, R. Bailey and J. Cort. 1998. The efficacy of VPA models in the presence of complicated movement patterns. Proceedings of the 25 Anniversary ICCAT Tuna Symposium. ICCAT Coll. Vol. Sci. Pap. 50(2):591-622.

PORCH, C. E., Restrepo, V. R., Turner, S. C., and G. P. Scott. 1995. Virtual population analyses of Atlantic bluefin tuna incorporating movement and tagging data. ICCAT Coll. Vol. Sci. Pap. 44(1): 183-190.

PORCH, C. E., S. C. Turner, and J. E. Powers. In press.Virtual population analyses of Atlantic bluefin tuna with alternative models of transatlantic migration: 1970-1997. ICCAT Collective Volume of Scientific Papers. SCRS/00/98

POWERS, J. E., and V. R. Restrepo. 1992. Additional options for age-sequenced analysis. ICCAT Col.

Vol. Sci. Pap. 39(3):540-553.
PRESS, W. H., B. P. Flannery, S. A. Teukolsky, and W. T. Vetterling. 1994. Numerical Recipes in Fortran. Cambridge University Press. Cambridge, MA. 963 pp.
PUNT, A. E., and D. S. Butterworth. 1995. Use of tagging data within a VPA formalism to estimate migration rates of bluefin tuna across the north Atlantic. ICCAT Coll. Vol. Sci. Pap. 44(1): 166-182.
RESTREPO, V. R. FADAPT Version 3.0: A Guide. Unpublished manuscript.
RESTREPO, V. R. and Porch, C. E. 2000. Options for conducting swordfish sex-specific assessments. ICCAT Collective Volume of Scientific Papers 51:1375-1386.
SCHWEIGERT, J. F., and Schwarz, C. J. 1993. Estimating migration rates for Pacific herring (*Clupea pallasi*) using tag-recovery data. Can. J. fish. Aquat. Sci. 50: 1530-1540.

18. AUTHOR'S NOTES

WHAT'S NEW IN VERSION 3.01?

This update of version 3.0 includes four changes:

1. Uses bisection routine, rather than Newton's method, for solution of 1-dimensional catch equation (1-area and 2-area diffusion model). This change appears to have little effect on the final results, but was made at the request of the 2002 bluefin tuna stock assessment working group.

2. The formulae for AIC and BIC are now based on the full likelihood expressions (with constants) rather than the deviance to allow more accurate comparisons between models where the index variances are estimated.

3. Correct formula for chi-square discrepancy in case of lognormal variates (formerly it was based on the predicted values of the indices as suggested in SCRS 2001, but in the case of lognormal variates the predicted values are the medians rather than the expectations).

4. Error message preventing use of overlap model when estimating terminal parameters on abundance scale while at the same time using different age groups for each stock (in that case it is not possible to solve the backwards recursion for the overlap model)

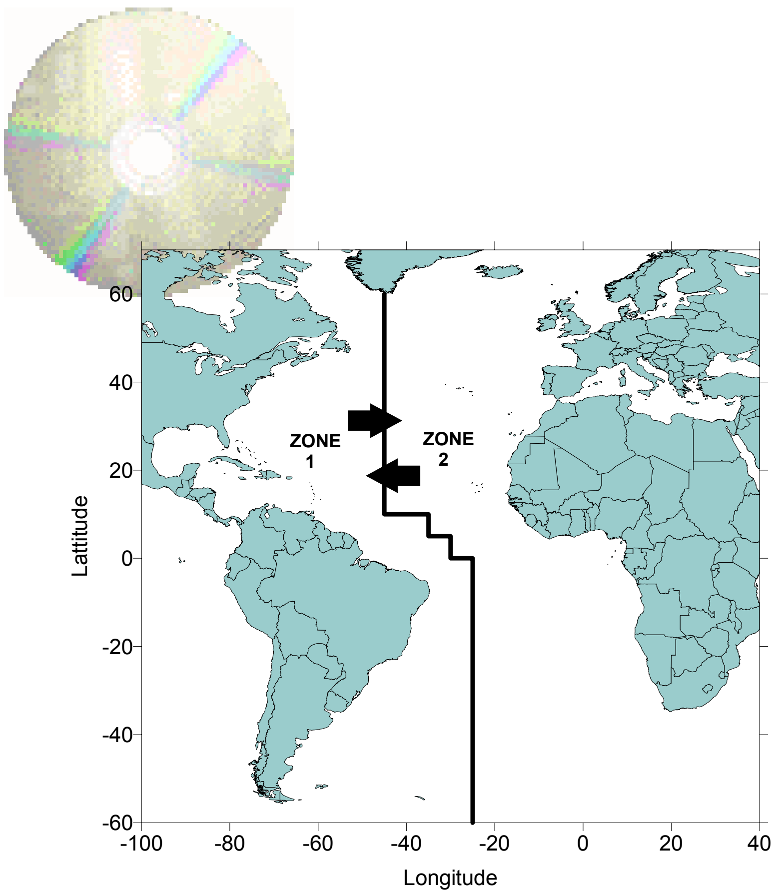
APPENDIX 1. ALGORITHM

See Methods of Estimation in **Section 8** the Users' Guide in **Appendix 2**.

Appendix 2

VPA-2BOX Version 3.01

User's guide



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Sustainable Fisheries Division Contribution SFD/2003-0004
March, 2003

TABLE OF CONTENTS

1. GETTING STARTED

VPA-2BOX is a flexible software tool for analyzing the abundance and mortality of exploited animal populations that is based on the ADAPT framework developed by Parrack (1986) and Gavaris (1988). The primary difference between this package and other versions of ADAPT is the capability of analyzing two different stocks simultaneously, making possible routine quantitative analyses of the effect of sex-specific growth or stock intermixing. In addition, a wide variety of options are provided with respect to the types of data that may be used and the way the parameters are estimated.

WHAT'S NEW IN VERSION 3.01?

This update of version 3.0 includes four changes:

1. Uses bisection routine, rather than Newton's method, for solution of 1-dimensional catch equation (1-area and 2-area diffusion model). This change appears to have little effect on the final results, but was made at the request of the 2002 bluefin tuna stock assessment working group.
2. The formulae for AIC and BIC are now based on the full likelihood expressions (with constants) rather than the deviance to allow more accurate comparisons between models where the index variances are estimated.
3. Correct formula for chi-square discrepancy in case of lognormal variates (formerly it was based on the predicted values of the indices as suggested in SCRS 2001, but in the case of lognormal variates the predicted values are the medians rather than the expectations).
4. Error message preventing use of overlap model when estimating terminal parameters on abundance scale while at the same time using different age groups for each stock (in that case it is not possible to solve the backwards recursion for the overlap model)

DISCLAIMER

The development of VPA-2BOX is ongoing. Executable versions may be obtained from the author free of charge, however there is no warranty of any kind. The author appreciates comments regarding the program, including any suspected bugs, but does not offer formal technical support.

Copies of the executable code and manual for VPA-2BOX may be distributed without restriction. Those desiring source code are requested to send a written request directly to the author[1]

[1]Address on front cover of this manual.

and will be asked to abide by certain restrictions.

SYSTEM REQUIREMENTS

- 80486, Pentium series, or compatible processor (standard PC's and clones)
- MS-DOS, IBM OS/2, or Microsoft Windows (9x, 2000, NT) operating systems[2]
- 1 MB of available hard disk space (30 MB for some bootstrap applications)

NOTATIONAL CONVENTIONS

The following notations are used:
- *Italics* indicate mathematical variables or text to be replaced by the user.
- Courier font indicates text in a file or keystrokes.

INSTALLING AND RUNNING VPA-2BOX

The files needed for a complete installation are normally sent as a self-extracting PKZIP file. The only steps required are:
- Copy file *VPA-ZIP*.exe to a directory on your hard drive
- Run *VPA-ZIP*.exe (or open a DOS window, move to the chosen directory, and enter *VPA-ZIP*)
- Add the chosen directory to your PATH statement as described in the documentation for your operating system and reboot your system (or place a copy of VPA-2BOX.exe in the directory where you plan to do the analyses)

The program may then be started using the Windows Run dialog, by double clicking on the `VPA-2BOX.EXE` icon or by entering the name `VPA-2BOX` at a DOS prompt. When the latter approach is taken, the name of the ASC-II text file that contains the control specifications may (optionally) be included as a command-line argument up to 50 characters long, e.g,

```
VPA-2BOX your_control_file_name
```

Otherwise, following screen display will appear:

[2]Reference to trade names does not imply endorsement by NOAA or the U.S. Government.

```
Command Prompt - vpa-2box

+-------------------------------------------------------------------------+
| Program VPA-2BOX.F90, Version 3.0 (Nov. 1, 2001)                        |
|                                                                         |
| A virtual population analysis tool that uses catch-at-age, indices of   |
| abundance, indices of mortality rates, and tag-recoveries to estimate   |
| the abundance and mortality of one or two (intermixing) populations.    |
|                                                                         |
| based on the methods of                                                 |
|   Porch, C. E., Turner, S. C., and Powers, J. E. 2001                   |
|   Virtual population analyses of Atlantic bluefin tuna with alternative |
|   models of transatlantic migration: 1970-1997. Int. Comm. Conserv. Atl.|
|   Tunas, Coll. Vol. Sci. Pap. 52: 1022-1045                             |
|                                                                         |
| programmed by                                                           |
|   Clay E. Porch                                                         |
|   NOAA Fisheries                                                        |
|   75 Virginia Beach Drive                                               |
|   Miami, Fl 33149 (USA)                                                 |
+-------------------------------------------------------------------------+



ENTER THE NAME OF THE CONTROL FILE:
```

The line at the bottom of the screen prompts the user for the name of the ASC-II control file. There is no graphical user interface; VPA-2BOX runs only as a console-mode program that takes all input from ASC-II text files (described in chapter 3). The screen is used only to enter the name of the control file and to display certain error and advisory messages. Hence, the user must be able to create and edit ASC-II text files.

2. THEORY BEHIND VPA-2BOX

Virtual population analysis (VPA) describes a family of techniques rooted in the seminal papers of Murphy (1965) and Gulland (1965). The method assumes that the catch history of any given year class is known without error, permitting the historical abundance and fishing mortality rates to be computed deterministically from a guess of the abundance or fishing mortality rate on the oldest (terminal) age of the year class. Various *ad hoc* methods have been proposed for fine tuning the guesses for the terminal parameters, but they invariably involve subjective criteria that may not be applicable to fisheries other than those for which they were developed. Parks (1976) appears to have been the first to estimate the terminal parameters from auxiliary data. He used least-squares to tune the VPA back-calculated fishing mortality rates to fishing mortality rates derived from tagging experiments. Subsequently, Gray (1977), Doubleday (1981) and Parrack (1986) developed similar tuning procedures for use with various types of abundance indices.

VPA is not the only method available for analyzing catch-at-age data. A plethora of statistical models now exist that allow for errors in the catch data and a more detailed accounting of the dynamics of the fishery (e.g., Deriso *et al.*, 1985; Methot, 1990; Fournier et al., 1999). Nevertheless, tuned VPA's remain popular, in part because of their long history and relative simplicity, but also because they have many fewer estimable parameters and reach a solution much faster than their more sophisticated counterparts. Some investigators also find it advantageous that tuned VPA's place no restrictions on the degree to which the fishing mortality rate may vary from year to year and age to age.

The present program is based on the ADAPT framework, which is essentially an extension of Parrack's (1986) model (see Gavaris, 1988; Conser and Powers, 1990; Powers and Restrepo, 1992). Various implementations of ADAPT have been widely used for domestic fisheries in the United States, South Africa and Canada; as well as in several international arenas, including the International Commission of the Conservation of Atlantic Tuna (ICCAT) and the Northwest Atlantic Fisheries Organization (NAFO).

The most distinctive feature of VPA-2BOX is of course its ability to examine two distinct groups simultaneously, making it amenable to sex-specific or stock-specific analyses where the two groups interact at some level. Aldenberg (1975) was the first to apply VPA methods to two intermixing stocks; solving the catch equations associated with the box-transfer model proposed by Beverton and Holt (1957). He examined the potential effect of various transfer rates on VPA appraisals of stock status, but did not attempt to estimate the transfer parameters for any stock in particular. Butterworth and Punt (1994) applied a similar box-transfer model to data for Atlantic bluefin tuna and showed that the magnitude of the transfer coefficients affected the model's ability to fit the indices of abundance. Subsequently, several versions of the box-transfer VPA were applied to Atlantic bluefin tuna in an attempt to estimate the transfer rates (NRC, 1994; Porch et al., 1995; Punt and Butterworth, 1995; Porch et al., 1998, 2001).

The box-transfer models mentioned above all assume that two populations exist, one in each of two management zones (see cover figure). Each year a fraction T_1 of the fish present in zone (box) 1 stray into zone 2 and a fraction T_2 in zone 2 stray into zone 1. Once a fish moves into a zone it is assumed to move in the same manner as the native population. When a spawner-recruit relationship is to be generated from the VPA results, then there is also the implicit assumption that immigrating fish will adopt the spawning habits of the native population as well. This assumption may be biologically unrealistic for some stocks (ICCAT, 1995: pp.108-110). As an alternative, Cooke and Lankester (1996) suggested the so-called 'overlap' model, which assumes that a fraction $\tilde{T}_1$ of the fish born in zone 1 will reside in zone 2 and a fraction $\tilde{T}_2$ of the fish born in zone 2 will reside in zone 1. Thus, fish movement in the overlap model depends on where they were spawned rather than their present location. VPA-2BOX includes algorithms for the Butterworth and Punt (1994) box-transfer model as well as the Cooke and Lankester (1996) 'overlap' model. Both models and their implementation are described in detail below, and also in Porch and Turner (1998) and Porch et al. (2001).

POPULATION DYNAMICS

The program includes two types of box-transfer models: Diffusion and overlap (see Tables 1 and 2 below). The former assumes a fraction T_{jk} of the population in zone *j* transfers to zone *k* whereas the latter assumes a fraction $\tilde{T}_{sk}$ of stock *s* transfers to zone *k*. Both models reduce to single-stock VPA's when the transfer fractions are set to zero, otherwise *T* and $\tilde{T}$ are not directly comparable inasmuch as the diffusion model allows fish born in one zone to accumulate in the other. For example, if the transfer fractions for both stocks were both 10%, the diffusion model (without mortality) would calculate that 10% of the fish born in zone 1 will be living in zone 2 after one year, 18% after two years and 24.4% after three years.

Table 1. Standard catch equation assumed in program VPA-2BOX

Catch equation	Description
$C_{kay} = \tilde{N}_{kay} \dfrac{F_{kay}\left(1 - e^{-Z_{kay}}\right)}{Z_{kay}}$	Catch of age *a* in year *y* from all stocks in management zone *k*
$Z_{kay} = F_{kay} + M_{kay}$	Total mortality rate in zone *k*
F_{kay}	Fishing mortality rate in zone *k*
M_{kay}	Natural mortality rate in zone k
$\tilde{N}_{kay}$	Number of fish in zone *k* that are age *a* at the beginning of year *y* (all stocks combined)

Table 2. Overlap and diffusion equations for population dynamics.

Overlap model equations	Description
$N_{s,a+1,y+1} = N_{say} \sum_{k} T_{skay}\, e^{-Z_{kay}}$	Number of fish from stock *s* that are age *a*+1 at the beginning of year *y* (*a+1<A*)
$N_{s,A,y+1} = \sum_{a=A-1}^{A} N_{say} \sum_{k} T_{skay}\, e^{-Z_{kay}}$	Number of fish from stock *s* that are age *A* or older at the beginning of year *y*
$\tilde{N}_{kay} = \sum_{s} T_{skay} N_{say}$	Number of fish in zone *k* that are age *a* at the beginning of year *y* (all stocks combined)
T_{skay}	Fraction of stock *s* residing in zone *k* at the beginning of year *y*
Diffusion model equations	**Description**
$\tilde{N}_{k,a+1,y+1} = \sum_{j} \tilde{N}_{jay} \tilde{T}_{jkay}\, e^{-Z_{kay}}$	Number of fish in zone *k* that are age *a*+1 at the beginning of year *y* (*a+1<A*)
$\tilde{N}_{k,A,y+1} = \sum_{a=A-1}^{A} \sum_{j} \tilde{N}_{jay} \tilde{T}_{jkay}\, e^{-Z_{kay}}$	Number of fish in zone *k* that are age *A* or older at the beginning of year *y*
$\tilde{T}_{jkay}$	Fraction of population in zone *j* that moves to zone *k* at the beginning of year *y*

PARAMETER ESTIMATION

The equations describing the catch and population dynamics (above) include a large number of variables representing the transfer coefficients, natural mortality rates, fishing mortality rates, catches and population abundances. Of these, it is often only the catches that are actually observed. The VPA approach to this problem is to develop an explicit recursion that determines the historical abundance and fishing mortality rate of each cohort from the observed catches and prescribed values for M, T, and the fishing mortality rate on the last age observed for each cohort (F_{Ay} or F_{aY}).

Successful application of the VPA approach depends on three assumptions: (1) the catch equation correctly describes the dynamics of the fishery, (2) the observed catches are known with negligible error, and (3) reasonable values of M, T, F_{Ay} and F_{aY} can be derived. The first assumption is common to all modeling exercises and is discussed further in the section on Model Selection. The second assumption determines whether or not the VPA approach is suitable; if the catches are not well known, then a statistical catch-at-age model may be more appropriate.

The third assumption has often been addressed by fixing M, T, F_{Ay} and F_{aY} to several values that seem plausible and then comparing the resulting solutions. The approach taken by ADAPT and related methods differs from this in that at least some of these parameters are estimated internally by use of auxiliary data such as indices of abundance or tag recoveries (a process sometimes referred to as 'tuning' the VPA). The tuning procedure occurs in two phases. The first phase is the explicit recursion, which determines the historical abundance and mortality rates from the latest estimates for M, T, F_{Ay} and F_{aY}. The second phase uses the abundance and mortality rate estimates from the first step to predict the values of the data. New values of M, T, F_{Ay} and F_{aY} are then selected so as to minimize the discrepancy between the model predictions and the observed values of the data as measured by an appropriate statistical model. These values are in turn used to reinitiate phase 1 and the process continues in iterative fashion until certain stopping criteria are met.

The explicit recursion itself involves two steps. Consider for example the simplest case of a single stock in one zone. In the first step the abundance at the beginning of the year for any given cohort is determined from the fishing mortality rate during that year by solving the catch equation

$$N_{a,y} = \frac{C_{a,y} Z_{a,y}}{F_{a,y}\left(1 - e^{-Z_{a,y}}\right)} \quad .$$

In the second step, $F_{a-1,y-1}$ is determined by numerically solving the equation derived by combining the catch and abundance equations for the next younger age,

$$C_{a-1,y-1} = \frac{F_{a-1,y-1}\left(1 - e^{-Z_{a-1,y-1}}\right)}{Z_{a-1,y-1}\, e^{-Z_{a-1,y-1}}} N_{a,y}$$

using the values of $N_{a,y}$ obtained from the first step. This two-step cycle is repeated to obtain $F_{k,a-2}$ from $F_{k,a-1}$ and so on back to the youngest age class in the analysis.

If the oldest age is a plus-group (age A and older fish lumped together), the fishing mortality rate on the next youngest age must be computed somewhat differently. In the first step $N_{A,y}$ is determined from $F_{A,y}$ by use of the catch equation as before, but it is also necessary to obtain $N_{A,y-1}$ from $F_{A,y-1}$. The second step then substitutes the values for $N_{A,y}$ and $N_{A,y-1}$ into the equation

$$C_{k,A-1,y-1} = \frac{F_{k,A-1,y-1}\left(1 - e^{-Z_{k,A-1,y-1}}\right)}{Z_{k,A-1,y-1}} \sum_{s=1}^{J} T_{s,k,A-1,y-1} \frac{N_{s,A,y} - N_{s,A,y-1} \sum_{k=1}^{J} T_{s,k,A,y-1}\, e^{-Z_{k,A,y-1}}}{\sum_{k=1}^{J} T_{s,k,A-1,y-1}\, e^{-Z_{k,A-1,y-1}}} ,$$

which is solved numerically for $F_{A-1,y-1}$. The value of $F_{A-1,y-1}$ is in turn is used to initiate the recursive sequence for the younger age classes discussed in the preceding paragraph..

The recursion for a plus-group requires starting guesses for the fishing mortality rate on the oldest age in two years ($F_{k,A,y}$ and $F_{k,A,y-1}$), whereas the recursion without a plus-group requires only $F_{k,A,y}$. This is of little consequence where a succession of cohorts is to be analyzed because starting values must be supplied for all years regardless. However, determining those starting values can be problematic. Program VPA-2BOX adopts the common convention of expressing the fishing mortality rate on the plus-group as a fraction φ of the fishing mortality rate on the next younger group, $F_{k,A,y} = \varphi_{k,y} F_{k,A-1,y}$. The value of φ should be less variable from year to year than the value of F inasmuch as changes in effort are to some degree factored out. In some applications the value of φ is assumed to be 1.0 while in others they are estimated.

The recursion for the overlap and diffusion models for two stocks is similar in principle to that above, but requires the linear decomposition of a system of equations (see Porch and Turner (1998) and Porch et al., in press).

The challenge that remains is to choose appropriate values for M_{kay}, T_{kay}, and the parameters that represent the fishing mortality on the oldest age in the cohort, $\varphi_{k,y}$, or in the case of incomplete cohorts represented by the last year of data, F_{kaY}. This involves the second phase of the tuning procedure discussed earlier, which is discussed in detail below.

Basic theory of parameter estimation

The basic tenet behind any statistical estimation procedure is that any data element d_j may be described as a scalar function f of a covariate vector $\mathbf{X}_j$ (e.g., time), parameter vector Θ, and random noise. The most popular estimation approach historically has been the method of least squares where the random noise is considered either to be additive ($d_j = f[\mathbf{X}_j, \Theta] + \varepsilon$) or multiplicative ($d_j = f[\mathbf{X}_j, \Theta]e^{\varepsilon}$) such that the best estimate of Θ is taken to be that which minimizes, respectively,

$$\sum_j (d_j - f[\Theta, \mathbf{X}_j])^2 \tag{2.1}$$

or

$$\sum_j (\log_e d_j - \log_e f[\Theta, \mathbf{X}_j])^2 \quad . \tag{2.2}$$

Another popular approach is the method of maximum likelihood, where the probability of observing the data matrix $\mathcal{D}$ under a proposed model structure is expressed as a probability function:

$$P(\mathcal{D}|\Theta, \mathbf{X}) = \prod_j P(d_j|\Theta, \mathbf{X}_j) \tag{2.3}$$

This probability expression is typically referred to as the likelihood function. According to classical maximum likelihood theory, the values of Θ that maximize $P(\mathcal{D} \mid \Theta, \mathbf{X})$ will be asymptotically efficient unbiased estimates of the true values provided the covariates are known without error.

To see how the maximum likelihood method is prosecuted, consider the special case where the likelihood function P has the form of a normal distribution with constant variance σ. In that case,

$$P(\mathcal{D}|\Theta, \mathbf{X}) = \prod_j \frac{1}{\sqrt{2\pi}\sigma} \exp\left(\frac{(d_j - f[\Theta, \mathbf{X}_j])^2}{2\sigma^2}\right). \tag{2.4}$$

Now the maximum of $P(\mathcal{D} \mid \Theta, \mathbf{X})$ occurs at the same values of Θ as the minimum of its negative logarithm;

$$- \log_e \mathrm{P}(\mathscr{D}|\Theta, \mathbf{X}) = \sum_j \frac{(d_j - f[\Theta, \mathbf{X}_j])^2}{2\sigma^2} - \log_e \sqrt{2\pi}\sigma \quad . \tag{2.5}$$

Notice that (2.5) has a form very similar to the least-squares estimator in (2.1); in fact they are minimized at exactly the same values of Θ inasmuch as σ and 2π are merely constants. Thus, it can be said that the additive least-squares estimator is equivalent to the maximum likelihood estimator under a normal distribution with constant variance. A similar equivalency can be shown for the multiplicative least-squares estimator (2.2) and the maximum likelihood estimator under a lognormal distribution with constant coefficient of variation.

As mentioned previously, one of the desirable properties of the maximum likelihood method is that, if an efficient unbiased estimator exists, the maximum lilelihood method will produce it--provided the covariates **X** are known without error. However, in most stock assessment models some of the covariates will be error-prone and alternative methods of estimation may be required (see Seber and Wild, 1989). One general class of models that deals explicitly with error prone covariates is the state space model. Typically the observations $\mathscr{D}_t$ (e.g., indices of abundance) are expressed as functions of time-independent parameters Θ and time-dependent covariates $\mathbf{X}_t$ that include the unobserved states of the system. A stochastic representation of a state space model is therefore defined by two probability statements: $\mathrm{P}(\mathscr{D} \mid \Theta, \mathbf{X})$, quantifying the likelihood of observation errors in the data, and $\mathrm{P}(\mathbf{X} \mid \Theta)$, quantifying the likelihood of process errors in the covariates (states).

A statistically rigorous Bayesian treatment of state space models is straightforward (see Schnute, 1994). By Bayes theorem, $\mathrm{P}(\Theta, \mathbf{X} \mid \mathscr{D})\, \mathrm{P}(\mathscr{D}) = \mathrm{P}(\mathscr{D} \mid \Theta, \mathbf{X})\, \mathrm{P}(\Theta, \mathbf{X})$. Inasmuch as $\mathrm{P}(\mathscr{D})$ is a constant and $\mathrm{P}(\Theta, \mathbf{X})$ may be expressed as $\mathrm{P}(\mathbf{X} \mid \Theta)\, \mathrm{P}(\Theta)$,

$$\mathrm{P}(\Theta, \mathbf{X} \mid \mathscr{D}) \propto \mathrm{P}(\mathscr{D} \mid \Theta, \mathbf{X})\, \mathrm{P}(\mathbf{X}|\Theta)\mathrm{P}(\Theta)\,. \tag{2.6}$$

Here $\mathrm{P}(\Theta)$ is the so-called 'Bayes prior', the analyst's best guess of the probability density for Θ.

Estimates for Θ (and therefore also **X**) may be obtained by maximizing (2.6), known as the method of highest posterior density (HPD), which of course is equivalent to minimizing

$$\Psi = -\log \mathrm{P}(\mathscr{D} \mid \Theta, \mathbf{X}) - \log \mathrm{P}(\mathbf{X}|\Theta) - \log \mathrm{P}(\Theta) \tag{2.7}$$

Alternatively, one may employ the classical Bayes moment estimator

$$\hat{\theta}_i = \int \theta_i\, \mathrm{P}(\mathscr{D} \mid \Theta, \mathbf{X})\, \mathrm{P}(\mathbf{X}|\Theta)\mathrm{P}(\Theta)\, d\theta_i \quad , \qquad \theta_i \in \{\Theta, \mathbf{X}\} \;. \tag{2.8}$$

Covariances may be obtained from the classical Bayes estimator

$$\hat{\sigma}_{ij} = \int (\theta_i - \hat{\theta}_i)(\theta_j - \hat{\theta}_j)\, \mathrm{P}(\mathscr{D} \mid \Theta, \mathbf{X})\, \mathrm{P}(\mathbf{X}|\Theta)\mathrm{P}(\Theta)\, d\theta_i \theta_j \,. \tag{2.9}$$

Notice that when process errors and priors are ignored equation (2.7) reduces to the classical negative log-likelihood expression and the HPD estimates are equivalent to the maximum likelihood

(ML) solution. In that case the covariance matrix may be obtained from the inverse of the matrix of second derivatives with respect to **Θ**.

To the uninitiated this brief review of statistical theory and state space modeling may seem a bit esoteric. However, it is not quite so complicated as it seems. Consider a single time series of abundance indices where the year observations I_y are modeled as

$$\begin{aligned} I_y &= q_y N_y + \varepsilon_y \\ q_y &= q_0 + \chi_y \\ \varepsilon &\sim \mathcal{N}(0,\sigma_I);\ \chi \sim \mathcal{N}(0,\sigma_q);\ q_0 \sim \mathcal{N}(\mu_{q_0},\sigma_{q_0}) \end{aligned} \quad . \qquad (2.10)$$

Here N_y is the abundance (assumed for this example to be meausred without error), q_y is the unobserved catchability coefficient for year y (a state variable), q_0 is the overall expected catchability (a parameter), χ is the process error (accounts for inter-annual variations in catchability) and **ε** is the observation error (accounts for errors in measuring the actual value of the index I). The notation $\mathcal{N}(\mu,\sigma)$ denotes a normal distribution with mean μ and standard error σ.

The HPD estimates of q_0 and the state variables q_y would be obtained by minimizing

$$\Psi = \sum_y \left(\frac{\left(I_y - q_y N_y\right)^2}{\sigma_I^2} + \ln \sigma_{Iq} \right) + \sum_y \left(\frac{\left(q_y - q_0\right)^2}{\sigma_q^2} + \ln \sigma_q \right) + \frac{\left(q_0 - \mu_{q_0}\right)^2}{\sigma_{q_0}^2} + \ln \sigma_{q_0} + \mathrm{C} \ . \qquad (2.11)$$

- first term: -log P(𝒟 | **Θ**, **X**), negative log-likelihood (negative logarithm of observation density)
- second term: -log P(**Θ**, **X**), negative logarithm of process density
- third term: -log P(**Θ**), negative log-prior
- remaining terms: constant terms

In comparison, the method of maximum likelihood (ML) minimizes only the negative loglikelihood term -log P(𝒟 | **Θ**, **X**), which in this case is equivalent to the method of least squares because the I_y are normal-distributed with constant σ_I.

Under certain conditions the HPD and ML estimators are equivalent. For example, as the process error variance tends to infinity, equation (2.11) reduces to

$$-\sum_y \left(\frac{\left(I_y - q_y N_y\right)^2}{\sigma_I^2} + \ln \sigma_{Iq} \right) - \frac{\left(q_0 - \mu_{q_0}\right)^2}{\sigma_{q_0}^2} + \ln \sigma_{q_0} + \mathrm{C} \quad , \qquad (2.12)$$

where q_0 is uniquely determined by the prior and is otherwise irrelevant. Thus, minimizing (2.8) is effectively equivalent to minimizing the negative log-likelihood by itself:

$$\sum_y \left(\frac{\left(I_y - q_y N_y\right)^2}{\sigma_I^2} + \ln \sigma_{Iq} \right) + \mathrm{C} \qquad (2.13)$$

The state variables q_y now act as free parameters and the values that minimize (2.9) are therefore equivalent to the ML (and least-squares) estimates.

Similarly, if there is no process error ($q_y = q_0$) and the prior is uninformative (infinite variance), equation (2.7) again reduces to the negative log-likelihood term

$$\sum_y \left(\frac{(I_y - q_0 N_y)^2}{\sigma_I^2} + \ln \sigma_I \right) + \text{C} \tag{2.14}$$

This time, however, there is only one free parameter– q_0 .

At this point one might ask "Why bother with process error and priors? Couldn't you just use maximum likelihood techniques and treat all the parameters as free parameters?" In this particular example, that sort of approach would indeed be possible because the abundance covariate is known without error, so the q_y are uniquely determined as I_y/N_y . Doing so, however, is equivalent to assuming there is no observation error in I_y and that all of the variation is due to changes in q; this despite the fact that σ_I was imposed specifically to account for observation errors! Furthermore, such an approach is not even possible when the N_y themselves are functions of other parameters because the number of parameters exceeds the number of data points. The only recourse within the ML paradigm is to reduce the number of parameters to be estimated either by fixing some of them to predetermined guesses or by assuming they are constant over certain strata. Here the HPD paradigm provides a useful alternative.

Recall from the example above that the HPD and ML methods were shown to be equivalent for two extremes-- unconstrained inter-annual variations in q_y (infinite process variance) and $q_y = q_0$ for all y (zero process variance). In the former case the solution would generally be indeterminate (infinitely many possible answers) and in the latter case the solution would be inaccurate if q really did change from year to year. The imposition of a finite process variance therefore provides a middle ground whereby q can be allowed to change, but slowly enough that unique estimates may be obtained with reasonable precision. In fact, one can think of the HPD approach as an elegant way of constraining the ML solution.

The use of Bayes priors has the added advantage of being able to impose a guess for a particular parameter without barring the model from choosing another value if the data warrant it. Moreover, Bayes priors provide a convenient way of incorporating the uncertainty in expert judgement into the assessment. The primary disadvantage of the use of Bayes priors is that the results tend to be sensitive to the shape of the prior distribution assumed (see Gelman et al., 2000).

Estimation from abundance indices

Program VPA-2BOX allows parameters to be estimated by minimizing the negative log-likelihood function of the observed and predicted values for various indices of abundance (Table 3). This introduces several new variables that need to be accounted for-- the index standard error σ, catchability q, and relative vulnerability to the gear v (which implicitly includes factors such as gear selectivity and the fraction of the population available to be caught). There are many options available in VPA-2BOX pertaining to how these variables may be treated and the reader is referred to the documentation on the input files for a detailed accounting.

One aspect about VPA-2BOX that is important to understand is the way the variance parameter σ^2 is represented. There are two basic components-- a fixed value that is determined externally and entered in the data file (INPUT) and an estimable parameter (υ) that scales the input value. The input value is interpreted as a coefficient of variation (CV) if it is positive and a standard error if it is negative. The scaling parameters may be multiplicative or additive (see line 47 of the CONTROL file). In the multiplicative case

$$\sigma_{iky}^2 = (\text{INPUT}_{iky} * \hat{I}_{iky} * \upsilon_{ik})^2 \qquad \text{if input value is a positive CV} \qquad (2.15a)$$
$$\sigma_{iky}^2 = (\text{INPUT}_{iky} * \upsilon_{ik})^2 \qquad \text{if input value is a negative std. error}$$

or, in the additive case

$$\sigma_{iky}^2 = (\text{INPUT}_{iky} * \hat{I}_{iky})^2 + \upsilon_{ik}^2 \qquad \text{if input value is a positive CV} \qquad (2.15b)$$
$$\sigma_{iky}^2 = (\text{INPUT}_{iky})^2 + \upsilon_{ik}^2 \qquad \text{if input value is a negative std. error}$$

where i is the index series identifier, k is the management zone and y is the year.

The multiplicative υ approach corresponds to the approaches used by Quinn and Deriso (1999) and Sullivan (1999), where the INPUT_{iky} values are interpreted as expert judgments of the relative variance of each annual observation of each index, presumably reflecting knowledge about how the data were obtained and their representativeness of the overall system (e.g., spatial and temporal coverage). The υ's then simply scale the inputs up or down to reflect the overall variance of the system. The additive approach corresponds to the 'additional variance' approach of Geromont and Butterworth (2001), where INPUT_{iky} values are interpreted as the variance of the index associated with observation errors (such as might be obtained from the GLM standardization approach) and the v^2 are interpreted as the additional variance characterizing the uncertainty in the index as a reflection of the true abundance trends (as might occur when the proportion of the stock sampled by the index varies from year to year). A detailed review of the pro's and con's of the additive and multiplicative approaches is beyond the scope of this manual, but some interesting discussions can be found in Legault and Porch (1999) and McAllister et al.(2001).

It is useful to note that the 'equal weighting' approach used by many investigators (when presumably they find no basis for weighting one index more than another) can be achieved by setting the INPUT values to 1.0 and then estimating (or fixing) a single, multiplicative value of v for all indices. Conversely, the 'input variance' approach can be affected by fixing the υ's to a value of 1.0.

Estimation from mortality indices

Parks (1976) estimated the VPA terminal fishing mortality parameters by use of a least-squares fitting to from fishing mortality rates obtained from tagging experiments, i.e.,

$$\min \sum_y \sum_a (F_{ay} - {}^{\tau}F_{ay})^2 \quad , \qquad (2.16)$$

where the superscript τ denotes the tagging-based values. This procedure assumes that the fishing mortality on the tagged population is the same as on the untagged population, however this may not be true for a number of reasons (see the next section). A less restrictive assumption would be to assume that F is proportional to ${}^{\tau}F$ by a factor q, i.e.,

$$\min \sum_{y} \sum_{a} (qF_{ay} - {}^{\tau}F_{ay})^2 \quad . \tag{2.17}$$

More generally, the objective is to make inferences about the loss rate of a certain target population based on estimates of the loss rate from a subpopulation τ. Suppose that the loss rate experienced by τ has some elements in common with the target population, some elements that are different, and some elements that are proportional. The two mortality rates could then be represented by the formulas $Z = M+F$ and ${}^{\tau}Z = M + L+qF$. When τ represents a group of tagged fish, for example, these equations could be interpreted to mean that tagged and untagged fish have the same natural loss rate M, tagged fish have an additional loss rate L owing to tag shedding or other factors, and the fishing mortality rate on tagged fish is proportional to that on the untagged population owing to incomplete mixing or a change in catchability.

If the factors q, M and L can be considered relatively constant through time, then M and L may be removed simply by subtracting the observed values of ${}^{\tau}Z_y$ from the value for one standard year ${}^{\tau}Z_{\psi}$

$${}^{\tau}Z_{\psi} - {}^{\tau}Z_y = q\left(F_{\psi} - F_y\right) , \tag{2.18}$$

where ψ is the standard year (perhaps the year with the maximum value of ${}^{\tau}Z$ to keep the deviations positive). Thus, a least squares estimation procedure analogous to (2.16) and (2.17) would be

$$\min \sum_{y \neq \psi} \sum_{a} (q(F_{\psi a} - F_{ya}) - ({}^{\tau}Z_{\psi a} - {}^{\tau}Z_{ya}))^2 \quad . \tag{2.19}$$

Note that this is an implicitly less assuming procedure than (2.17) because it does not require the total loss rate estimates for the subpopulation to be partitioned into fishing and non-fishing components. Moreover there is little to gain in using (2.17) even when external estimates of fishing mortality rates are available unless q is known to be 1.0. It should also be noted that the least-squares formulations above have essentially the same form as those for the indices of abundance, in which case the proportionality factor q is termed the catchability coefficient. It is a trivial matter to derive analogous maximum likelihood formulations (contrast Tables 3 and 4).

Two extensions of the above methodology are included as options in the current software. The first allows for a slightly different model, ${}^{\tau}Z = qZ+b$ (so ${}^{\tau}Z_{\psi} - {}^{\tau}Z_y = q[Z_{\psi} - Zy]$). The second option accommodates the possibility that ${}^{\tau}F$ or ${}^{\tau}Z$, when they represent the effective mortality rate on multiple age groups, may not represent those age groups in the same proportion as they exist in target population. This may be useful when it is possible to derive these proportions external to the VPA, but not otherwise as they cannot be estimated from the partial catches as is done for indices of abundance. See the data file section and Table 4 for further details.

Table 3. Models for indices of abundance (index series: *i*, zone: *k*, age: *a*, year: *y*) that are available in VPA-2BOX.

Equations and variables		Description
$\sum_i \sum_k \sum_y 0.5\left(\frac{\ln\left(I_{iky}/\hat{I}_{iky}\right)}{\tilde{\sigma}_{iky}}\right)^2 + \ln\tilde{\sigma}_{iky}$	lognormal	negative log-likelihood terms $L(\vec{I})$ for various error distributions.
$\sum_i \sum_k \sum_y 0.5\left(\frac{I_{iky} - \hat{I}_{iky}}{\sigma_{iky}}\right)^2 + \ln\sigma_{iky}$	normal	Note: for the lognormal distribution σ' is the variance on a logarithmic scale,
$\sum_i \sum_k \sum_y \hat{I}_{iky} - I_{iky}\ln(\hat{I}_{iky})$	Poisson	$\tilde{\sigma}_{iky} = \sqrt{\log_e\left\{\left(\frac{\sigma_{iky}}{\hat{I}_{iky}}\right)^2 + 1\right\}}$,
$\sum_i \sum_k \sum_y 0.5\frac{\left(I_{iky} - \hat{I}_{iky}\right)^2}{\sigma_{iky}^2\ (\hat{I}_{iky} + 1)}$	Chi - square	
$\sum_i \sum_k \sum_y \left(\frac{\sqrt{2}\left\lvert I_{iky} - \hat{I}_{iky}\right\rvert}{\sigma_{iky}}\right)^2 + \ln\sigma_{iky}$	Laplace	and for the gamma distribution: $\alpha = (\hat{I}_{iky}/\sigma_{iky})^2$ and
$\sum_i \sum_k \sum_y C\ln\beta - (\alpha - 1)\ln I_{iky} - \frac{I_{iky}}{\beta} - \ln\Gamma(\alpha)$	gamma	$\beta = \hat{I}_{iky}/\alpha$.
I_{iky}		observed value of index
$\hat{I}_{iky} = q_{iky}\Delta_{ik}\sum_a v_{ikay}\, w_{ikay}\, \tilde{N}_{kay}$		predicted value of index
v_{ikay}		relative selectivity/availability at age
σ_{iky}		standard error of index
q_{iky}		catchability coefficient
w_{ikay}		weight
Δ_{ik}		adjustment for time of year

Table 4. Models for indices of mortality rate (index series: *i*, zone: *k*, age: *a*, year: *y*) available in VPA-2BOX. Options 3-6 refer to the third entry on line 56 of the catch data file.

Equations and variables		Description
$\sum_i \sum_k \sum_y 0.5\left(\frac{\ln\left(D_{iky}/\hat{D}_{iky}\right)}{\tilde{\sigma}_{iky}}\right)^2 + \ln \tilde{\sigma}_{iky}$	lognormal	negative log-likelihood terms $L(\vec{D})$ for various error distributions.
$\sum_i \sum_k \sum_y 0.5\left(\frac{D_{iky} - \hat{D}_{iky}}{\sigma_{iky}}\right)^2 + \ln \sigma_{iky}$	normal	Note: for the lognormal distribution σ' is the variance on a logarithmic scale,
$\sum_i \sum_k \sum_y \hat{D}_{iky} - D_{iky} \ln(\hat{D}_{iky})$	Poisson	$\tilde{\sigma}_{iky} = \sqrt{\log_e\left\{\left(\frac{\sigma_{iky}}{\hat{D}_{iky}}\right)^2 + 1\right\}}$,
$\sum_i \sum_k \sum_y 0.5\frac{\left(D_{iky} - \hat{D}_{iky}\right)^2}{\sigma_{iky}^2\ (\hat{D}_{iky} + 1)}$	Chi - square	
$\sum_i \sum_k \sum_y \left(\frac{\sqrt{2}\left\lvert D_{iky} - \hat{D}_{iky}\right\rvert}{\sigma_{iky}}\right)^2 + \ln \sigma_{iky}$	Laplace	and for the gamma distribution: $\alpha = (\hat{D}_{iky}/\sigma_{iky})^2$ and
$\sum_i \sum_k \sum_y C \ln \beta - (\alpha - 1) \ln D_{iky} - \frac{D_{iky}}{\beta} - \ln \Gamma(\alpha)$	gamma	$\beta = \hat{D}_{iky}/\alpha$.
$D_{iky} = \begin{cases} \max_y \{Z_{iky}\} - Z_{iky} & \text{options 3 or 4} \\ F_{iky} & \text{option 5} \\ Z_{iky} & \text{option 6} \end{cases}$		observed value of standardized mortality rate index
$\hat{D}_{iky} = \begin{cases} q_{iky} \sum_a v_{ikay} (\hat{F}_{kay} - \hat{F}_{kay}) & \text{option 3} \\ q_{iky} \sum_a v_{ikay} (\hat{Z}_{kay} - \hat{Z}_{kay}) & \text{option 4} \\ q_{iky} \sum_a v_{ikay} \hat{F}_{kay} & \text{option 5} \\ q_{iky} \sum_a v_{ikay} \hat{Z}_{kay} & \text{option 6} \end{cases}$		predicted value of standardized mortality rate index
v_{ikay}		age-specific scaling factor
σ_{iky}		standard error of index
q_{iky}		proportionality coefficient

Estimation from tag recoveries

Program VPA-2box assumes the temporal and spatial distribution of tag recoveries from a given group (cohort) of releases are multinomial-distributed (Schweigert and Schwarz, 1993; Anganuzzi et al., 1994) as described in Table 5. The tag attrition model includes terms for the reporting rate (ρ), immediate loss of tags owing to misapplication or tagging-induced mortality (*d*), and chronic loss of tags owing to shedding or fouling (λ). The first two terms always occur together as the product $(1\text{-}d)\rho$ and cannot be distinguished using tag recovery data alone; therefore only one of the terms may be estimated and the other must be fixed. The chronic tag loss rate λ is similarly confounded with the natural mortality rate *M*, but independent estimation becomes possible when abundance indices are available in addition to the tagging data.

The model in Table 5 also allows for the possibility that the effective fishing mortality on the tagged population may differ from that on the untagged population by use of pre-mixing adjustment factors $\gamma_{\tau y}$. The values of $\gamma_{\tau y}$ can be difficult to distinguish precisely from *F* when only tag recovery data are available (Hoenig et al., 1998), but the task is made easier when catch and abundance data are included because *F* is largely determined from them.

Another necessary adjustment has to do with the fact that the VPA accounting is by year, but tag releases tend to occur at various times within a year– sometimes before and sometimes after the periods of most intense fishing. Consider, for example, a group of fish that were tagged and released at the end of the 7th month after the major fishery was over. In that case the tagged fish would be exposed to five months of tag loss and natural mortality, but none would be recaptured. If no adjustments are made to account for this, the model would erroneously interpret the lack of recaptures for that year as no fishing for the year, when in fact the fishing pressure could have been very high. The fishing fraction parameter ϕ in Table 5 adjusts the fishing mortality rate parameter by the fraction of the total fishing pressure exerted during the year that was experienced by tags. This requires information on the seasonality of the fisheries beyond that which is normally required by VPA (see discussion on line 34 of the control file). Of course this sort of problem only occurs for the year when the fish were first tagged. In subsequent years the tagged population will face the full cycle of fishing such that ϕ=1.

Finally, it usually will not be possible to distinguish members of the two stocks during the tagging process. In the case of the diffusion model this is unimportant because the two stocks are defined by management zone (rather than by origin)--fish born in zone 1 and tagged in the zone 2 are considered to be members of the zone 2 stock and vice versa. In the case of the overlap model, where the two stocks are defined by origin, fish from each stock are assumed to be tagged in proportion to their relative abundance in each management zone, i.e.,

$$R_{s\tau} = R_{\tau} \frac{T_{s\kappa ay} N_{say}}{\sum_{s} T_{s\kappa ay} N_{say}} \quad . \tag{2.17}$$

where the *N* and *T* values are the estimates from the VPA.

Table 5. Model for tag recoveries. The subscript τ denotes a unique group (cohort) of tag releases distinguished by the zone (κ), year (ψ) and age (α) of release. The remaining subscripts are as defined previously (stock: s, zone: k, year: y, age: $a = \alpha + y - \psi$).

Equations and variables	Description
$\mathscr{L}(\vec{r}) = \sum_{\tau} \frac{1}{\omega_{\tau}^{2}} \left\{ (R_{\tau} - \sum_{k,y} r_{k\tau y}) \ln\left[1 - \sum_{k,y} \frac{\hat{r}_{k\tau y}}{R_{\tau}}\right] - \sum_{k,y} r_{k\tau y} \ln\left[\frac{\hat{r}_{k\tau y}}{R_{\tau}}\right] \right\}$	negative log-likelihood for tag recoveries from all cohorts
R_{τ}	number of tag releases in cohort τ
$r_{k\tau y}$	observed recoveries from cohort τ
$\hat{r}_{k\tau y} = \rho_{kay} \tilde{n}_{k\tau y} \frac{f_{k\tau ay}}{z_{k\tau ay}} \left(1 - e^{-z_{k\tau ay}}\right)$	expected recoveries from cohort τ
$z_{k\tau ay} = f_{k\tau ay} + (M_{kay} + \lambda_{\tau y})(1 - t_{\tau y})$	total loss rate of cohort τ
$f_{k\tau ay} = \phi_{\tau y} \gamma_{\tau y} F_{kay}$	fishing mortality rate of cohort τ
$\gamma_{\tau y}$	pre-mixing adjustment for cohort τ
$\phi_{\tau y}$	fishing fraction (= 1 for $y > \psi$)
$\lambda_{\tau y}$	chronic tag loss rate of cohort τ
d_{τ}	immediate tag loss of cohort τ
$t_{\tau y}$	release date of cohort τ (= 0 for $y > \psi$)
ρ_{kay}	reported fraction of recaptured tags
Overlap tag attrition model	
$\tilde{n}_{k\tau y} = \begin{cases} R_{\tau}(1\text{-}d_{\tau}) & (y = \psi,\ k = \kappa) \\ \sum_{s} T_{skay} n_{s\tau y} & (y > \psi) \end{cases}$	number of survivors with tags from cohort τ in zone k at start of year y
$n_{s,\tau,y+1} = \begin{cases} R_{s\tau}(1 - d_{\tau})\, e^{-z_{\kappa\tau ay}(1 - t_{\tau y})} & (y = \psi) \\ n_{s\tau y} \sum_{k} T_{skay}\, e^{-z_{k\tau ay}} & (y > \psi) \end{cases}$	number of survivors with tags from cohort τ and stock s at start of year y ($R_{s\tau}$ is the number of releases by stock)
Diffusion tag attrition model	
$\tilde{n}_{k,\tau,y+1} = \begin{cases} R_{\tau}(1 - d_{\tau})\, e^{-z_{\kappa\tau ay}(1 - t_{\tau y})} & (y = \psi) \\ e^{-z_{k\tau ay}} \sum_{j} T_{jkay} \tilde{n}_{j\tau y} & (y > \psi) \end{cases}$	number of survivors with tags from cohort τ in zone k at start of year y

BIAS AND UNCERTAINTY

In any statistical analysis there is a tradeoff between precision and accuracy. Generally, adding parameters to a model should improve its ability to reflect the dynamics of the population (making it more accurate). However, if the data are limited, adding too many parameters will lead to a situation where the estimates are highly imprecise, i.e., many combinations of parameter values can explain the data equally well (give the same posterior/likelihood values). In this regard, one of the challenges to the investigator is to determine whether the additional parameters improve the model's ability to fit the data in a statistically significant way. If not, the new model is generally rejected in favor of the simpler model (see the section on model selection below). Subsequent inferences are usually made under the implicit assumption that the selected model is correct and the parameter estimates obtained by the nonlinear optimization are unbiased.

Maximum likelihood estimators, where the objective function being minimized is the negative log-likelihood, are asymptotically unbiased under fairly general conditions (Hoel et al., 1980). In principle, asymptotically efficient estimates of the covariances of the parameters may be obtained from the inverse of the Hessian matrix (matrix of second derivatives), allowing one to quantify the precision with which the parameters were estimated. However, in most stock assessments the number of data points available is seldom much larger than the number of parameters, so the asymptotic theory may not apply and a substantial bias can be incurred in both the point estimates and their corresponding Hessian matrix covariances. Moreover, the asymptotic covariance matrix is not generally given by the inverse of the expected Hessian matrix when penalties, priors or process errors are imposed (Seber and Wild, 1989).

The best way to ascertain the bias and variance of any given estimator is to apply that estimator to a large number of random samples from a population with known distributional characteristics. In practice of course, one does not know the distribution of the population in question and, in many cases, does not have the capacity to resample that population multiple times. Therefore one must turn to various approximations, such as Box's (1971) linear approach, which involves computing both first and second derivatives (see discussion in Gavaris, 1993). I am unaware of an analogous technique for determining the bias of the corresponding covariance estimators. Moreover, it is unclear how the Box (1971) approach would apply when the objective function is not simply the negative log-likelihood, but also includes process error, priors and other penalties.

An alternative way of determining the bias and covariances of the point estimates is by use of a technique known as bootstrapping. Punt and Butterworth (1993) found that, on average, the estimates of variance from the inverse of the Hessian matrix were about the same as the estimates from bootstrapping, but it is not clear that this will always be the case for the reasons discussed above. In practice, the bootstrap estimator may often perform better than the inverse of the Hessian matrix because the latter is based only on the shape of the negative log-likelihood surface in the vicinity of the minimum, which of course presupposes that the true minimum has in fact been found and is based on a single configuration of the data. The bootstrap estimator, on the other hand, implicitly takes into account the possibility that the minimum may not always be found and the sensitivity of the solution to perturbations in the data.

Bootstrap procedures

The concept behind bootstrapping is that the distribution of values from any given random sample is the best guide to the distribution of values in the population the sample came from. Therefore, the next best thing to resampling a population is resampling the sample. Regression analyses may be bootstrapped either by resampling the regression residuals or by resampling the data (Manly, 1998, p 167), but the latter is seldom an option for VPA tuning approaches because there is only one observation for each index for any given time unit (year). Accordingly, most of the literature on bootstrapping VPA's involves resampling the residuals.

There are two principal ways of bootstrapping from regression residuals: parametrically by sampling from a known distribution with a prescribed variance and non-parametrically by sampling directly from the residuals of the model fit (random draws with replacement). In either case, the sampled residuals are added to the model expectation (not the observations themselves) to generate a pseudo-data set. The model is then refit to each of *B* number of pseudo data sets and the results used to construct the sampling distributions of the estimators in question.

VPA-2BOX can presently conduct parametric and non-parametric bootstrap analyses of the indices of abundance and indices of mortality. In principle, one should choose the parametric approach only if the distribution of the statistic being bootstrapped is known (e.g., lognormal with a variance of 0.2). Punt and Butterworth (1993) found that the non-parametric and parametric bootstrap procedures gave similar results in their examples, but Freedman and Peters (1984) and others have found that the non-parametric approach generally gives less-biased results.

The parametric bootstrap entails the following steps:

(1) Fit the model to the actual data;

(2) Create new "bootstrap" indices, ${}^{b}I_{ky}$, by drawing at random with replacement from normal or lognormal distributions with mean and standard deviation equal to the model expectations of *I* and σ (*k* denotes a particular series and *y* denotes a particular year):

$$
{}^{\mathrm{b}}I_{ky} = \begin{cases} \hat{I}_{ky} + {}^{\mathrm{b}}\pi_{ky} & \text{additive (normal) error} \\ \hat{I}_{ky}\, e^{{}^{\mathrm{b}}\pi_{ky}} & \text{multiplicative (lognormal) error} \end{cases} \qquad (2.18)
$$

$$
{}^{\mathrm{b}}\pi_{ky} \sim \mathcal{N}(\hat{I}_{ky}, \sigma_{ky})
$$

(3) Fit the model to the bootstrap data set created in step 2;

(4) Repeat steps 2 and 3 until the required number of replications is obtained.

A potential problem with this approach occurs when the standard error term σ is not known and is instead replaced by a value estimated in the model, $\hat{\sigma}$. In many cases the estimated value $\hat{\sigma}$ may be smaller than the true value, causing the bootstrap residuals π to be smaller than they should be. As a result, the bootstrap could indicate that the model parameters are well-estimated when in fact they are poorly estimated and $\hat{\sigma}$ just happens to be too low. For this reason I recommend against using the parametric approach unless one is confident in the values being used for σ .

The non-parametric bootstrap is similar in principle, but steps 1 and 2 become:

(1) Fit the model to the actual data and store the residuals--

$$r_{ky} = \begin{cases} I_{ky} - \hat{I}_{ky} \\ \log_e I_{ky} - \log_e I_{ky} \end{cases} \tag{2.19a}$$

(2) Create new "bootstrap" indices of abundance, ${}^{b}I_{ky}$, by drawing at random with replacement from the index-specific sets of residuals–

$$ {}^{b}I_{ky} = \begin{cases} \hat{I}_{ky} + {}^{b}\pi_{ky} & \text{additive (normal) error} \\ \hat{I}_{ky}\, e^{{}^{b}\pi_{ky}} & \text{multiplicative (lognormal) error} \end{cases} \quad . \tag{2.19b}$$

$$ {}^{b}\pi_{ky} \sim \{ r_{ky} \} $$

As it stands, this approach tends to perform poorly when the number of estimated parameters is large relative to the number of data points. In such cases the model may be able to provide a near perfect fit to the data with many different combinations of parameter values. The small residuals in turn will lead to bootstrap data sets that are essentially identical to the original data set, ultimately leading to artificially small bootstrap estimates of the parameter variances. The reason for this is easy to see in the context of a regression involving a single index of abundance. In that case the variance of the bootstrap residuals (being random draws from the finite population r_y) is

$$\mathrm{VAR}({}^{b}\pi_y) = \frac{n_\Theta - n_\mathscr{D}}{n_\mathscr{D}} \hat{\sigma}^2 \quad , \tag{2.20}$$

where n_Θ is the number of estimated parameters and $n_\mathscr{D}$ is the number of observations. Hence, the variance of the residuals is too small by a factor of $1\text{-}n_\Theta/n_\mathscr{D}$.

Tukey (1987) and Stine (1990) recommend 'fattening' the residuals from linear regressions by dividing each by a factor $(1\text{-}n_\Theta/n_\mathscr{D})^{1/2}$. However, this may not be the correct adjustment in more complicated regressions, such as when more than one index of abundance is being used. Efron and Tibshirani (1993) suggest that the random variablility in the estimates of variance is more important than the bias caused by factors such as $(1\text{-}n_\Theta/n_\mathscr{D})^{1/2}$ and that the problem is not too worrisome unless $n_\Theta/n_\mathscr{D}$ is greater than about 0.25. Nevertheless, in the case of multiple indices it is reasonable to take an intermediate position and at least adjust for the number of estimated parameters unique to each index (optional in VPA-2BOX). Thus, step 1 of the non-parametric procedure becomes

$$\begin{aligned} {}^{b}I_{ky} &= \begin{cases} \hat{I}_{ky} + {}^{b}\pi_{ky} & \text{normal} \\ \hat{I}_{ky}\, e^{{}^{b}\pi_{ky}} & \text{lognormal} \end{cases} \\ {}^{b}\pi_{ky} &\sim \left\{ \frac{r_{ky}}{\sqrt{1 - n_{\Theta k}/n_{\mathrm{D}k}}} \right\} \end{aligned} \tag{2.21}$$

where $n_{\mathscr{D}k}$ and $n_{\Theta k}$ indicates the number of observations and estimated parameters unique to index

k (namely the catchability coefficients q_k and variances σ_k). In point of fact the above adjustment is still too low owing to the bias caused by not adjusting for the parameters shared by each index, but it is not clear how such further adjustments should be accomplished. Therefore, a warning message is output by program VPA-2BOX whenever $n_\Theta/n_\mathscr{D} > 0.25$.

Finally, it may sometimes happen that the variance of an index differs from one year to the next owing to differences in sample size or other factors and that the investigator may wish to deal with this heterogeneity explicitly. With the parametric approach this is straightforward and no further modifications are required, but the non-parametric approach will lead to homoscedastic bootstrap samples. In such cases residuals r may be transformed to standard normal deviates by dividing by the standard errors. Thus, steps 1 and 2 become

(1) Fit the model to the actual data, standardize the residuals by the known (or estimated) standard errors and store them (Note: for the lognormal case σ is the standard error on a logarithmic scale.)–

$$\mathrm{r}_{ky} = \begin{cases} \left(I_{ky} - \hat{I}_{ky}\right)/\sigma_{ky} & \text{normal} \\ \left(\log_e I_{ky} - \log_e \hat{I}_{ky}\right)/\sigma_{ky} & \text{lognormal} \end{cases} \tag{2.22}$$

(2) Create new "bootstrap" indices of abundance, ${}^bI_{ky}$, by drawing at random with replacement from the index-specific sets of residuals and then renormalizing by the appropriate standard errors–

$${}^{\mathrm{b}}I_{ky} = \begin{cases} \hat{I}_{ky} + {}^{\mathrm{b}}\pi_{ky}\sigma_{ky} & \text{normal} \\ \hat{I}_{ky}\,\mathrm{e}^{{}^{\mathrm{b}}\pi_{ky}\sigma_{ky}} & \text{lognormal} \end{cases}$$

$${}^{\mathrm{b}}\pi_{ky} \sim \left\{ \frac{r_{ky}}{\sqrt{1 - n_{\Theta k}/n_{\mathscr{D}k}}} \right\} \quad . \tag{2.23}$$

Note: This standardization procedure is an *ad hoc* approach employed by the author to account for heterogeneous variances among years; it would not be necessary if multiple observations were available for each year, in which case one could simply resample the data.

Bootstrap estimates of bias and variance

The expected value of an estimator applied to bootstrap pseudo-data sets is, by definition, the point estimate associated with original model fit. Therefore, in the absence of any methodological bias, the mean of the estimates from each of the bootstrap fits should be the same as the original point estimate. Otherwise, the difference between the mean and the point estimate is taken to be an indicator of the bias, i.e., the difference between the point estimate and the true value. Program VPA-2BOX computes the bias and variance of any given point estimate $\hat{\phi}$ via the estimators suggested by Efron (1990):

$$\text{bias}_B(\hat{\phi}) = \frac{\sum {}^b\phi}{B} - \phi(\bar{\mathbf{I}})$$

$$V_B(\hat{\phi}) = \frac{\sum_{b=1}^{B} \left({}^b\phi - \frac{\sum {}^b\phi}{B}\right)^2}{B-1} \,. \tag{2.24}$$

where $\phi(\bar{\mathbf{I}})$ denotes the estimate obtained by fitting the model to the average of the bootstrap data sets (i.e., $\bar{I}_{ky} = \Sigma\, {}^b I_{ky}/B$). Note that some investigators prefer to use the median of the bootstraps to calculate the bias rather than the mean because it is less sensitive to rare, large aberrations:

$$\text{bias}_B(\hat{\phi}) = \text{median}\{{}^b\phi\} - \hat{\phi} \,. \tag{2.25}$$

This has not yet been automated in VPA-2BOX, but can be computed from the binary output files.

Frequently one may wish to correct the statistic $\hat{\phi}$ in order to make it less biased:

$$\phi_{corrected} = \hat{\phi} - \text{bias}_B(\hat{\phi}) \,. \tag{2.26}$$

Note that $\phi_{corrected}$ is not equivalent to the median or mean of the bootstraps, a fairly common mistake (in fact, if $\hat{\phi}$ is biased then, by definition, the bootstrap mean and median are even more so). Efron and Tibshirani (1993) point out that bias-correcting is a dangerous affair; even if $\phi_{corrected}$ is less biased than $\hat{\phi}$, its standard error may be much greater. For this reason they suggest that the bias statistic is most useful as a diagnostic tool and that it is safer to use $\hat{\phi}$ than $\phi_{corrected}$ if the bias is small relative to the estimated standard error. On the other hand, a large bias relative to the standard error may indicate that the statistic $\hat{\phi}$ is too poorly determined to be useful.

How many bootstraps?

Porch (1999) found that the estimates of bias and coefficients of variation converged to stable values as the number of bootstrap replicates increased to 200 or more (Figures 1 and 2). However, even as few as 50 replicates gave reasonably good estimates. Therefore, there seems to be little to gain from using more than 200 replicates and as few as 50 may be adequate when computing time is limited. This conclusion seems to be typical of many bootstrap problems (Efron, 1987; Punt and Butterworth, 1993; Smith and Gavaris, 1993), although it is possible that very large data sets may require more replicates.

Cautions

It must be emphasized that the bootstrapping procedure only addresses errors that arise specifically because a nonlinear model is being applied to a relatively small data set. Other biases may occur when the error structure of the dependent variables is mis-specified or because the independent variables (e.g., the predicted indices of abundance) are treated as though they were error-free when in fact they do have error. In case of the latter, for example, the inverse of the Hessian matrix will usually lead to underestimates of variance (page 496 in Seber and Wild, 1989).

Still other uncertainties may arise because the catches (and even some of the model parameters) are treated as though they were perfectly known. In the case of catches, VPA-2BOX does include an option to generates pseudo-catch-at-age data from the observed values assuming a particular distribution type and variance (or cv) analogous to the parametric bootstrap discussed above. This approach is useful for characterizing the additional uncertainty attributable to the catches, but is biased because it is centered on the data (see Poole et al., 1999) and should not be used for bias-correction.

Retrospective pattern analysis

One means of detecting some potential biases not discernable from the bootstrap is retrospective pattern analysis. The idea here is to determine if there is a systematic trend in the model estimates when the same model is applied to successively shorter data sets. For example, one might compare the fishing mortality estimates when the model was applied to the data from 1975 to 1999, then again to the data from 1975 to 1998, then again to the data from 1975 to 1997, and again to the data from 1975 to 1996. A systematic trend in the F estimates could suggest a number of possible biases, including mis-specification of some of the fixed parameters (often the natural mortality rate), consistent under or over-reporting of catches, indices of abundance that do not represent abundance, and ageing errors.

Various *ad hoc* procedures have been developed to try to adjust the estimates to account for potential biases indicated by the retrospective pattern (e.g., ICCAT 1995, page 48), however the statistical properties of these adjustments are unclear. Certainly no adjustment should be attempted if the standard errors of the estimates are larger than the indicated retrospective bias inasmuch as the bias adjustment itself is likely to be poorly estimated. Moreover, retrospective patterns usually dissipate as more data are added owing to the convergent properties of the VPA, so it is unclear how the estimates farther back in time should be adjusted. For these reasons I recommend retrospective analyses only as a diagnostic tool to help identify failings in the model or data.

MODEL SELECTION

Model selection is the process of identifying the model that provides the ‘best’ description of a given set of data from a suite of competing models. There are two important caveats that must be addressed at the outset. First, none of the comparative methods discussed below are useful for comparing models applied to different data sets-- they all assume the same data are used. Second, one should have an idea of the most theoretically plausible model structures to examine and then limit the comparisons to these. The strategy should never be to try every model under the sun and then select the one that provides the best fit, the danger being that the selection process will identify a model that explains much of the variation in the data but has little connection to reality. Draper (1995), for example, has shown that traditional methods of model selection can lead to models with apparently strong predictive power even for randomly generated data. This problem is analogous to what happens in step-wise regression procedures with a very large number of potential covariates: the probability of finding some combination of covariates that accounts for the variation in the data may be great even when none of the covariates are related to the data (Manly, 1998).

Hypothesis tests

Hypothesis tests are often used to select the best approximating model. If the models are fitted by maximum likelihood, for example, the standard likelihood ratio test may be used to determine if the addition of *n* number of parameters to a previous model significantly improved the fit to the data. The test statistic,

$$-2\log\left\{\frac{P(\mathscr{D}\,|\,\Theta_2,\mathbf{X}_2)}{P(\mathscr{D}\,|\,\Theta_1,\mathbf{X}_1)}\right\}\ , \tag{2.27}$$

is chi-square distributed with *n* degrees of freedom (Hoel et al., 1981). Thus, the augmented model (2) would be judged significantly better than its simpler predecessor (1) if the test statistic was greater than the value from the chi-square distribution with *n* degress of freedom and the prescribed probability level (say 5%).

The primary drawback to likelihood ratio tests is that they are made with the understanding that one model is a reduced version of the other. Accordingly, models with different distributional assumptions about the data (e.g., lognormal versus normal distributed indices) cannot be compared with likelihood ratio tests. For this reason it is often preferable to work with information criteria, which do not require the competing hypotheses to be nested.

Information criteria

Perhaps the most familiar information criterion is Akaike's (1973) AIC metric,

$$\text{AIC} = -2\log P(\mathscr{D}|\Theta,\mathbf{X}) + 2n_\Theta\ , \tag{2.28}$$

and the small sample bias-adjusted version AIC_c (Hurvich and Tsai, 1995),

$$\text{AIC}_c = -2\log P(\mathscr{D}|\Theta,\mathbf{X}) + 2n_\Theta\left(1+\frac{n_\Theta+1}{n_{\mathscr{D}} - n_\Theta - 1}\right)\ . \tag{2.29}$$

The variables n_Θ and $n_{\mathscr{D}}$ represent the number of estimated parameters and number of data points, respectively. The philosophy behind the AIC is that reality is high-dimensional, possibly requiring infinitely many parameters to describe it. Model selection is therefore seen as a process of identifying the best approximating model. The dimension of this 'best' approximation would be expected to be low when the data are sparse and increase with the quantity and quality of the available data. The 'best' model is taken to be that with the lowest AIC (AIC_c) value.

Another metric that is sometimes used is the Bayes Information Criterion BIC,

$$\text{BIC} = -2\log P(\mathscr{D}|\Theta,\mathbf{X}) + n_\Theta\,\log(n_{\mathscr{D}})\ . \tag{2.30}$$

The philosophy underlying the BIC criterion is that reality is low dimensional and model selection is seen as the process of identifying the true model (the usual Bayesian approach). As with AIC, the ‘best’ model is taken to be that with the lowest BIC value. An interesting implication of the BIC is that it should be proportionately harder to add parameters as more data become available, which seems somewhat counterintuitive.

Burnham et al. (1994) and Buckland et al. (1997) favor the AIC/AIC_c approach over BIC, arguing that reality is rarely low-dimensional. VPA-2BOX includes both metrics, but I do not generally recommend the BIC because the systems one is likely to analyze with VPA are likely to be very much more complex than any model that can be supported by the data. I generally use the AIC_c metric rather than AIC because of the relatively small ratio of data to parameters in most VPA applications.

It is important to note that the negative log-likelihood expression -log $P(\mathscr{D} \mid \Theta, \mathbf{X})$ used in criteria (2.28 -2.30) must include all constant terms if comparisons are to be made between models with different distributional assumptions (e.g., normal versus lognormal distributed indices of abundance). An alternative form of the criteria uses the model *deviance* in place of -2log $P(\mathscr{D} \mid \Theta, \mathbf{X})$, however it is unclear how this form could be applied when the variance terms are estimated. (Model deviance is twice the difference between the negative loglikelihood function associated with the model fit and the negative loglikelihood that would be obtained if the model were able to fit the data perfectly.)

Bayes factors

A related point to keep in mind is that the AIC, BIC, likelihood ratio tests, and related criteria are based on likelihood theory and should not be applied when Bayesian priors and penalty functions are incorporated unless the priors and penalties are relatively uninformative (and so have little influence on the likelihood function). Strictly speaking, a discrete set of Bayesian models should be compared by contrasting their posterior densities,

$$P(H_i|\mathscr{D}) = \frac{P(\mathscr{D}|H_i)P(H_i)}{P(\mathscr{D})} , \tag{2.31}$$

where H_i denotes the i’th of several alternative models to be tested, $P(\mathscr{D}|H_i)$ is the marginal density of observing the data if hypothesis H_i were true, $P(H_i)$ is the prior representing expert opinions on probability that H_i is true relative to the competing hypotheses, and $P(\mathscr{D})$ is the unknown probability density of the data. If the same data are used for all models, $P(\mathscr{D})$ is a constant that can be ignored. In that case the ratios of $P(H_i \mid \mathscr{D})$ for two competing models (H_1 and H_2) may be compared:

$$\frac{P(H_2|\mathscr{D})}{P(H_1|\mathscr{D})} = \frac{P(\mathscr{D}|H_2)P(H_2)}{P(\mathscr{D}|H_1)P(H_1)} . \tag{2.32}$$

Model H_2 would then be interpreted as ‘better’ than H_1 if the ratio were greater than 1.

Unfortunately, the computation of the ratio $P(\mathscr{D}|H_2)/P(\mathscr{D}|H_1)$, known as the Bayes factor, has a number of practical limitations. One of the most important of these limitations is that they cannot reasonably be applied to noninformative priors (See Gelman et al. 2000, pp. 175-177). Another is that their computation requires performing the multidimensional integration

$$P(\mathscr{D} \mid H_i) = \int_{\Theta_i} P(\mathscr{D} \mid \Theta_i, \mathbf{X}_i)\, P(\mathbf{X}_i|\Theta_i) P(\Theta_i) d\Theta_i \quad , \tag{2.33}$$

which may demand considerable computing time. A number of alternatives to the Bayes factor have been suggested, including the controversial 'posterior Bayes factor' suggested by Aitkin (1991) and appropriated (in one of its limiting forms) for stock assessments by Fournier et al., (1998). Each such alternative has its own peculiarities and, at this point, none have been programmed into VPA-2BOX.

Chi-square discrepancy statistic

One useful check of model performance that can be applied in both Bayesian and non-Bayesian constructs is the Chi-square discrepancy statistic (Gelman et al., 1995; BFT, 2001):

$$\chi^2 \text{ discrepancy} = \sum_j \frac{(d_j - f[\hat{\Theta}, \mathbf{X}_j]\,)^2}{V(d_j)} \quad , \tag{2.34}$$

where $f[\hat{\Theta}, \mathbf{X}_j]$ is the model expectation of d_j given the estimated parameter vector and $V(d_j)$ is the variance. This statistic is approximately Chi-square distributed with $n_{\mathscr{D}} - n_{\Theta}$ degrees of freedom, so the probability p of observing a value of χ^2 that exceed the calculated value may be read from a standard Chi-square table. The idea here is to assess whether the observed discrepancies between the data and model predictions could have arisen by chance under the model's own assumptions. Major failures of the model should lead to either very high p-values (say, over 0.99, in which case the model probably has too many parameters) or very low p-values (say, less than 0.01, in which case the model is inconsistent with the data). The chi-square statistic can also be used to identify changes in the model, other than error structure, that augment its performance and bring the p-values to a reasonable range. It should not be used to compare different assumptions about error structure because it would, by its very nature, always favor weighted least-squares estimators. Note that VPA-2BOX computes this statistic for the indices of abundance/mortality only; it does not compute it for tag-recapture data.

NUMERICAL OPTIMIZATION

The section on parameter estimation discussed how the ability of a model to fit the data could be expressed as a single objective function Ψ that depends on a number of independent variables (parameters). The goal was to find the values of those variables where Ψ takes on its lowest possible value, i.e., the minimum. In certain special cases, such as when the model is a linear in its parameters, the minimum can be found exactly by setting the derivatives of Ψ with respect to the parameters equal to zero and solving the resulting system of equations analytically. In the case of nonlinear models, however, it is seldom possible to find a solution analytically and numerical procedures must be employed.

Numerical optimization methods essentially amount to trying a large number of different combinations of parameter values and finding the combination with the optimal (in this case lowest) value of Ψ. Ideally, one would like to try compare the values of Ψ obtained with every possible combination of feasible parameter values (or increments of values in the case of continuos variables). Unfortunately, the number of function evaluations (parameter combinations) required for this strategy increases geometrically with the number of values (n) evaluated and parameters considered (p): evaluations = n^p. Thus, the use of even a very course grid with only ten values for each parameter would require ten million function evaluations for seven parameters (a fairly modest number). At this writing, even the fastest PC processors require several hours to compute a typical VPA-type objective functions ten-million times. Grid searches with any more than 7 parameters or ten values can therefore be seen to be completely impractical. For this reason a number of algorithms have been developed to reduce the number of parameter combinations that must be evaluated in an intelligent way.

Unfortunately, by trying to intelligently select from among all possible parameter combinations, any given algorithm is prone to be 'fooled' in certain situations. Perhaps the most common failure involves mistaking a local minimum in the solution surface for the overall (global) minimum. It is beyond the scope of this manual to discuss the pros and cons of the innumerable number of search algorithms that have been developed. Interested readers are referred to any standard text on the subject (e.g., Press et al., 1992).

A two-step approach is used in VPA-2BOX. The first step involves the OSSRS algorithm of Sheela (1979), which was designed to rapidly converge on the general vicinity of the global minimum. Once in that vicinity, however, the OSRSS algorithm converges very slowly. At that point VPA-2BOX automatically swithes to the Nelder-Mead simplex routine AMOEBA of Press et al. (1992). This routine has the advantage of not requiring analytical or numerical derivatives, as do quasi-Newton and related algorithms.

The AMOEBA algorithm is restarted multiple times to avoid being fooled by local minima. New initial vertices are selected for each such restart using the formula

$$\theta_{ij} = \theta_{0j}\, e^{\sigma\eta\delta} \qquad (i,j = 1, 2, ... p) \tag{2.35}$$

where θ_{0j} is the value of the j'th parameter at the presumed minimum, θ_{ij} is the value of the j'th coordinate (parameter) in the i'th vertex of the initial simplex, η is a standard normal variate, σ is a user-prescribed standard deviation, and δ is equal to one if i equals j and zero otherwise. Subsequent 'restarts' continue until a prescribed number of consecutive sets of parameter estimates differ by less than one percent.

It should be reiterated that no algorithm is foolproof and the combination of OSSRS and AMOEBA used here is no exception. However, this combination has fared well in extensive comparisons with several other VPA programs that use different search algorithms, usually finding the same minimum and often a lower one.

3. INPUT FILES

Program VPA-2BOX reads four input files: 1) a control file that designates the type of model to be run, 2) a parameter file that specifies how the parameters should be estimated, 3) a data file containing the catches, weights and indices of abundance, and 4) a data file containing the tag-recovery information. Each of the files is read in free-format fashion, that is, the input data need not be in any particular column. Of course, if there are multiple entries on one line, it is necessary to enter the data in the proper sequence. For example, catch-at-age information must be entered in the sequence {year, catch-at-youngest-age, catch-at-youngest-age+1, ..., catch-at-oldest-age}.

Comments may be inserted anywhere in any of the input files provided they are preceded by a # symbol in the first column of the file. Data placed after a # symbol will not be read. Comments may also be safely inserted at the end of a complete data stream (without need of a # symbol). For example, the following comments are acceptable:

```
# the catches of ages 1 and 2 in 1995 are unknown (1996 catches are used)
1995  13456  23454  68906  80001  25501
1996  13456  23454  78906  90001  24565
```

or

```
1995  13456  23454  68906  80001  25501   the catches of ages 1 and 2 in 1995
1996  13456  23454  78906  90001  24565   are unknown (1996 catches are used)
```

In contrast, the comment forms below are unacceptable:

```
  # the catches of ages 1 and 2 in 1995 are unknown (1996 catches are used)
1995  13456  23454  68906  80001  25501
1996  13456  23454  78906  90001  24565
```

or

```
1995  13456  23454 the catches of ages 1 and 2 in 1995   68906  80001  25501
1996  13456  23454 are unknown (1996 catches are used)   78906  90001  24565
```

A template for each input file appears as an appendix. The explanation for each line item in the appropriate appendix is then given under the corresponding heading below.

CONTROL FILE: Appendix 1

This is the only file VPA-2BOX will prompt the user for. It contains the file names of all the other input files. Among other things, it specifies the type of model being used (one stock or two, overlap versus diffusion), imposes certain constraints on the model (e.g., a stock recruitment penalty), controls the performance of the search algorithm, and conducts bootstrap or retrospective analyses. What follows is a line by line explanation of the entries in Appendix 1.

Line	Explanation
Comments	
1 - 13	Comments preceded by the # symbol in the first column.
Names (must be placed within single quotes)	
14	The title of the run, which may be up to 50 characters long.
15	The name of the file with the catch, weight and index data (50 characters).
16	The name of the file with the parameter specifications (50 characters).
17	The name of the output file with the results (50 characters).
18	The name of the output file with the parameter estimates (50 characters).
19	The name of the output file with the results in a spreadsheet friendly format (50 char.)
20	The name of the file with the tag-recovery data (50 characters). The name of this file is immaterial if the tagging data switch on line 34 is set to 0, but some kind of name must still be entered
Model type	
24	Number of zones or stocks being considered (either 1 or 2)
25	The class of model being used (overlap or diffusion, see Table 2). If only 1 stock is considered then the overlap and diffusion models are exactly the same.
Tagging data controls	
34	Fourteen specifications must be entered here. The first is the tagging data switch: a value less than or equal to 0 tells the program to ignore the tag-recovery information and the other 13 entries can be left out. Otherwise, a positive value tells the program to use the tag-recovery information and the second entry is interpreted as a multiplicative weighting factor ω that controls the influence that the tagging data has on the estimation procedure. The objective function minimized in program VPA-2BOX is

$$\Psi(\Theta, X) = \mathscr{L}(\vec{I}) + \omega\, \mathscr{L}(\vec{r}) + \text{priors and other terms} \tag{3.1}$$

Thus, a value of ω greater than 1.0 magnifies the influence of the tagging,whereas a value less than 1.0 decreases its influence.

The next 12 entries give the relative amount of fishing E_j expected to occur in each month j. These are used to calculate the fraction of the annual fishing pressure ϕ_τ each cohort of tags was exposed to during the calendar year they were released (see Table 5):

$$\phi_\tau = \frac{(J_\tau - t_\tau)E_{J_\tau} + \sum_{j>t_\tau}^{12} E_j}{\sum_{j=1}^{12} E_j} \tag{3.2}$$

where t_τ is the time of release in terms of elapsed months and J_τ is the month the release occurred (an integer value from 1 to 12). The monthly effort indices E can be in any units so long as they are consistent. Note, however, that the above formula implicitly assumes that the E values are fairly constant from year to year. If they are not, the release dates should be somehow adjusted outside program VPA-2BOX and the monthly values for E all set to the same value (say 1) so that VPA-2BOX does not modify them.

Search algorithm controls

38 The seed for the random number generator, which can be any negative integer. You would want to change this if you were running separate bootstrap analyses (perhaps on different machines) and planned later to combine the results into one grand bootstrap analysis. If you do not change the random number seed the bootstrap runs will be identical whether you run them at different times or on different machines.

39 The maximum number of Amoeba simplex restarts (see Numerical Optimization section) can be fixed to prevent the algorithm from running too long. Most applications will converge within 10 restarts, however some two-stock analyses with tagging data can take 50 or more. Usually, this many restarts does not lead to a noticeable improvement in the model fit and is the result of one or two parameters being poorly determined. Therefore one may wish to cap the number of restarts at the point where noticeable improvements cease, particularly when doing bootstrap analyses.

40 The number of consecutive restarts over which the parameter estimates must not vary by more than one percent (see discussion of equation 2.35). Usually three is enough, but one may wish to use four or five with especially difficult problems.

41 This is the standard deviation parameter used in equation (2.35). It controls the extent to which the restart vertices span the parameter space. If the value is large, the initial simplex at each restart will be large, which will lead to rapid convergence initially, but slower convergence when the algorithm gets closer to the minimum. Conversely, small values tend to enhance the performance in the vicinity of the minimum, but the initial rate of convergence will be slow. Experience has shown that, for VPA analyses, the best tradeoff usually occurs with values of 0.4 - 0.5.

Index weighting controls

45 This option allows one to divide each index of abundance by its arithmetic mean (to do so enter any positive nonzero value). This scales all of the indices to an order of 1. It is important to do this if you are assuming the indices are normally distributed and wish to weight all of the indices the same (choice -1 at line 46 below). Otherwise, the objective function will be dominated by the indices with the largest values. If you are assuming the indices are lognormally distributed or are allowing each series to be weighted by different variances, then no scaling is necessary.

46 This option allows one to substitute a default value for the index variance inputs discussed in connection with line 63 of the data file. The available options are:

<u>Option</u>	<u>Result</u>
0	no action, program uses the INPUT_{iky} values specified in the data file
+ value	any positive nonzero input is read as a default CV, and $\sigma^2_{iky} = (\text{value}^* \hat{I}_{iky})^2$.
- value	any negative input is read as a default standard error, and $\sigma^2_{iky} = (\text{value})^2$
999	a value with the integer part equal to 999 causes the variance for each index to be estimated by the concentrated maximum likelihood formulae

$$\sigma_{iky}^2 = \sqrt{\frac{\sum_y \left(I_{iky} - \hat{I}_{iky}\right)^2}{\sum_y 1.0}} \qquad \text{(Normal distribution)} \qquad (3.3)$$

$$\tilde{\sigma}_{iky}^2 = \sqrt{\frac{\sum_y \left(\ln I_{iky} - \ln \hat{I}_{iky}\right)^2}{\sum_y 1.0}} \qquad \text{(Lognormal distribution)} \qquad (3.4)$$

This option is included for comparison with previous ADAPT programs and should only be used if the indices of abundance are being modeled as normal or lognormal distributed variates. The concentrated likelihood approach is effectively equivalent to the method of iterative re-weighting used by some other ADAPT programs such as STAATS (J. E. Powers, National Oceanic and Atmospheric Administration, Southeast Fisheries Science Center, Miami Laboratory, USA). Note that VPA-2BOX also allows the variances to be represented by parameters estimated in the search (see discussion on line 47 below). If the solution is well-determined, the maximum likelihood and concentrated maximum likelihood estimates should be the same.

47 This option tells the program whether the variance scaling parameters (υ_{ik}) specified in the parameter file (see line 77 of Appendix 4) should be multiplied or added to the input values entered in the data file or line 46 above. It is important to remember that the input values may be either CV's or negative standard errors. The scaling parameters therefore modify those values as follow

Option	Result	
0	$\sigma_{iky}^2 = (\text{INPUT}_{iky} * \hat{I}_{iky} * \upsilon_{ik})^2$	if input value is a positive CV
	$\sigma_{iky}^2 = (\text{INPUT}_{iky} * \upsilon_{ik})^2$	if input value is a negative std. error
1	$\sigma_{iky}^2 = (\text{INPUT}_{iky} * \hat{I}_{iky})^2 + \upsilon_{ik}^2$	if input value is a positive CV
	$\sigma_{iky}^2 = (\text{INPUT}_{iky})^2 + \upsilon_{ik}^2$	if input value is a negative std. error

As is true of any parameter listed in the parameter file, the variance parameters may be fixed or estimated in various ways. However, the program will send an error message if you enter 999 at line 46 and then try to estimate the variance parameters entered in the parameter file since they are merely different ways of estimating the same quantity.

One very important item to remember is that the multiplicative factors are made after the inputs are converted into the appropriate variances. Therefore, when a lognormal distribution is specified the υ_i^2 values are added or multiplied to the inputs after they are converted to logscale variances $\tilde{\sigma}_{iky}^2$, i.e.,

Option Result

0 $\tilde{\sigma}^2_{iky} = \ln(\text{INPUT}_{iky}{}^2 + 1) * \upsilon_{ik}{}^2$ if input value is a positive CV

$\tilde{\sigma}^2_{iky} = \ln((\text{INPUT}_{iky}/I_{iky})^2 + 1) * \upsilon_{ik}{}^2$ if input value is a negative std. error

1 $\tilde{\sigma}^2_{iky} = \ln(\text{INPUT}_{iky}{}^2 + 1) + \upsilon_{ik}{}^2$ if input value is a positive CV

$\tilde{\sigma}^2_{iky} = \ln((\text{INPUT}_{iky}/I_{iky})^2 + 1) + \upsilon_{ik}{}^2$ if input value is a negative std. error

Note that constant variance scenarios equivalent to the concentrated likelihood method (line 46) may be imposed by use of the additive structure with INPUT=0 or by use of the multiplicative structure with INPUT=1.

Constraints on vulnerability

56 The vulnerability (partial recruitment) for a subset of age groups can be constrained to change slowly over the last several years of the time series. The number of years included in the penalty (*n*) is entered first, followed by the log-scale standard error σ_v (which controls the severity of the penalty) and the youngest age (α) and oldest age (A). If *n* is less than 2, no penalty is imposed and the program does not attempt to read σ_v, α and A, so they do not need to be entered.

The penalty term that is added to the objective function is a correlated random walk:

$$\sum_{y=Y-n+2}^{Y} \sum_{a=\alpha}^{A} \left\{ 0.5 \left(\frac{\ln v_{k,a,y} - \ln v_{k,a,y-1}}{\sigma_v} \right)^2 + \ln \sigma_v \right\} , \qquad (3.5)$$

$$v_{k,a,y} = \frac{F_{k,a,y}}{\max\limits_{a} F_{k,a,y}}$$

where Y is the last year in the time series and v is the relative vulnerability. Note that the maximization in the vulnerability computation is over all ages, not just those from α to A. Also, the penalty is on the relative vulnerability, not the fishing mortality rates themselves (which are more likely to vary from year to year owing to changes in effort).

The vulnerability penalty can be very useful in situations where there are few data covering several age groups during the recent time period. Usually,the VPA solution can be stabilized by linking the last two or three years with a σ_v between 0.2 and 1.0, although one should be careful not to impose values of σ_v too much smaller than the standard errors of the indices abundance or the penalty will dominate the objective function. Furthermore, I do not recommend the use of a σ_v value much below 0.2 because the VPA must achieve an exact match to the catch-at-age and, if the penalty is too strong, sometimes will require rather strange solutions to do so. Again, this is strictly an artifact of having to match the catches exactly. Of course the value of σ_v should be large (> 1.0) if there is evidence to suggest that the vulnerability has changed substantially during the last *n* years of the time series. Alternatively, one could set *n* =

0 to eliminate the vulnerability penalty altogether and then fix the partial recruitments to some predetermined values (see discussion of line 41 in the parameter file).

Constraints on recruitment

62 The recruitments R (abundance of youngest age group) can be linked as a correlated random walk. The number of years included in the penalty (n) is entered first, followed by the log-scale standard error σ_R (which controls the severity of the penalty):

$$\sum_{y=Y-n+2}^{Y} \left\{0.5\left(\frac{\ln R_{k,y} - \ln R_{k,y-1}}{\sigma_R}\right)^2 + \ln \sigma_R\right\} \quad . \tag{3.6}$$

As with the vulnerability penalty above, this recruitment penalty is most useful where there is little information to determine the last several recruitments (which is almost always true). A strong penalty can force nearly constant recruitment over the most recent two or three years, but earlier recruitment estimates are seldom affected, even when n is set to include the entire time period, owing to the well known convergent properties of VPA. However, bizarre solutions can arise if the penalty is too strong (σ_R << 0.1) because the penalty will try to force essentially constant recruitment, but the VPA must still match the catches.

63 The recruitments R of the two separate stocks may be linked by the penalty term

$$\sum_{y=Y-n+2}^{Y} \left\{0.5\left(\frac{\ln rR_{2,y} - \ln R_{1,y-1}}{\sigma_r}\right)^2 + \ln \sigma_r\right\} \tag{3.7}$$

Here n refers to the number of years to link (including the most recent year Y), σ_r is the standard error and r is the recruitment ratio (number of recruits from stock 1 divided by the number from stock 2). The entries for σ_r and r are not read if n is set to 0.

The main purpose for this penalty is to accommodate situations where the growth and fishing pressure on a stock may differ by sex, but the sex ratio is fixed at the time of recruitment. Restrepo and Porch (2000) applied this penalty to Atlantic swordfish and found that it had a strong effect on the recruitments during the most recent years, but little effect farther back in time (again, owing to the well known convergent properties of VPA). As with the other penalties, setting σ_R much lower than 0.1 can lead to aberrant solutions and poor fits to the data.

Constraint on spawner-recruit relationship

72 This constraint penalizes departures from the Beverton and Holt (1957) spawner-recruit relationship assuming a first-order autoregressive error structure. It is invoked by entering either 1, 2, -1, or -2; followed by the first and last years corresponding to the range of recruitments one wishes to use (ψ and Ψ):

$$\sum_k \frac{1}{2\sigma_{BH,k}^2}\left[(1-\rho_k^2)\varepsilon_{k,\psi}^2 + \sum_{y=\psi}^{\Psi-1}(\varepsilon_{k,y+1} - \rho\varepsilon_{k,y})^2\right] + n_k \ln \sigma_{BH,k} - \frac{\ln(1-\rho_k^2)}{2} \tag{3.8}$$

where the form of the ε's depends on the distribution specified by the first entry

$$\varepsilon_{k,y} = \begin{cases} \ln(R_{k,y}) - \ln\left(\dfrac{a_k SSF_{k,y-\alpha}}{b_k + SSF_{k,y-\alpha}}\right) & \text{lognormal (entry = 1 or -1)} \\ R_{k,y} - \dfrac{a_k SSF_{k,y-\alpha}}{b_k + SSF_{k,y-\alpha}} & \text{normal (entry = 2 or -2)} \end{cases} . \qquad (3.9)$$

Here n_k is the number of spawner-recruitment pairs, α is the youngest age in the VPA, and *SSF* is the average spawning stock fecundity computed from user-supplied fecundity-at-age data as described for line 147 in the data file section.. The variables a and b are parameters of the Beverton and Holt spawner-recruit relationship and ρ is the correlation coefficient, all three of which must be specified in the parameter file. The term σ_{BH}, which refers to the standard error of the random component of the recruitment deviations, may either be specified in the parameter file (if the first entry is 1 or 2) or else estimated by the concentrated likelihood approach (if the entry is -1 or -2):

$$\sigma^2_{BH,k} = \frac{1}{n_k}\left[(1-\rho_k^2)\varepsilon^2_{k,\psi} + \sum_{y=\psi}^{\Psi-1}(\varepsilon_{k,y+1} - \rho\varepsilon_{k,y})^2\right] . \qquad (3.10)$$

As for the previous two stock-recruitment penalties, most of the effect is on the recruitment estimates for the most recent years. Strong effects on the early part of the time series are usually not achieved without a very strong penalty (under about 0.1), in which case there is a danger of bizarre solutions because of the conflicting need to match the catch-at-age history exactly.

Parameter estimation options

78 The parameters for each age group a on the last year Y may be represented by the fishing mortality rate in that year $F_{a,Y}$ (entry = 1) or the abundance at the beginning of the next year after mixing $N_{a+1,Y+1}$ (entry =2). Normally the first option is to be preferred because it is easier to guess the magnitude of F than of N, but the latter is useful to facilitate comparisons with older ADAPT programs.

79 This option allows one to estimate the catchability parameters q_{ki} by the concentrated likelihood approach (enter 0) rather than include them in the search list specified by the parameter file (enter 1) . The concentrated likelihood approach is computationally more efficient and generally is the method of choice if one is willing to assume catchability does not change with time. Otherwise, one should specify the q's in the parameter file.

The concentrated likelihood approach is available for three distributions:

$$
q_{ik} = \begin{cases}
\exp\left[\dfrac{\sum_y \dfrac{\ln I_{iky} - \ln(\sum_a v_{ikay}\, w_{ikay}\, \tilde{N}_{kay})}{\tilde{\sigma}^2_{iky}}}{\sum_y \dfrac{1}{\tilde{\sigma}^2_{iky}}} \right] & \text{lognormal} \\[2ex]
\dfrac{\sum_y \dfrac{I_{iky} \sum_a v_{ikay}\, w_{ikay}\, \tilde{N}_{kay}}{\sigma^2_{iky}}}{\sum_y \dfrac{(\sum_a v_{ikay}\, w_{ikay}\, \tilde{N}_{kay})^2}{\sigma^2_{iky}}} & \text{normal} \\[2ex]
\dfrac{\sum_y I_{iky}}{\sum_y \sum_a v_{ikay} w_{ikay}\, \tilde{N}_{kay}} & \text{Poisson}
\end{cases} \tag{3.11}
$$

If the chi-square, Laplace or gamma distributions are selected for the indices (see Table 4), then one should specify the q's in the parameter file (otherwise the program will substitute the concentration formula for the normal distribution).

Bootstrap analyses

86 This is the number of bootstraps you wish to conduct. A positive integer indicates they are to be nonparametric bootstraps and a negative integer indicates they are to be parametric bootstraps (e.g., entering -500 would tell the program to do 500 parametric bootstraps). Of course an input value of 0 means no bootstraps are to be conducted. If you chose to conduct a nonparametric bootstrap, then you must enter another integer on the same line that specifies whether or not to inflate the bootstrap residuals by use of the Stine correction factor discussed in regards to equations 2.20 - 2.23 (1 = yes, do it; 0 = no, do not do it).

Retrospective analyses

90 This entry specifies the number of years to go back for annual retrospective analyses (up to 20). The program automatically removes one year from the data and relevant parameters and then performs the VPA on the reduced data set. This procedure is repeated in annual steps until the data are reduced by the specified number of year (no retrospective analyses will be conducted if a 0 is entered). The results from each successive retrospective run (x) are written to files with the same format as the output files from the base run: `MINUSx.R` gives the diagnostic output, `MINUSx.EST` gives the parameter estimates, and `MINUSx.SPD` gives the spreadsheet friendly output (see the explanation of the output files in chapter 4).

One potential pitfall of automating this process occurs when when some of the data do not go as far back in time as the specified retrospective analyses. For example, suppose there is an index of abundance that only goes back 7 years and you are attempting to estimate both a catchabilty q and standard error σ for that index. The fifth restrospective run will have to estimate those two parameters from only two index points and any subsequent run will not be able to estimate them at all. A similar problem would be encountered when estimating tagging parameters from too few data. The user should be mindful that the program will attempt to run retrospective VPA's regardless of whether they make sense or not. The nonsensical results should be evident from the output files and the user should consider setting up those retrospective analyses by hand.

Note that you cannot run a retrospective analysis and a bootstrap analysis with the same call to the program. You will need to initiate two different runs with the same random number seed (line 38 above), one with the control file pointing to retrospectives and another with it pointing to bootstraps

91 The @ symbol is read as the end of the file, but is not necessary here.

CATCH DATA FILE: Appendix 2

This file contains all the information pertaining to the data used in the VPA with the exception of the tag-recoveries. One feature that distinguishes the format of this file from the control and parameter files is the use of negative entries to demarcate the end of a data input stream.

Remember, the line numbers given here are only for referencing the example file in Appendix 2; they will change depending on the placement of comments and the length of the data series. What is important is to enter the data and specifications in the correct order, not the specific line number.

Line Explanation

Comments

1 - 6 Comments preceded by the # symbol in the first column.

General specifications

7 The first and last year in the data. It is not necessary to use four digit years, but of course you must be consistent in whatever accounting you use.

8 The youngest and oldest age classes in the data followed by the age of the plus-group. If the plus-group is less than the oldest age, the program reads the data from the youngest age to the oldest age and automatically accumulates the catch of age classes greater than or equal to the plus-group. If there is weight information given in the data file, the average weight of the plus-group is computed from the weights of the older age classes as leveraged by the corresponding catches (see discussion of lines 141 and 147). The oldest age is then reset to the value of the plus-group and all subsequent calculations use the plus-group age as the maximum age. (This makes it easier to examine the effect of changing the age of the plus-group).

Input for first stock/zone

9-11 These comments remind the user to begin inputting all the data that pertains specifically to the first zone or stock in the analysis. If only one zone/stock is specified in the control file, then the information will only be read for that one zone and the user can disregard the comment on line 174.

12 Number of indices of abundance (or mortality) to be read. This should include any indices that you list later in the data file, even if you do not intend to use them in the analysis.

13 Spawning date ($spawntime_k$), in months elapsed. A value of 0 indicates the beginning of the year and a value of 12 indicates the end of the year (but before mixing occurs, if applicable).

14 Fecundity modifier (*MAT*) for each age class. This is used to determine the spawning stock fecundity *SSF* as follows:

$$SSF_{kay} = \begin{cases} \sum_a MAT_{ka}\, FEC_{kay}\, N_{kay}\, e^{-Z(spawntime_k/12)} & \text{if } spawntime_k \geq 0 \\ \sum_a MAT_{ka}\, FEC_{kay}\, N_{kay} \dfrac{(1-e^{-Z})}{Z} & \text{if } spawntime_k < 0 \end{cases} \tag{3.12}$$

where the fecundity information (*FEC*) is specified at the bottom of the file (line 147). The fecundity modifier can be used, for example, as an index of maturity when computing spawning stock biomass from weight information.

17 Title of the stock/zone to which the following catch data apply (must be 50 characters or less) followed by the probability density (pdf) the catch data are expected to follow and a measure of its standard error σ_C (a positive value is interpreted as a CV and a negative value as a standard error). The pdf and σ_C specifications are only used if a bootstrap analysis is specified in the control file. If the pdf is set to 0 the catches are held constant, otherwise a parametric bootstrap of the catches is carried out according to the specified distribution (where the expectation is set equal to the observed catch at age). The options available for the pdf are summarized in Table 6.

Catch data input

22 - 46 Here is where the catch at age vectors are input. Each line must include the year followed by the catch observations for every age class from youngest to oldest (recall that if the age of the plus-group is less than the oldest age indicated on line 8, then the program will read from youngest to oldest and automatically combine the catches into a plus-group).

Years with no catch need not be input; the missing years will automatically be assigned catch-at-age values of 1.0. Also, catch-at-age entries that are less than or equal to zero are replaced by a value of 1.0. Zero catches are not acceptable because the explicit VPA recursion would be undefined, so a small value of 1 fish is used instead. If vectors for the same year are entered on more than one line, the catches corresponding to the last line with that year will be used.

47 A negative value (e.g., -1) must be entered after the catch-at-age matrix to tell the program to move on to the index specifications.

Table 6. Probability density functions available for parametric bootstraps of catch and index data. In case of catch data the expectation μ is set equal to the observed catch-at-age, whereas with the index data μ is set equal to the model prediction of the index value. The methods of generating the variables are described in Law and Kelton (1982).

Option	Mathematical representation	How x is generated
1: lognormal	$\frac{1}{\sqrt{2\pi\tilde{\sigma}^2}x} e^{-0.5(\log_e[x]-\mu)^2/\tilde{\sigma}^2}$	polar method to get normal variate y, then take $x = e^y$
2: normal	$\frac{1}{\sqrt{2\pi\sigma^2}} e^{-0.5(x-\mu)^2/\sigma^2}$	polar method
4: Poisson	$\frac{\mu^x e^{-\mu}}{x!}$	Law and Kelton (1982)
7: uniform	$\begin{cases} \frac{1}{\sqrt{12}\sigma} & \text{for } \mu(1-\frac{\sqrt{3}\sigma}{\mu}) \le x \le \mu(1+\frac{\sqrt{3}\sigma}{\mu}) \\ 0 & \text{otherwise} \end{cases}$	3 linear congruential generators (see Press et al., 1995)
8: triangular (centered at μ)	$\begin{cases} \frac{x-\mu+\sqrt{6}\sigma}{6\sigma^2} & \text{if } -\sqrt{6}\sigma \le x-\mu \le 0 \\ \frac{\mu+\sqrt{6}\sigma-x}{6\sigma^2} & \text{if } 0 \le x-\mu \le \sqrt{6}\sigma \\ 0 & \text{otherwise} \end{cases}$	Law and Kelton (1982)

Index specifications

56-57 There are 8 entries on each line that tell the program how to interpret the index time series that follow. There should be one line for each index. The **first entry** identifies the index and must be an integer between 1 and the number entered on line 12.

The **second entry** identifies the error structure one wishes to employ (see Table 6) and must be one of the following choices: 0 = do not use this index, 1 = lognormal, 2 = normal, 4 = Poisson, 5 = robust Chi-square, 6 = Laplace double exponential, 7 = gamma, 12 = standard normal. Please note, however, that only the lognormal, normal and Poisson forms can be used for parametric bootstraps. The last choice, 12 = standard normal, uses the same formula as choice 2 (normal), but the input data are interpreted as standard normal deviates created by subtracting the series mean from each observation and then dividing by the series standard deviation. I included this option because I have encountered situations where the only available indices had been standardized in this manner. However I recommend against the use of this standardization approach if at all possible inasmuch as the difference between a fairly flat trend with low variance and a steep trend with high variance is obscured.

The **third entry** is an integer that specifies the units of the index as follows:

Option	Prescription
1	index of abundance in numbers
2	index of biomass (abundance in terms of weight)
3	index of relative fishing mortality rate, Max$\{F_y\}$ - F_y
4	index of relative total mortality rate, Max$\{Z_y\}$ - Z_y
5	index of absolute fishing mortality rate
6	index of absolute total mortality rate

The first two options relate to indices of abundance and correspond to Table 3, where for choice (1) w_{kiay} = 1.0 and for choice (2) w_{kiay} = the weight-at-age specified later in the data file. Options 3, 4, 5 and 6 relate to indices of mortality and correspond to Table 4.

The **fourth entry** is an integer that specifies the method that is to be used to determine the index-specific vulnerability vector v_{ikay}. There are three basic choices here:

Option	Prescription
1	Vulnerability vector read as input (line 111)

2 - 3

$$v_{ikay} = \frac{C_{ikay} F_{kay} / C_{kay}}{\underset{a}{\text{MAX}} \{C_{ikay} F_{kay} / C_{kay}\}} \tag{3.13}$$

4

$$v_{ika} = \frac{\sum_{y} C_{ikay} F_{kay} / C_{kay}}{\underset{a}{\text{MAX}} \{\sum_{y} C_{ikay} F_{kay} / C_{kay}\}} \tag{3.14}$$

When options (3) or (4) are selected, the values read from the file (see line 111) are assumed to be the fishery-specific (partial) catches C_{ikay}. When option (2) is selected, the values from line 111 are assumed to be the fractions C_{ikay}/C_{kay} (but otherwise the computations are identical to option 3). The value of F_{kay} is the fishing mortality rate estimated by the VPA at the current iteration.

Option 1 should be used whenever the index represents a single age class, in which case one would normally assume the vulnerability is constant at 1.0 (the default value if no vulnerabilities are input). Option 1 is the only option available for indices of mortality. The choice between options 2 or 3 (Powers and Restrepo, 1992) and option 4 (Geromont and Butterworth, 1999) depends upon how stable one believes the vulnerability-at-age vector is likely to be. The former allows the vector to change from year to year whereas the latter assumes it is constant over all of the years covered by the index. One may be tempted to go with the seemingly more flexible approach of option 2-3, however it turns out that option 4 nearly always produces a better fit to the indices of abundance (and a lower value of the objective function). There reasons for this are two inherent inconsistencies in the method of options 2-3. The first inconsistency arises because the partial catches are usually observed with some error and yet must be matched exactly; large random errors in the partial catches will tend to skew the estimated vulnerabilities too far towards younger ages in some years and too far towards older ages in other years, making it difficult for the model to fit the index data. The method of option 4 will tend to average these random errors away. The second inconsistency arises with the usual practice of holding the catchability coefficient q constant. In point of fact, one would expect a change in S to be accompanied by an effective change in q since some of the same factors affect both; one would, for example, generally expect very different q values to accompany the relative vulnerability vectors v={1,1,1,1,1} and v={0,0,0,0,1}. However, when option 4 is used and q is at the same time held constant, this likely scenario is ruled out, creating a potentially serious model mis-specification problem. In general, I do not recommend the use of options 2 and 3 unless q is allowed to vary from year to year (see the discussion on specifications for the q parameters in the parameter file).

The **fifth entry** specifies when the index observations were made in terms of months elapsed ($indextime_{ki}$). A negative integer (e.g., -1) indicates the observations represent the average abundance during the year. The value of $indextime_{ki}$ is used to determine the value of the adjustment factor Δ:

$$\Delta = \begin{cases} e^{-Z_{kay}(indextime_{ki}/12)} & \text{if } indextime_{ki} \geq 0 \\ \dfrac{1-e^{-Z_{kay}(indextime_{ki}/12)}}{Z_{kay}} & \text{if } indextime_{ki} < 0 \end{cases} \tag{3.15}$$

The **sixth** and **seventh entries** give the youngest and oldest age represented by the index. The oldest age should not exceed the age of the plus-group. The **eighth** entry is the title of the index you want to appear in the output (must be 50 characters or less).

58 Again, a negative value (e.g., -1) must be entered after the index specifications to tell the program to move on to reading the index data.

Index data

63-105 Here the actual values of the indices of abundance or mortality are read. The **first entry** is the integer identifying the index and the **second entry** is the year. The **third entry** is the value of the index, which is ignored if it is negative unless the standard normal option is selected. The **fourth entry** is interpreted as a coefficient of variation if is positive and a standard error if it is negative. It corresponds to the value labeled INPUT_{iky} in the discussion on line 47 of the control file.

106 A negative value (e.g., -1) must be entered after the index specifications to tell the program to move on to reading the vulnerability data.

Index vulnerability information

111-135 Here the values of the vulnerabilities or partial catches for the indices are read. The **first entry** is the integer identifying the index and the **second entry** is the year. After these must come the vulnerability-at-age vector for that year, starting with the youngest age and continuing to the oldest age (as per line 8). If no lines are input for a given index or year a value of 1.0 is assumed for all ages (thus you do not need to list an index where the vulnerabilities are the same for all ages in all years).

If the plus-group age is less than the oldest age and the inputs are fixed vulnerabilities, the vulnerability given for the plus-group age will be used. Otherwise, the partial catches or fractional catches of the age classes older than the plus-group age will be combined into the plus-group. Whether the values are read as vulnerabilites, partial catches or catch fractions is specified by the fourth entry on line 56.

136 A negative value (e.g., -1) must be entered after the index specifications to tell the program to move on to reading the index weight data.

Index weight information

141 Here the weight-at-age vectors for the indices are read. This information is only used if the third entry on line 56 is set to 2 (for biomass units). The **first entry** is the integer identifying the index and the **second entry** is the year. After these must come the weight-at-age vector for that year, starting with the youngest age and continuing to the oldest age (as per line 8). If the plus-group age is less than the oldest age, the weight of the plus-group is computed from the partial catches if they are available and the total catch otherwise, i.e., as $\Sigma C_{ikay} w_{ikay} / \Sigma C_{ikay}$ or $\Sigma C_{kay} w_{ikay} / \Sigma C_{kay}$.

142 A negative value (e.g., -1) must be entered after the index specifications to tell the program to move on to reading the fecundity data.

Fecundity information

147 Here the fecundity-at-age data are entered (the variable *FEC* discussed in connection with line 14 and equation 3.12). This can be weight-at-age for computation of spawning stock biomass or the per capita fecundity (e.g., average gondad weight, average number of eggs per female, etc.). The **first entry** is the integer identifying the index and the **second entry** is the year. After these must come the fecundity-at-age vector for that year, starting with the youngest age and continuing to the oldest age (as per line 8). If the plus-group age is less than the oldest age, the fecundity of the plus-group is computed from the total catch as $\Sigma C_{kay} FEC_{kay} / \Sigma C_{kay}$.

172 A negative value (e.g., -1) must be entered after the index specifications to tell the program to move on to the next zone/stock.

Input for second stock/zone

173-175 These comments remind the user to begin inputting all the data that pertains specifically to the second zone or stock in the analysis. If only one zone/stock is specified in the control file, then any information entered from here on will not be read. Otherwise, the information in lines 12 to 172 will need to be repeated for the second stock (the number of lines will of course change, but the order and formats must be identical to those used for the information on lines 12 to 172.

TAG RECOVERY FILE: Appendix 3

This file contains all the information pertaining to the tag-recovery data. The example in Appendix 3 has been abridged to appear as though there were only two years of releases and 6 years of recoveries; the reader is reminded that the line numbers given here are only for referencing the example file in Appendix 3; they will change depending on the placement of comments and the length of the data series. What is important is to enter the data and specifications in the correct order, not the specific line number.

<u>Line</u> <u>Explanation</u>

Comments

1 - 17 Comments preceded by the # symbol in the first column.

Release information

7-53 Here you must indicate the zone, year, and integer age of the fish when they were tagged and released (in that order), which defines the tag-release cohort τ. On the same line, this information must be followed by the number of fish tagged, the average time of the year when they were tagged (in months), and a weighting factor. The average time of the year (t_τ) is used in the calculation to determine the fraction of the fishing year that this group of tags was exposed to (see discussion of line 34 in the control file and equation 3.2).

The weighting factor is used to discount tag-recovery information that is deemed somehow less reliable than that of other cohorts (one might wish to do this, for example, if the number of releases that survived the tagging process that year was more uncertain than in other years). It takes the form of a variance (ω_τ^2 in Table 5). If you do not wish to include any special weighting, just set all the ω_τ^2 values to 1.0, otherwise values greater than 1.0 will decrease the weight attributed to the tagging data for that cohort (one can also down-weight the entire tagging data set using the default weighting factor discussed on line 32 of the example control file).

54 A negative value (e.g., -1) must be entered after the release information to tell the program to move on to reading the recovery data

Recovery data

64-135 Here you must indicate the zone, year, and integer age of the fish when they were tagged and released (in that order), which defines the tag-release cohort τ. On the same line, this information must be followed by the zone of recovery and the number of tags recovered from the cohort in that zone during each year of the analysis–not just the years of the tagging experiment, but the first and last years indicated in the catch data file. Thus, there should be zero values for every year prior to the year when the fish in that cohort were tagged. For example, in the sample tag data file there is a 0 value for the column labeled 1975 for all of the tag cohorts released in 1976 (it is not possible to recapture a tag before it was released, so a zero is entered).

136 A negative value (e.g., -1) can be entered after the recovery information to tell the program to stop reading data.

PARAMETER SPECIFICATIONS FILE: Appendix 4

This file determines how the parameters of the model will be estimated. The format for all parameter specifications is as follows:

```
 lower bound
 |     best estimate (prior expectation)
 |     |     upper bound
 |     |     |      method of estimation
 |     |     |      |       log-scale standard error of prior
 |     |     |      |       |
0.1   1.2   2.0     1      0.1  {anything after the fifth entry is not read}
```

There must be one line of specifications for each parameter, however several consecutive parameters with exactly the same prescription may be represented by a single line if it is preceded by a $ symbol in the first column followed by an integer value that indicates the number of parameters the line represents. For example, writing the line

```
$ 3     0.1  1.2  2.0    1      0.1
```

is equivalent to writing

```
        0.1  1.2  2.0    1      0.1
        0.1  1.2  2.0    1      0.1
        0.1  1.2  2.0    1      0.1             .
```

The lower bound (l) refers to the lowest reasonable value of the parameter you will accept, the best starting estimate (b) refers to the value of the parameter you think is most likely, and the upper bound (u) refers to the highest reasonable value of the parameter you will accept. Solutions with parameter values (θ) that are outside the upper and lower bounds incur a penalty,

$$penalty = \begin{cases} 10 + 1000\left(\dfrac{\theta - u}{b}\right)^2 & \text{if } \theta > u \\ 10 + 1000\left(\dfrac{\theta - l}{b}\right)^2 & \text{if } \theta < l \end{cases} , \qquad (3.16)$$

which is added to the objective function. This usually helps the search algorithm find a solution faster by forcing it to concentrate on parameter values within the feasible range. A judicious choice for the starting value b will also usually improve the search algorithm's performance.

The 'method of estimation' indicator tells the program how to handle each parameter θ_j:

Method	Parameter structure	
0	$\theta_j \equiv b_j$	fixed constant at best starting guess
1	$\theta_j = \theta_j$	estimated as 'frequentist' parameter (no Bayes prior)
2 (0.3)	$\theta_j = b_j e^{\varepsilon_k}$	estimated with Bayes prior
3 (0.1)	$\theta_j = \theta_{j-1} e^{\varepsilon_j}$	estimated with correlated process error (random walk)
4 (0.2)	$\theta_j = \theta_{ref} e^{\varepsilon_j}$	estimated with uncorrelated process error
-0.1	$\theta_j = \theta_{est}$	set to value of the closest previous estimated parameter
-n	$\theta_j = \theta_n$	set to value of *n*th parameter in the list (whether estimated or not)

where $\varepsilon_k \rightarrow \text{Normal}(0, \tilde{\sigma}_k)$

Note: the Bayesian method designations in parentheses--0.1, 0.2 and 0.3–were used in previous versions of VPA-2BOX and are still accommodated (i.e., the old parameter files can still be used). The variable θ_{ref} refers to the closest previous parameter determined by any method other than method 4 (an uncorrelated random deviation from the preceding uncorrelated random deviation becomes effectively a random walk). The variable θ_{est} refers to the closest previous parameter that was actually estimated (methods 1 to 4). The variable $\tilde{\sigma}_k$ is the log-scale standard error and is specified by the last entry on the parameter specification line (which is read but not used with options 0, 1, -n, and -0.1).

The choice of methods 1 to 4 causes the program to estimate the parameter by searching for the value that minimizes the objective function. Method 1 takes the usual frequentist approach of minimizing the negative log-likelihood function that measures the discrepancy between the data and the model predictions (subject to the constraints discussed in the description of the control file). Methods 2, 3 and 4 however, expand the objective function to include terms that penalize discrepancies between the parameter estimates and their preconceived values:

Method	Term added to objective function
2 (0.3)	$0.5\left(\frac{\ln\theta_k - \ln b_k}{\tilde{\sigma}_k}\right)^2 + \ln\tilde{\sigma}_k$
3 (0.1)	$0.5\left(\frac{\ln\theta_k - \ln\theta_{k-1}}{\tilde{\sigma}_k}\right)^2 + \ln\tilde{\sigma}_k$
4 (0.2)	$0.5\left(\frac{\ln\theta_k - \ln\theta_{ref}}{\tilde{\sigma}_k}\right)^2 + \ln\tilde{\sigma}_k$

Method 2 invokes a lognormal Bayesian prior for the parameter centered on the input best guess *b* and having a log-scale standard error of $\tilde{\sigma}_k = \sqrt{\log_e(CV^2+1)}$. This construct is useful when there is some external information on a parameter, but additional insight may be gained from the data used in the VPA. For example, the natural mortality rate is notoriously difficult to estimate and is usually fixed to some predetermined constant. An alternative is to impose a prior centered at that predetermined value with a variance term that reflects its uncertainty.

Methods 3 and 4 may be interpreted as autocorrelated process errors with correlation coefficients of 1 and 0, respectively (see section xx). From this perspective the parameter θ_k is viewed as a state variable (see Chapter 2, Parameter Estimation) with expectation θ_{k-1} or θ_{ref} (if θ_{ref} is estimated). The two methods are identical when $\theta_{ref} = \theta_{k-1}$, however they have very different implications when a long series of parameters are linked. Generally, one should chose method 3 (known as a random walk; see Porch, 1999) if there is likely to be a consistent trend and method 4 otherwise. For example, the catchability coefficient q of a catch per unit effort series might be expected to increase through time owing to technological improvements made by the fishing fleet, in which case one might prefer the random walk. On the other hand, the catchability coefficient for a research survey might be expected to be devoid of any trends yet still vary owing to fluctuations in the spatial distribution of the stock relative to the locations where the survey was conducted, in which case method 4 might be preferred.

The process error approach tends to the frequentist approach as the process variance becomes either very small ($\tilde{\sigma}_k \to 0$) or very large ($\tilde{\sigma}_k \to \infty$). In case of the former, it is as if only θ_{ref} were being estimated, whereas in the case of the latter it is as if one were trying to estimate every θ_k, as a free parameter (generally impossible because of insufficient data). Thus, moderate values of $\tilde{\sigma}_k$ (say between 0.1 and 1.0) can be thought of as a middle ground adding flexibility to the model while still preserving the estimability of the parameters. The best choice for $\tilde{\sigma}_k$ depends on how many other parameters are being estimated, what data are available, and how variable the state variables are likely to be. The bootstrap and other diagnostic tools may give some insight as to when the value of $\tilde{\sigma}_k$ is too large, but the choice is really more of an art than a science.

As mentioned previously, all of the parameters in this file are represented in the same fashion (with one exception to be discussed). However, the order of parameter input is very important. The following discussion is based on the file in Appendix 4 and the reader is reminded that the line numbers given here are only for referencing that example; they will change depending on the placement of comments and the number of parameters. What is important is to enter the specifications in the correct order, not the specific line number. It is also important to recognize that a single parameter can be used to represent several categories (age class, year, or index) simply by estimating the value for one category and then using the -0.1 or -n method prescriptions to set subsequent parameters equal to that estimated value. Also, one should take care not to try to estimate parameters where there is no data to do so, as might happen if you try to estimate the variance scaling factor for an index that you have in the data file but told the program not to use (by setting the pdf in the data file to 0).

<u>Line</u>	<u>Explanation</u>
Comments	
1 - 40	Comments preceded by the # symbol in the first column.
Terminal-year parameters	
41-47	The parameters for each age group a on the last year Y may be represented by the fishing

mortality rate in that year $F_{a,Y}$ or the abundance at the beginning of the next year after mixing $N_{a+1,Y+1}$, depending on the prescription on line 78 of the control file. Each age must be represented by one specification line with the exception of the oldest age, which is represented by the F-ratio parameter discussed in connection with line 51. Thus, the youngest age is represented by the first parameter (first specification line) in the file.

The format used to specify the terminal-year parameters is the same as for the other parameters below, with one exception. If the method indicator is set to 0 and the value of the best estimate is less than 9, then the best estimate is interpreted as the vulnerability on that age *a* relative to a reference age *j* (which is entered in place of the standard deviation) such that $F_{a,Y} = b_a F_{j,Y}$.

If the option to estimate $N_{a+1,Y+1}$ (rather than $F_{a,Y}$) is chosen, then the specifications for $N_{a+1,Y+1}$ are entered in the same position as for $F_{a,Y}$ and the reference age *j* must still refer to the age during the terminal year (not the age +1). Note that when the overlap model is specified, the program will attempt to solve for $F_{1,a,Y}$ and $F_{2,a,Y}$ simultaneously from $N_{1,a+1,Y+1}$ and $N_{2,a+1,Y+1}$; therefore the same age groups must be used for both stocks (an error message will be generated if you attempt otherwise).

The terminal parameters for the first three or four age groups tend to be rather poorly determined because they are affected by relatively few data points, but their estimability can be improved by implementing the vulnerability or recruitment constraints discussed in the control file. Where those constraints do not seem plausible, one may fix the relative vulnerabilities to some predetermined values and link them to a reference age that can reasonably be estimated.

In the example file (Appendix 4), line 41 tells the program that $F_{1,Y} = 0.2\ F_{2,Y}$ and line 42 tells the program to estimate $F_{2,Y}$ with a starting value of 0.4886. Lines 43 to 46 likewise tell the program to estimate the F's on ages 3 to 6, but line 47 tells the program to link age 7 to age 6 such that $F_{7,Y} = 0.9\ F_{6,Y}$.

F-ratio parameters

51 This is the ratio of the fishing mortality on the plus-group to the next younger age, $\varphi_{ky} = F_{k,A,y}/F_{k,A-1,y}$. There must be one F-ratio specification for each year. Typically the values are fixed to 1.0 unless there is some compelling biological reason to suggest otherwise. VPA-2BOX allows separate values of φ_{ky} to be estimated as free parameters for every year, but this is seldom practical owing to the scarcity of data. Generally one will have to limit the number of parameters by assuming φ_{ky} is constant during several blocks of years or limit the amount φ_{ky} can vary from year to year by use of the process error formulations with moderate $\tilde{\sigma}_k$.

Natural mortality parameters

57 One natural mortality parameter M_{ka} must be specified for each age class (inter-annual variations are not accommodated). In the example file there are two *M* parameters being estimated, one for age 1 and another for age 2 and older (both with starting values of 0.3). In general, the natural mortality rate will not be well-estimated unless the indices of abundance cover a time without fishing or the tag-recovery data come from a well-executed experiment. In most cases it will be necessary to impose informative Bayesian priors on the M_{ka}'s or else fix them to some externally derived constants.

Mixing parameters

61 One mixing parameter T_{ka} must be specified for each age class (inter-annual variations are not accommodated). These parameter are very unlikely to be well-estimated without tag-recovery data, in which case one must either fix them or impose tight Bayesian priors. If the one stock option is chosen these parameters are read, but ignored.

Stock recruit parameters

65-69 Here are specified five parameters that dictate the autocorrelated stock recruit relationship discussed in connection with line 72 of the control file. The first two parameters represent a_k and b_k of the Beverton and Holt (1957) spawner-recruit curve:

$$R_{k,y} = \frac{a_k SSF_{k,y-\alpha}}{b_k + SSF_{k,y-\alpha}}. \tag{3.17}$$

The third specification refers to a parameter that will be used to introduce a three parameter spawner-recruit curve in a later version, but is not now being used and should have the estimation method set to 0. The fourth and fifth specifications are the correlation coefficient ρ_k and standard error σ_k ($\tilde{\sigma}_k$ in the lognormal case) of the process error, respectively. Obviously one cannot estimate any of these parameters unless the stock-recruit penalty on line 72 of the control file is turned on.

Variance scaling parameters

77-78 These are the scaling parameters υ_{ik} discussed in connection with equation 2.15 and line 47 of the control file. One υ parameter must be specified for each index listed in the data file. Obviously the values of the υ_{ik} parameters cannot be estimated if the corresponding index is not being used, so be sure to check that the estimation method for these parameters is either set to zero or equated to a previous parameter as in the example here.

Catchability parameters

83-88 These represent the catchability coefficients for the indices of abundance and proportionality coefficients for the indices of mortality (q_{iky}). This section must not appear if the option on line 79 of the control file specifies for the q values to be estimated by the concentrated likelihood method. Otherwise, there must be one specification line for every year regardless of the number of years for which there are data. If you intend to estimate only a single value of q for all years, then you can estimate the value for the first year and set the values for the remaining years equal to that value as in lines 83-84. However, if you intend to allow q to vary from year to year, it generally does not make sense to try to estimate q for the years where there is no data and you should fix the q values for the years without data to some arbitrary constant (as done in line 88, since the second index in the corresponding data file does not include 1999) or to the value estimated in a preceding year (the program won't predict the value of the index for years with no data). If you do try to estimate a q parameter for a year with no data, the program will try to estimate it and the search algorithm will take unnecessarily long. One exception to this rule might be when the index is missing a year or two in the midst of the time series. In that case it would still be appropriate to try to estimate the q values for the missing year using one of the process error approaches (provided the imposed $\tilde{\sigma}_k$ is not too large),

Tag-recovery parameters

89-110 The rest of the specifications in this example file pertain to the tag recovery parameters. This section must not appear if tag-recovery information is not being used (or be placed after the @ symbol discussed below at line 111).

92 This line specifies the immediate loss of tags owing to misapplication or tagging-induced mortality (d_τ of Table 5). One parameter must be specified for each age class (inter-annual variations are not accommodated but see discussion on line 100).

96 This line specifies the chronic loss of tags owing to shedding or fouling (λ_τ of Table 5). One parameter must be specified for each age class (inter-annual variations are not accommodated). If indices of abundance are available this parameter is estimable, otherwise it is confounded with the natural mortality rate M and one may prefer to set it equal to values determined from double tagging experiments.

100 This line specifies the reporting rate ($\rho_{kay\tau}$ of Table 5). One parameter must be specified for each year (age-specific variations are not accommodated, but see below). Of course the parameters corresponding to years with no tag releases should be assigned arbitrary constants.

It is important to notice that this term always occurs together with d (see line 92) as the product $(1-d)\rho$ in the tag-recovery equations, therefore the two sets of parameters may not be estimated independently for every age and year combination no matter how good the tag-recovery data are. For this reason the formulation used by VPA-2BOX limits changes in d to age specific effects and changes in p to year specific effects. Together, these parameters can be thought of as constituting a separable model of the quantity $(1-d)\rho$, that is, as a model of $(1-d)\rho$ where the year/age interactions are considered negligible. With sufficient data, all of the age and year effects will be estimable. The absolute magnitudes of the d_a and ρ_y parameters however, will remain indistinguishable inasmuch as the age and year effects are multiplicative. Therefore, I recommend fixing either one of the d_a parameters or one of the ρ_y parameters to some value determined external to the model (via captive studies or tag seeding experiments) and estimating the others.

105-106 These are the pre-mixing adjustment factors for the first calendar year after the release $\gamma_{\tau\psi}$. Values must be specified for every age in every year (making these the most tedious parameters to specify). The example in Appendix 4 simply assumes this value is the same for every year and age of release, but one can in principle estimate different values for every year/age combination where tags were actually released (see the bluefin tuna mixing example files included with the electronic copies of this manual). Hoenig et al. (1998) points out that the values of γ can be difficult to distinguish precisely from F when only tag recovery data are available, but this should not be too serious of a problem here because F is largely determined from the catch and index data.

110 These are the pre-mixing adjustment factors for the second calendar year after the release $\gamma_{\tau,\psi+1}$. Values must be specified for every age in every year. The example in Appendix 4 simply assumes this value is 1.0 for every year and age of release, but one can in principle estimate different values for every year/age combination where tags were actually released (just as for the first-year pre-mixing factors).

@ The end of file indicator

111 The appearance of an @ symbol in the first column tells the program to stop reading the parameter file at that point. It is superfluous if it comes at the end of the file, but is useful if you want to store alternative parameter specifications in the same file. For example, if the concentrated likelihood method were to be used in runs that did not use the tagging data, then an @ could be placed in the first column of line 79 to avoid having delete or comment out all the q and tagging parameters.

4. OUTPUT FILES

Program VPA-2BOX always produces four output files containing the: 1) parameter estimates, 2) diagnostic statistics and derived quantities, 3) derived quantities in a spreadsheet friendly format and 4) log of performance statistics. If a retrospective analysis is conducted, then each of the first three files is reproduced for every retrospective run as explained for line 90 of the control file. If a bootstrap analysis is conducted, then a summary file is produced along with a set of binary files with the output from each individual bootstrap run.

PARAMETER ESTIMATE FILE

This format of this file is very much like that of the parameter specification file and can be used as the parameter specification file for subsequent runs simply by changing its name to the pointer in line 16 of the control file[3]. The only differences are that the estimated value is substituted for the 'best guess', the parameters are enumerated, a coefficient of variation (CV) is computed and an exponential format is used. Also, the flag BOUND appears when the parameter is close to the constraints.

```
lower bound
|           estimated value
|           |            upper bound
|           |            |            method of estimation
|           |            |            |     log-scale std. error of prior
|           |            |            |     |            parameter ID
|           |            |            |     |            |  estimate ID
|           |            |            |     |            |  |   CV (%)
|           |            |            |     |            |  |   |     Flag
|           |            |            |     |            |  |   |     |
0.0000E+00  0.6000E+00   0.3000E+01   0.0   0.2000E+01   1
0.1000E-01  0.7337E+00   0.5000E+01   1.0   0.1000E+00   2  1   21.
0.1000E-01  0.4999E+01   0.5000E+01   1.0   0.1000E+00   2  1    1.  BOUND
```

The column labeled 'parameter ID' identifies the numerical order of the adjacent parameter specification. The column labeled 'estimate ID' is similar, but refers to the numerical order of the parameters that are estimated. Both identifiers are useful when trying to reference certain error messages produced by VPA-2BOX. The parameter ID is also useful when one wishes to link one parameter to another parameter specified earlier in the file (estimation method -*n* discussed above).

The coefficient of variation (CV) is the standard error of the estimator divided by the value of

[3]Note, however, that the new estimates will be used as the central tendencies for any Bayes priors that are imposed (estimation method 2). If you wish to preserve the old priors, you will have to manually change the values in the second column to the 'best' values specified in the original parameter file..

the estimate, here expressed as a percentage. Typically, values of less than 10 or 20% are interpreted as indicating the parameter estimates are fairly precise, whereas values of more than 50% indicate the parameters are poorly estimated. However, it is important to realize that the standard errors are themselves estimated by inverting the Hessian matrix, which assumes the likelihood[4] surface is quadratic near the minimum. In practice, this is only approximately true and the estimates of standard error tend to be less precise than the estimates of the parameters themselves. In extreme cases a true minimum may not have been found or the surface may be so far from quadratic that the Hessian is not be positive semi-definite and estimates of the CV cannot be produced. Furthermore, the CV's will tend to be biased if the variance parameters for the indices of abundance/mortality are incorrectly specified. Hence, it is recommended that the CV's derived from the Hessian matrix not be trusted unless the variance terms for the indices are estimated (either in the search or by the concentrated likelihood method) and the Hessian appears well-behaved (see discussion on the log file below).

DIAGNOSTIC AND DERIVED STATISTICS FILE

This file contains most of the output statistics one might expect from a VPA program in a format that is easy to read. The first set of information presented is a synopsis of the model's performance:

```
Total objective function =   10602.56 value of the negative log  posterior function at its minimum
      (With constants)   =   10602.56 value of the negative log  posterior with constant terms
Number of parameters (P) =         73 number of parameters that are estimated
Number of data points (D)=       8691
AIC : 2*objective+2p     =    2531.44
AICc: 2*objective+2p(...)=    2532.69
BIC : 2*objective+Plog(D)=    3047.55
Chi-square discrepancy   =     869.30
Log-likelihood (deviance)=  -10600.77 (    2385.44)      the values in parentheses
   effort data           =     -54.67 (     326.16)      are the deviances
   tagging data          =  -10546.10 (    2059.27)
Log-posteriors           =      -1.79
   catchability          =       0.00
   f-ratio               =      -1.79
   natural mortality     =       0.00
   mixing coeff.         =       0.00
   initial tag survival  =       0.00
   tag shedding rate     =       0.00
   tag reporting rate    =       0.00
   tag non-mixing factor =       0.00
Constraints              =       0.00
   terminal F            =       0.00
   stock-rec./sex ratio  =       0.00
Out of bounds penalty    =       0.00
```

[4]The asymptotic covariance matrix is not generally given by the inverse of the Hessian matrix when informative Bayes priors or process errors are incorporated since the posterior is no longer a true likelihood. It may, however, be given to good approximation if the variances of any penalties, priors or process errors are much larger than those associated with the data observation errors (the posterior effectively reducing to a likelihood).

Explanations of these output statistics are provided in previous sections of this manual (see index). Note that the components of the objective function pertaining to the data, priors and process errors and constraints are the positive logarithms of the respecitve likelihood and posterior function– not the negative logarithms. Thus, a better fit is indicated by larger (less negative) values. The quantity being minimized (first entry above), therefore, is the negative of the sum of the components listed below it.

The remaining components are fairly self explanatory. The first three tables give the estimated fishing mortality rates, estimated abundances and observed catches for each year and age group.

TABLE 1.1 FISHING MORTALITY RATE FOR EAST

	1	2	3	4	5
70	0.219	0.231	0.129	0.099	0.037
71	0.011	0.281	0.267	0.112	0.098
72	0.171	0.235	0.433	0.140	0.094
73	0.145	0.178	0.200	0.111	0.042
74	0.127	0.234	0.273	0.237	0.168

TABLE 2.1 ABUNDANCE AT THE BEGINNING OF THE YEAR [BY AREA] FOR EAST

	1	2	3	4	5
70	839440.	407538.	256252.	207707.	305586.
71	1244733.	413005.	247664.	172667.	150988.
72	933262.	754513.	238717.	145232.	123160.
73	1313402.	481718.	456478.	118423.	100363.
74	1931654.	696225.	308705.	285930.	83930.
75		1042334.	421733.	179783.	177808.

TABLE 3.1 CATCH OF EAST

	1	2	3	4	5
6	7	8	9	10	
70	131834.	73211.	26994.	17842.	9793.
71	10384.	88198.	50413.	16589.	12777.
72	116980.	137100.	73231.	17152.	9923.
73	140707.	68048.	71707.	11121.	3710.
74	182955.	125976.	64125.	54045.	11608.

A fourth table is included that gives the abundance by stock (rather than area) when the overlap model is specified for analyzing two stocks simultaneously.

The next set of tables gives the spawning stock biomass, which is computed from the weights and other specifications given in the catch data file:

TABLE 4.1 SPAWNING STOCK FECUNDITY AND RECRUITMENT OF EAST

year	spawning biomass	recruits from VPA
70	161011.	839440.
71	183815.	1244733.
72	191700.	933262.
73	188799.	1313402.
74	194959.	1931654.

An additional column containing the expected value of recruitment from the spawner-recruit relationship is included if that constraint is employed (see discussion of line 72 in the control file).

The next set of Tables summarizes the fits to the indices of abundance and indices of mortality.

```
TABLE 5       FITS TO INDEX DATA EAST

======================================================================

   --------------------
   5.1
   --------------------
   Lognormal dist.
   average numbers
   Ages  8 - 10
   log-likelihood     =         1.46
   deviance           =        64.17
   Chi-sq. discrepancy=        75.96
```

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransformed Observed	Untransformed Predicted	Chi-square Discrepancy
70	-0.456	-0.295	-0.161	0.226	0.136E-05	0.634	0.745	0.420
71	-0.177	-0.398	0.221	0.227	0.136E-05	0.838	0.672	1.156
72	0.232	-0.509	0.741	0.232	0.136E-05	1.261	0.601	21.786
73	-0.498	-0.518	0.020	0.230	0.136E-05	0.608	0.596	0.007
74	-0.708	-0.553	-0.155	0.246	0.136E-05	0.493	0.575	0.331

Selectivities by age

Year	8	9	10
70	0.810	1.000	0.791
71	0.810	1.000	0.791
72	0.810	1.000	0.791
73	0.810	1.000	0.791
74	0.810	1.000	0.791

Note that the columns labeled ‘untransformed’ refer to the value of the indices on an arithmetic scale. They should be the same as the original input values unless the user specified in the control file that they should be divided by the series mean. The columns labeled ‘observed’, ‘predicted’, ‘residuals’, and ‘standard deviation’ contain the observed values and model predictions on a log scale when the lognormal distribution is specified in the data file, but otherwise are presented on an arithmetic scale (in which case the ‘untransformed’ columns do not appear). The chi-square discrepancy is computed for each index point for ease of identifying possible outliers (they should sum to the total given at the top of the file, but in this case the entire table has not been presented).

Finally, the last tables in this output file give the fits to the tag-recovery data:

```
TABLE 6.1 FITS TO TAGS RELEASED IN AREA OF EAST

    Multinomial dist.
    log-likelihood =     -1770.26
    deviance       =       367.20

     Release    Recapture             Recaptures by year following release
    Year  Age     Area      Type         1        2       3       4
=======================================================================
      70    1      1        obsd        3.00     2.00    0.00    0.00
                            pred        0.60     0.36    0.03    0.01
      71    1      1        obsd       23.00     1.00    3.00    2.00
                            pred        7.28     2.18    1.13    0.13
```

Note that chi-square discrepancy statistics are not computed for tag-recapture data.

DERIVED STATISTICS IN SPREADSHEET FRIENDLY FORMAT

This file contains the fishing mortality rate estimates, abundance estimates, observed catches, input weight at age for spawners, and the observed and predicted values of the indices. There are 100 spaces (for up to 100 years) devoted to each matrix, enabling the user to set up a spreadsheet file that need not be readjusted for every particular application. The index matrix has two columns devoted to each index for each area; the first contains the observed values and the second contains the predicted values (-9's are written as place holders where data are missing).

LOG OF PERFORMANCE STATISTICS

This file, called VPA-2BOX.LOG, records the value of the objective function after each restart of the objective function. Then it displays the results of a first derivative test to see if the proposed minimum point is in fact a local extremum (the hope of course is that it is also a minimum rather than a saddle point, in which case the Hessian matrix must also be positive semi-definite).

The first derivative test results are presented in a table that looks like the following:

```
FIRST DERIVATIVE TEST
==============================================
            -h        central        +h
        ----------  ----------  ----------
    1 : -0.1003D-01  0.1703D-01  0.1904D-01
    2 : -0.1001D-01  0.1621D-01  0.1821D-01
    3 :  0.8303D-02  0.8309D-02  0.9315D-02     FAIL: Backward step :
```

where in this case there are three estimated parameters. If a local extremum has been found, then all of the first derivatives should be zero at that point. Owing to the large number of options available, VPA-2BOX does not compute analytical derivatives, but instead employs finite difference approximations. In that case, a good indication of whether a true minimum has been reached is if the central difference approximation is close to zero while the backwards difference (-h) is slightly negative and the forward difference (+h) is slightly positive. Several flags are written to alert the user when these criteria are not met (as for the third parameter in the example above). Such failures may occur for a number of reasons, including (1) one or more parameters are estimated near the boundary constraints, (2) the simplex search has not found a true minimum and (3) surface of objective function is not approximately quadratic near the minimum (either very flat or very jagged). The first possibility can easily be checked by inspection of the parameter estimate file discussed above. The second possibility can be addressed by restarting the algorithm with several different initial values for the parameters; if the same minimum is found each time then it is likely that the lowest point has been found. One should also check to see if the search was terminated prematurely because the number of restarts exceeded the limit indicated in the control file. The third possibility suggests either the data are too noisy, conflicting or sparse to provide useful parameter estimates; the user should consider reducing the number of estimable parameters.

It may happen that the first derivative test above indicates that a minimum had been found, but the Hessian is not positive semi-definite and therefore not invertible. This may occur for the same reasons outline above, and the remedies are the same. When the Hessian matrix is invertible, the resulting covariance matrix is printed as well as the corresponding matrix of correlation coefficients. As mentioned previously, the covariance matrix will be biased if the variances of the index data are incorrectly specified or the objective function is not a true likelihood. Moreover, the numerical derivatives in the Hessian matrix are sometimes very sensitive to the step-size used owing to the jagged terrain of the solution surface in the vicinity of the lowest point found by the simplex algorithm (which may not be a well-behaved minima). The correlation coefficients derived from the inverse-Hessian covariances,

$$\hat{\rho}_{ij} = \frac{\hat{\sigma}_{ij}}{\hat{\sigma}_i \hat{\sigma}_j} \quad ,$$

appear to be more stable than the covariance estimates themselves inasmuch as some of the biases cancel out. Accordingly, they are probably a more reliable indicator of the quality of the solution than the magnitudes of the covariances (correlations of 0.1 or 0.2 are considered very low, whereas correlations above 0.9 are excessively high and may indicate that some of the parameters involved should somehow be combined or eliminated altogether). In summary, I do not recommend placing much confidence in the inverse-Hessian covariance estimates or the coefficients of variation derived from them. I have found the correlation coefficients to be somewhat useful during the model development phase, but recommend the bootstrap procedure for characterizing the uncertainty in any model used to generate management advice.

BOOTSTRAP OUTPUT FILES

The file BOOTSTRP.OUT records the bias and standard error of the fishing mortality rate and abundance estimates, which are computed according to the methods discussed in chapter two. The bias and standard errors are also computed for the parameter estimates with the following format

TABLE 1E. PARAMETER ESTIMATES FOR Northern Albacore

==

TERMINAL AGE STRUCTURE OF POPULATION ABUNDANCE

Age	MLE	Average of bootstraps	Bias	Std. Error	% CV
2	0.125E+08	0.134E+08	0.657E+06	0.491E+07	36.6
3	0.167E+07	0.183E+07	0.118E+06	0.834E+06	45.6
4	0.784E+06	0.882E+06	0.353E+05	0.267E+06	30.3
5	0.625E+06	0.610E+06	-0.258E+05	0.155E+06	25.4
6	0.454E+06	0.433E+06	0.664E+04	0.124E+06	28.7
7	0.145E+06	0.147E+06	0.151E+05	0.700E+05	47.5
8	0.458E+06	0.492E+06	0.111E+05	0.779E+05	15.8

Here the column labeled "MLE" stands for the best (maximum likelihood or highest posterior density) estimates, the "average of bootstraps" is the mean value of the parameter estimates from all of the bootstrap runs, and the bias is computed from the "average of bootstraps" and a run using the averages of the bootstrap data as described in chapter two.

The results from each individual bootstrap run are stored in a set of 4-bit binary files (.bin extension) with the following formats:

Abundance, fishing mortality, catch, natural mortality, and transfer rate coeffients

```
record length = 4*(Y-y0+1)*(A-firstage+1)*NBOX
NAA.bin: (((N(k,a,y),y=y0,Y),a=firstage,A),k=1,NBOX)
FAA.bin: (((F(k,a,y),y=y0,Y),a=firstage,A),k=1,NBOX)
CAA.bin: (((C(k,a,y),y=y0,Y),a=firstage,A),k=1,NBOX)
MAA.bin: (((M(k,a,y),y=y0,Y),a=firstage,A),k=1,NBOX)
TAA.bin: (((T(k,a,y),y=y0,Y),a=firstage,A),k=1,NBOX)
```

Observed indices of abundance and mortality

```
record length = 4*(Y-y0+1)*(number of indices)
IND.bin ((I(i,1,y),y=y0,Y),i=1,Nind(1)),((I(i,2,y),Y=y0,Y),i=1,Nind(2))
```

Terminal vulnerabilities (during last year)

```
record length = 4*(A-firstage+1)*NBOX
TERM.bin:((Term(k,a),a=firstage,A),k=1,NBOX)
```

Stock recruitment parameters

```
record length = 4*(5+Y-y0+1)*NBOX
SR.bin:((SR(k,Y),Y=1,5+Y),k=1,NBOX)
```

where y_0 and Y are the first and last years in the model, A is the age of the plus-group, *NBOX* is the number of zones (1 or 2), and *Nind* is the number of indices representing each zone.

These files are useful if one wishes to use other software to compute confidence limits and alternative forms of bias correction. They may also be read into programs designed to project the VPA results into the future (such as the companion program to VPA-2BOX, called PROJECT). Note that an ASC-II file called BAD.OUT is also produced that identifies bootstrap runs that may not have converged or gave otherwise unreasonable results (which the careful investigator may wish to exclude from any further calculations).

5. LITERATURE CITED

Anganuzzi, A., Hilborn, R. and Skalski, J. R. 1994. Estimation of size selectivity and movement rates from mark-recovery data. Can. J. Fish. Aquat. Sci. 51: 734-742

Baglin, R. E., Farber, M. I., Lenarz, W. H. and Mason, J. M. 1980. Shedding rates of plastic and metal dart tags from Atlantic bluefin tuna, *Thunnus thynnus*. Fishery Bulletin (US) 78: 179-185.

Block, B. A., Dewar, H., Blackwell, S. B., Williams, T., Prince, E. D., Farwell, C., Boustany, A., and Seitz, A. In press. Archival tagging of Atlantic bluefin tuna. ICCAT Coll. Vol. Sci. Pap. (SCRS/99/103)

Brown, B., and M. L. Parrack, 1985. Status of the Atlantic bluefin tuna resource. Pages 279-289 in Stroud, R. H., ed., World Angling Resources and Challenges. Int. Game Fish Assoc. 390 pp.

Brownie, C., Anderson, D. R., Burnham, K. P., and Robson, D. S. 1985. Statistical inference from band recovery data: a handbook. 2nd ed. U.S. Fish and Wildl. Serv. Resour. Publ. No. 156.

Buckland, S. T., Burnham, K. P., and Augustin, N. H. 1997. Model selection: An integral part of inference. Biometrics **53**: 603-618

Butterworth, D. S., and A. E. Punt. 1994. The robustness of estimates of stock status for the western north Atlantic bluefin tuna population to violations of the assumptions underlying the associated assessment models. ICCAT Coll. Vol. Sci. Pap. 42(1): 192-210.

Cooke, J. G., and K. Lankester. 1996. Examination of alternative stock distribution models for the interpretation of bluefin tuna (*Thunnus thynnus*) tag-recovery data. ICCAT Coll. Vol. Sci. Pap. 45(2): 135-138.

Hilborn, R. 1990. Determination of fish movement patterns from tag recoveries using maximum likelihood estimators. Can. J. Fish. Aquat. Sci. 47: 635-643.

Hoenig, J. M., Barrowman, N. J., Pollock, K. H., Brooks, E. N., Hearn, W. S., and Polacheck, T. 1998. Models for tagging data that allow for incomplete mixing of newly tagged animals. Can. J. Fish. Aquat. Sci. 55: 1477-1483.

Hurvich, C. M., and Tsai, C. 1995. Model selection for extended quasi-likelihood models in small samples. Biometrics **51**: 1077-1084.

ICCAT. 1994. Report for the biennial period 1992-1993. Part II (1993). 395 pp.

ICCAT. 1995. Report for the biennial period 1994-1995. Part I (1994). 395 pp.

Lutcavage, M. E., Brill, R. W., Skomal, G. B., Chase, B. C., and Howey, P. W. 1999. Results of pop-up satellite tagging on spawning size class fish in the Gulf of Maine: Do North Atlantic bluefin tuna spawn in the mid-Atlantic? Can. J. Fish. Aquat. Sci. 56: 173-177.

Mather, F. J. 1980. A preliminary note on migratory tendencies and distributional patterns of Atlantic bluefin tuna on recently acquired and cumulative tagging results. ICCAT Coll. Vol. Sci. Pap. 11: 478-490.

Mather, F. J., Rothschild, B. J., Paulik, G. J. and Lenarz, W. H. 1974. Analysis of migrations and mortality of bluefin tuna, Thunnus thynnus, tagged in the northwestern Atlantic Ocean. Fishery Bulletin (US) 72: 900-911.

Mather, F. J., Mason, J. M., and Jones, A. C. 1995. Historical Document: Life history and fisheries of Atlantic bluefin tuna. 1995. NOAA Tech. Memo. NMFS-SEFSC-370. 165 p.

NRC. 1994. Report of the National Research Council review of Atlantic bluefin tuna. National Academy Press. Washington, D.C. 148 pp.

Porch, C. E. 1995. A two-area VPA with discrete mixing: Can we discriminate between mixing rates given the present condition of the data? ICCAT Coll. Vol. Sci. Pap. 44(1): 198-208.

Porch, C., P. Kleiber, S. Turner, J. Sibert, R. Bailey and J. Cort. 1998. The efficacy of VPA models in the presence of complicated movement patterns. Proceedings of the 25 Anniversary ICCAT Tuna Symposium. ICCAT Coll. Vol. Sci. Pap. 50(2):591-622.

Porch, C. E., Restrepo, V. R., Turner, S. C., and G. P. Scott. 1995. Virtual population analyses of Atlantic bluefin tuna incorporating movement and tagging data. ICCAT Coll. Vol. Sci. Pap. 44(1): 183-190.

Porch, C. E. and S. C. Turner. 1998. Virtual population analyses of Atlantic bluefin tuna with alternative models of trans-Atlantic migration. ICCAT Coll. Vol. Sci. Pap. 49:291-305.

Powers J.E.; Conser R.J and Parrack M.L. 1983. An assessment of Atlantic bluefin tuna resources. ICCAT Coll. Vol. Sci. Pap. 18(2): 563-611

Powers, J. E., and J. Cramer. 1996. An exploration of the nature of Atlantic bluefin tuna mixing. ICCAT Coll. Vol. Sci. Pap. 45(2): 173-181.

Punt, A. E., and D. S. Butterworth. 1995. Use of tagging data within a VPA formalism to estimate migration rates of bluefin tuna across the north Atlantic. ICCAT Coll. Vol. Sci. Pap. 44(1): 166-182.

Restrepo, V. R. and Porch, C. E. 2000. Options for conducting swordfish sex-specific assessments. ICCAT Collect. Vol. Sci. Pap. 51:1375-1386.

Schweigert, J. F., and Schwarz, C. J. 1993. Estimating migration rates for Pacific herring *(Clupea pallasi*) using tag-recovery data. Can. J. fish. Aquat. Sci. 50: 1530-1540.

Sibert, R., and D. A. Fournier. 1994. Evaluation of advection-diffusion equations for estimation of movement patterns from tag recapture data. FAO Fish. Tech. Pap. 336/1:108-121.

SCRS. 2001. Report of the ICCAT SCRS West Atlantic Bluefin Tuna Stock Assessment Session (Madrid, Spain, September 18 - 22, 2000). ICCAT Col. Vol. Sci. Pap. 52: 831-958.

Turner, S. C. 1986. An analysis of recaptures of tagged bluefin with respect to the mixing assumption. ICCAT Col. Vol. Sci. Pap. 24: 196-202.

Turner, S. C., and J. E. Powers. 1995. Review of information related to Atlantic bluefin tuna east-west movement. ICCAT Col. Vol. Sci. Pap. 44(1): 191-197.

6. APPENDICES

APPENDIX 1. Sample control file with line numbers

First column of file

Line |

```
#################################################################################
###               CONTROL FILE FOR PROGRAM VPA-2BOX, Version 3.0           ###
#################################################################################
#  INSTRUCTIONS: the control options are entered in the order specified.
#                Additional comment lines may be inserted anywhere in this
#                file provided they are preceded by a # symbol in the FIRST
#                column, otherwise the line is perceived as free-format data.
#################################################################################
#
#############################################
# TITLES AND FILE NAMES (MUST BE PLACED WITHIN SINGLE QUOTES)
#############################################
#|--------must be 50 characters or fewer----------|
'NORTHERN ALBACORE 1975-97'                          TITLE OF RUN
'ALB00.d01'                                          DATA FILE NAME (INPUT)
'ALB00.p01'                                          PARAMETER SPECIFICATION FILE (INPUT)
'ALB00.r01'                                          RESULTS FILE NAME (OUTPUT)
'ALB00.e01'                                          PARAMETER ESTIMATE FILE NAME (OUTPUT)
'ALB00.SPD'                                          SPREADSHEET FRIENDLY RESULTS (OUTPUT)
'none for ALB '                                      TAGGING DATA FILE (INPUT)
#############################################
# MODEL TYPE OPTIONS
#############################################
 1                          NUMBER OF ZONES (1 OR 2)
 1                          MODEL_TYPE (1=DIFFUSION, 2=OVERLAP)
#############################################
# TAGGING DATA SWITCH
#############################################
# tagging data switch (0=do not use tagging data, 1=use tagging data)
# |  weighting factor for modifying importance of tagging data in objective function
# |  |     Relative amount of fishing in each month (not necessary tag data switch = 0)
# |  |     |
# |  |     |
  0  1.0   0 0 0 1 1 1 1 1 1 0 0 0           TAGGING MODEL CONTROLS
#############################################
# SEARCH ALGORITHM CONTROLS
#############################################
-911   RANDOM NUMBER SEED
 20    MAXIMUM NUMBER OF AMOEBA SIMPLEX SEARCH RESTARTS
 3     NUMBER OF CONSECUTIVE RESTARTS THAT MUST VARY BY LESS THAN 1% TO STOP SEARCH
 .4    PDEV (standard deviation controlling vertices for Initial simplex of each restart)
#############################################
# INDEX WEIGHTING CONTROLS
#############################################
 0      SCALE (DIVIDE INDEX VALUES BY THEIR MEAN)- ANY VALUE > 0 = YES
 1.0    INDEX WEIGHTING:(0)INPUT CV's, (+)DEFAULT CV, (-)DEFAULT STD. DEV., (999)MLE
 0      (0) MULTIPLICATIVE VARIANCE SCALING FACTOR or (1) ADDITIVE VARIANCE SCALING FACTOR
#############################################
# CONSTRAINT ON VULNERABILITY (PARTIAL RECRUITMENT)
#############################################
# apply this penalty to the last N years (SET N = 0 TO IGNORE)
# |  standard deviation controlling the severity of the penalty
# |  |  first age affected
# |  |  |  last age affected
# |  |  |  |
  0 .4  1  9    LINKS THE VULNERABILITIES IN THE LAST N YEARS
```

```
#############################################
# CONSTRAINTS ON RECRUITMENT
#############################################
# apply this penalty to the last N years (SET N = 0 TO IGNORE)
# |  standard deviation controlling the severity of the penalty
  0 .1          LINKS THE RECRUITMENTS IN THE LAST N YEARS
  0 .1   1      LINKS THE RECRUITMENTS OF THE TWO STOCKS
#        |
#        ratio of stock (sex) 1 to stock (sex) 2 {a value of 1 means a 1:1 ratio}
#############################################
# CONSTRAINT ON SPAWNER-RECRUIT RELATIONSHIP
#############################################
# PDF of spawner-recruit penalty: 0=none, 1=lognormal, 2=normal (-)=estimate sigma by MLE
# |  first and last years to use in fitting (in terms of recruits)
# |  |
  0  1975 1996  PENALIZES DEPARTURES FROM BEVERTON AND HOLT STOCK-RECRUIT CURVE
#                    (note: check the parameter file to make sure you are estimating the S/R
#                           parameters when pdf not 0, or not estimating them when pdf=0))
#############################################
# PARAMETER ESTIMATION OPTIONS
#############################################
 1              OPTION TO USE (1) F'S OR (2) N'S AS TERMINAL YEAR PARAMETERS
 -1             ESTIMATE Q IN (+) SEARCH or (<0) by concentrated MLE's
#############################################
# BOOTSTRAP ANALYSES
#############################################
# Number of bootstraps to run (negative value = do a parametric bootstrap)
# |   Use Stine correction to inflate bootstrap residuals (0=NO)
# |   |
  0   1           BOOTSTRAP OPTION
#############################################
# RETROSPECTIVE ANALYSES (CANNOT DO RETROSPECTIVE ANALYSES AND BOOTSTRAPS AT SAME TIME)
#############################################
 4                NUMBER OF YEARS TO GO BACK FOR RETROSPECTIVE ANALYSES
@EOF@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
```

APPENDIX 2. Sample data file with line numbers

First column of file

Line |

```
###############################################################################
#  DATA FILE FOR PROGRAM VPA-2BOX, Version 3.0
#      The data and specifications are entered in the order indicated
#      by the existing comments. Additional comments must be preceded by a # symbol
#      in the first column, otherwise the line is perceived as free format input.
###############################################################################
1975 1999                                FIRST AND LAST YEAR
1 8 8                                    FIRST AGE, LAST AGE AND PLUSGROUP AGE
################################################################################
# BEGIN INPUT FOR Zone/STOCK 1
################################################################################
 2                      NUMBER OF INDICES in this file (whether used or not)
 6                      SPAWNING SEASON (elapsed months, 0 is beginning of year)
 0 0 0 0 0.5 1 1 1      FECUNDITY MODIFIER (MATURITY) AT AGE
# 50 character title within single quotes ‘ ’ ----->]  PDF OF CATCH
# |                                                    |       SIGMA CATCH
 'Northern Albacore'                                   0       1
#===============================================================================
# NOW ENTER THE CATCH-AT-AGE DATA. ROW=YEAR, COLUMN=AGE
#===============================================================================
#YEAR  1        2       3       4       5       6       7       8+      <--AGE
1975   315733   1066318 1237487 299015  280100  186106  212809  68034
1976   931707   2228301 935988  823222  448893  313768  151055  68898
1977   428823   2433768 1397655 321475  454251  277723  108428  72114
1978   2487904  2179912 1182421 418111  219033  213060  84188   31706
1979   883487   3295114 1767666 179078  150122  108815  51052   121773
1980   1661960  1372292 1533717 280723  85452   49805   31750   67929
1981   1127638  1524756 1019549 302997  74073   51145   42296   99892
1982   239468   1844670 1610921 284073  77559   70137   37154   173027
1983   890767   1577368 1628346 619212  207258  156937  80563   106758
1984   432954   1204226 972542  275997  209046  124572  123533  225416
1985   1052931  1354882 996685  235554  231200  137424  40219   212844
1986   821188   1559763 1172319 343754  409680  166179  78931   146896
1987   378762   2372142 1358300 146963  50677   45487   27354   70074
1988   1725728  2070614 1039478 140129  33163   15686   14680   21340
1989   1113168  1826467 1385188 106313  41240   23941   9374    10010
1990   1101655  2609762 790747  212087  97017   74879   60175   63898
1991   1197076  2190165 588433  96016   105347  34942   32053   51821
1992   1367443  1895016 833741  161041  47378   69838   56897   22928
1993   988442   2102203 1031346 208371  83237   52766   79599   178022
1994   708148   2863041 696340  160490  36962   27918   40370   163956
1995   1327523  2302110 992772  108378  118960  122804  78394   93902
1996   1343761  2438753 342995  96818   55599   39962   46529   77277
1997   1769533  1666480 763456  96324   49881   53179   39700   27793
1998   1847969  1933866 546087  83660   31479   32148   32259   36206
1999   1852736  1612315 1087974 248920  68592   52359   43632   50509
-1 end of catch data
#===============================================================================
# NOW ENTER IN THE ABUNDANCE INDEX SPECIFICATIONS
#===============================================================================
# INDEX PDF  (0= do not use,1=lognormal, 2=normal)
# |     |    UNITS (1 = numbers, 2 = biomass)
# |     |    |      VULNERABILITY (1=fixed, 2=frac.catches, 3=part. catches, 4=Butt. & Gero.
# |     |    |      |      TIMING (-1=average, +integer = number of months elapased}
# |     |    |      |      |    FIRST AGE  LAST AGE     TITLE (IN SINGLE QUOTES)
   1    1    1      1    -1    2          2            'SP. TROLL 2'
   2    1    1      4    -1    2          8            'TAIWAN LL'
-1 end index specifications
#===============================================================================
# NOW ENTER IN THE INDICES OF ABUNDANCE
#===============================================================================
#INDEX YEAR     INDEX VALUE    INDEX STD ERROR
1      1981     40.50319669    -1              SP Troll 2
1      1982     53.95664758    -1
1      1983     38.30118752    -1
1      1984     31.99824001    -1
1      1985     24.86051748    -1
1      1986     37.62169586    -1
1      1987     42.23633635    -1
1      1988     41.50778091    -1
```

```
1      1989     22.77312019    -1
1      1990     38.9929516     -1
1      1991     57.01309062    -1
1      1992     49.02747727    -1
1      1993     42.29127929    -1
1      1994     66.17355432    -1
1      1995     51.94995761    -1
1      1996     61.3982235     -1
1      1997     38.33567411    -1
1      1998     34.43869895    -1
1      1999     28.71963116    -1
2      1975     14.3106        -1             Chinese-Taipe LL
2      1976     16.0662        -1
2      1977     12.3064        -1
2      1978     14.0685        -1
2      1979     16.532         -1
2      1980     17.3829        -1
2      1981     16.3676        -1
2      1982     20.168         -1
2      1983     19.0735        -1
2      1984     15.3925        -1
2      1985     13.0577        -1
2      1986     11.33          -1
2      1987     10.342         -1
2      1988     17.2733        -1
2      1989     14.2442        -1
2      1990     11.6289        -1
2      1991     9.6744         -1
2      1992     11.0432        -1
2      1993     14.2994        -1
2      1994     11.0544        -1
2      1995     17.2424        -1
2      1996     6.6744         -1
2      1997     7.9734         -1
2      1998     14.3053        -1
-1 end index data
#===============================================================================
# NOW ENTER IN THE VulnerabilitIES OR PARTIAL CATCHES FOR THE INDICES OF ABUNDANCE
#===============================================================================
#INDEX YEAR     AGE1    AGE 2   AGE 3   AGE 4   AGE 5   AGE 6   AGE 7   AGE 8
2      1975     1       8004    117604  136701  80679   45508   53501   28105
2      1976     1       20625   110919  267439  206916  127664  62566   29343
2      1977     1       25506   130719  122264  227435  142092  60194   39084
2      1978     1       2358    58387   111893  122751  125723  50297   15838
2      1979     1       32263   71613   48715   68205   51369   30048   62593
2      1980     1       14023   119100  111482  56875   34060   21647   48676
2      1981     1       29024   62736   96319   38412   26434   27092   69689
2      1982     1       67783   151933  119530  58476   53898   25025   115500
2      1983     1       49625   162733  239222  118373  100967  52898   82696
2      1984     1       56542   128831  167504  151424  79661   62894   136840
2      1985     1       31390   106341  135704  176272  102264  29379   165136
2      1986     1       32052   92679   207010  348902  142385  65886   124171
2      1987     1       85954   104652  60162   27649   27904   19321   61656
2      1988     1       4083    71760   42457   6332    2291    3959    13382
2      1989     1       13      26034   19085   21453   11262   1522    349
2      1990     1       8       8887    23971   38597   11777   1697    4862
2      1991     1       14      94566   27532   92448   23152   7031    12421
2      1992     1       289     17639   22351   22613   31948   17784   6396
2      1993     1       19154   84338   65883   69497   24628   33747   56260
2      1994     1       25322   39961   26040   10477   10969   22885   121014
2      1995     1       18269   88299   49967   45340   33248   12944   7432
2      1996     1       22114   48631   34637   24666   11195   7296    48784
2      1997     1       2994    99172   33814   16296   20193   14837   10667
2      1998     1       316     89790   33267   11842   14431   15955   17393
2      1999     1       530     169504  62954   24445   24473   25948   33850
-1 end index vulnerabilities
#===============================================================================
# NOW ENTER IN THE WEIGHTS AT AGE FOR THE INDICES OF ABUNDANCE (row=year, col=age)
#===============================================================================
#Index year     age 1   age 2   age 3   age 4   age 5   age 6   age 7   age 8
1      1975     2.59    5.88    10.55   15.19   18.75   22.92   29.64   38.99
-1
#===============================================================================
# NOW ENTER IN THE FECUNDITY AT AGE FOR THE SPAWNING STOCK BIOMASS (row=year, col=age)
  #===============================================================================
#year  age 1    age 2   age 3   age 4   age 5   age 6   age 7   age 8
1975   2.59     5.88    10.55   15.19   18.75   22.92   29.64   38.99
```

```
1976  2.52   5.94   10.27  15     19.17  23.57  28.9   39.01
1977  2.45   5.84   10.64  15.01  19.01  23.88  29.18  38.48
1978  2.69   6.2    10.55  15.04  19.59  23.54  28.78  39.14
1979  2.59   5.99   10.92  15.45  18.79  22.51  28.33  37.22
1980  2.65   6.03   10.57  15.81  19.06  22.93  26.91  37.07
1981  2.74   6.08   10.49  15.48  19.77  23.29  26.94  36.78
1982  2.49   5.88   10.67  15.75  18.61  21.58  26     36.37
1983  2.78   6.1    10.51  15.32  19.13  22.05  27.47  37.87
1984  2.84   6.01   10.64  15.18  19.32  21.58  26.02  37.14
1985  2.72   6.23   10.67  15.04  19.31  21.81  26.9   36.8
1986  2.64   6.1    10.66  15.21  19.06  22.83  28.87  37.45
1987  3.1    6.02   10.94  15.98  19.13  23.08  28.02  36.47
1988  2.81   6.28   10.88  15.28  19.6   23.18  28.08  37.33
1989  2.64   6.07   11.11  16.37  19     22.16  27.69  38.13
1990  2.65   6.07   10.7   15.39  19.54  22.37  27.46  38.1
1991  2.67   6.12   10.98  16.14  17.63  22.96  26.87  37.11
1992  2.68   6.08   10.7   15.56  18.64  22.22  28.49  38.84
1993  2.6    6.02   10.66  15.31  17.82  22.06  27.23  36.19
1994  2.56   6.04   10.86  15.66  19.27  22.01  27.25  36.83
1995  2.59   6.15   10.93  15.16  18.27  22.34  27.30  37.61
1996  2.62   6.37   11.09  15.62  18.87  21.98  27.60  36.84
1997  2.65   6.20   11.07  15.69  18.27  22.95  29.10  37.97
1998  2.65   6.02   10.89  15.97  18.36  22.28  27.75  37.89
1999  2.65   6.12   10.67  15.78  18.92  22.98  28.10  37.51
-1
################################################################################
# BEGIN INPUT FOR Zone/STOCK 2
################################################################################
```

APPENDIX 3. Sample tag-recovery data file with line numbers

===

First column of file

Line |

```
################################################################################
# TAG-RECOVERY DATA FILE FOR PROGRAM VPA-2BOX, Version 3.0
#      The data and specifications are entered in the order indicated
#      by the existing comments. Additional comments must be preceded by a # symbol
#      in the first column, otherwise the line is perceived as free format input.
################################################################################
#
#---------------------------------------------------------------------------
 # Release information
 #---------------------------------------------------------------------------
 # release zone
 # |   release year
 # |   |   release age
 # |   |   |       number released
 # |   |   |       |   time of year releaed (in months)
 # |   |   |       |   |     weight given to tagging data in objective function
 # |   |   |       |   |     |
   1   75  0       0.  0.0   1
   1   75  1       0.  0.0   1
   1   75  2       0.  0.0   1
   1   75  3       0.  0.0   1
   1   75  4       0.  0.0   1
   1   75  5       0.  0.0   1
   1   75  6       0.  0.0   1
   1   75  7       0.  0.0   1
   1   75  8       0.  0.0   1
   2   75  0       5.  6.8   1
   2   75  1     134.  7.1   1
   2   75  2      78.  6.9   1
   2   75  3      15.  7.1   1
   2   75  4      38.  7.7   1
   2   75  5       7.  8.1   1
   2   75  6       3.  8.7   1
   2   75  7       1.  7.0   1
   2   75  8       1.  7.0   1
   1   76  0       0.  0.0   1
   1   76  1       0.  0.0   1
   1   76  2       1.  9.0   1
   1   76  3       0.  0.0   1
   1   76  4       0.  0.0   1
   1   76  5       0.  0.0   1
   1   76  6       0.  0.0   1
   1   76  7       0.  0.0   1
   1   76  8       0.  0.0   1
   2   76  0       2.  7.5   1
   2   76  1     729.  7.0   1
   2   76  2     939.  7.0   1
   2   76  3     589.  7.0   1
   2   76  4       0.  0.0   1
   2   76  5       0.  0.0   1
   2   76  6       0.  0.0   1
   2   76  7       0.  0.0   1
   2   76  8       0.  0.0   1
  -1 end release data
 #---------------------------------------------------------------------------
 # Recapture data
 #---------------------------------------------------------------------------
 # release zone
 # |     release year
 # |     |   release age
 # |     |   |  recapture zone
 # |     |   |  |       number recaptured by year (from first to last)
 # |     |   |  |       |
 # |     |   |  |       1975   1976   1977 1978     1979   1980
   1     75  0  1       0.     0.     0.     0.     0.     0.
   1     75  0  2       0.     0.     0.     0.     0.     0.
   1     75  1  1       0.     0.     0.     0.     0.     0.
   1     75  1  2       0.     0.     0.     0.     0.     0.
   1     75  2  1       0.     0.     0.     0.     0.     0.
   1     75  2  2       0.     0.     0.     0.     0.     0.
```

1	75	3	1	0.	0.	0.	0.	0.	0.
1	75	3	2	0.	0.	0.	0.	0.	0.
1	75	4	1	0.	0.	0.	0.	0.	0.
1	75	4	2	0.	0.	0.	0.	0.	0.
1	75	5	1	0.	0.	0.	0.	0.	0.
1	75	5	2	0.	0.	0.	0.	0.	0.
1	75	6	1	0.	0.	0.	0.	0.	0.
1	75	6	2	0.	0.	0.	0.	0.	0.
1	75	7	1	0.	0.	0.	0.	0.	0.
1	75	7	2	0.	0.	0.	0.	0.	0.
1	75	8	1	0.	0.	0.	0.	0.	0.
1	75	8	2	0.	0.	0.	0.	0.	0.
2	75	0	1	0.	0.	0.	0.	0.	0.
2	75	0	2	0.	0.	0.	0.	0.	0.
2	75	1	1	0.	0.	0.	0.	0.	0.
2	75	1	2	8.	12.	1.	1.	0.	0.
2	75	2	1	0.	0.	0.	0.	0.	0.
2	75	2	2	9.	7.	1.	0.	0.	0.
2	75	3	1	0.	0.	0.	0.	0.	0.
2	75	3	2	3.	0.	0.	0.	0.	0.
2	75	4	1	0.	0.	0.	0.	0.	0.
2	75	4	2	2.	1.	0.	0.	0.	0.
2	75	5	1	0.	0.	0.	0.	0.	0.
2	75	5	2	0.	0.	0.	0.	0.	0.
2	75	6	1	0.	0.	0.	0.	0.	0.
2	75	6	2	0.	0.	0.	0.	0.	0.
2	75	7	1	0.	0.	0.	0.	0.	0.
2	75	7	2	0.	0.	0.	0.	0.	0.
2	75	8	1	0.	0.	0.	0.	0.	0.
2	75	8	2	0.	0.	0.	0.	0.	0.
1	76	0	1	0.	0.	0.	0.	0.	0.
1	76	0	2	0.	0.	0.	0.	0.	0.
1	76	1	1	0.	0.	0.	0.	0.	0.
1	76	1	2	0.	0.	0.	0.	0.	0.
1	76	2	1	0.	0.	0.	0.	0.	0.
1	76	2	2	0.	0.	0.	0.	0.	0.
1	76	3	1	0.	0.	0.	0.	0.	0.
1	76	3	2	0.	0.	0.	0.	0.	0.
1	76	4	1	0.	0.	0.	0.	0.	0.
1	76	4	2	0.	0.	0.	0.	0.	0.
1	76	5	1	0.	0.	0.	0.	0.	0.
1	76	5	2	0.	0.	0.	0.	0.	0.
1	76	6	1	0.	0.	0.	0.	0.	0.
1	76	6	2	0.	0.	0.	0.	0.	0.
1	76	7	1	0.	0.	0.	0.	0.	0.
1	76	7	2	0.	0.	0.	0.	0.	0.
1	76	8	1	0.	0.	0.	0.	0.	0.
1	76	8	2	0.	0.	0.	0.	0.	0.
2	76	0	1	0.	0.	0.	0.	0.	0.
2	76	0	2	0.	0.	0.	0.	0.	0.
2	76	1	1	0.	0.	0.	0.	0.	0.
2	76	1	2	0.	23.	33.	41.	3.	0.
2	76	2	1	0.	0.	0.	0.	0.	0.
2	76	2	2	0.	61.	4.	20.	3.	0.
2	76	3	1	0.	0.	0.	0.	1.	0.
2	76	3	2	0.	25.	19.	5.	1.	0.
2	76	4	1	0.	0.	0.	0.	0.	0.
2	76	4	2	0.	0.	0.	0.	0.	0.
2	76	5	1	0.	0.	0.	0.	0.	0.
2	76	5	2	0.	0.	0.	0.	0.	0.
2	76	6	1	0.	0.	0.	0.	0.	0.
2	76	6	2	0.	0.	0.	0.	0.	0.
2	76	7	1	0.	0.	0.	0.	0.	0.
2	76	7	2	0.	0.	0.	0.	0.	0.
2	76	8	1	0.	0.	0.	0.	0.	0.
2	76	8	2	0.	0.	0.	0.	0.	0.

-1 end of recapture data

APPENDIX 4. Sample parameter file with line numbers

First column of file

```
Line |
 1   ################################################################################
 2   # PARAMETER FILE FOR PROGRAM VPA-2BOX, Version 3.0
 3   #       The specifications are entered in the order indicated
 4   #       by the existing comments. Additional comments must be preceded by a # symbol
 5   #       in the first column, otherwise the line is perceived as free format input.
 6   #
 7   #       Each parameter in the model must have its own specification line unless a $
 8   #       symbol is placed in the first column followed by an integer value (n), which
 9   #       tells the program that the next n parameters abide by the same specifications.
10   #
11   #       The format of each specification line is as follows
12   #
13   #       column 1
14   #       |   number of parameter to which these specifications apply
15   #       |   |    lower bound
16   #       |   |    |       best estimate (prior expectation)
17   #       |   |    |       |       upper bound
18   #       |   |    |       |       |       method of estimation
19   #       |   |    |       |       |       |      standard deviation of prior
20   #       $   5    0       1.2     2.0     1      0.1
21   #
22   #       The methods of estimation include:
23   #       0       set equal to the value given for the best estimate (a fixed constant)
24   #       1       estimate in the usual frequentist (non-Bayesian) sense
25   #       2(0.1)  estimate as a random deviation from the previous parameter
26   #       3(0.2)  estimate as a random deviation from the previous constant or type 1 parameter
27   #       4(0.3)  estimate as random deviation from the best estimate.
28   #       -0.1    set equal to the value of the closest previous estimated parameter
29   #       -n      set equal to the value of the nth parameter in the list (estimated or not)
30   ################################################################################
31   #===============================================================================
32   # TERMINAL F PARAMETERS: (lower bound, best estimate, upper bound, indicator, reference age)
33   #       Note 1: the method indicator for the terminal F parameters is unique in that if it is
34   #       zero but the best estimate is set to a value < 9, then the 'best estimate'
35   #       is taken to be the vulnerability relative to the reference age in the last
36   #       (fifth) column.  Otherwise these parameters are treated the same as the
37   #       others below and the fifth column is the standard deviation of the prior.
38   #       Note 2: the last age is represented by an F-ratio parameter (below), so the number
39   #       of entries here should be 1 fewer than the number of ages
40   #-------------------------------------------------------------------------------
41   $ 1 0   .2     3  0   2       first age (here age 1)
42   $ 1 0   .4886  2  1  .1
43   $ 1 0   .5118  2  1  .1
44   $ 1 0   .1416  2  1  .1
45   $ 1 0   .2439  2  1  .1
46   $ 1 0   .1738  2  1  .1
47   $ 1 0   .9     2  0   6       next to last age
48   #===============================================================================
49   # F-RATIO PARAMETERS F{oldest}/F{oldest-1} one parameter (set of specifications) for each year
50   #-------------------------------------------------------------------------------
51   $ 25 0.1 1.0 5.0 0 .2 fixed
52   #===============================================================================
53   # NATURAL MORTALITY PARAMETERS: one parameter (set of specifications) for each age
54   #-------------------------------------------------------------------------------
55   $ 1  0  0.30 1.0  1    .1
56   $ 1  0  0.30 1.0  1    .1
57   $ 6  0  0.30 1.0 -0.1  .1
58   #===============================================================================
59   # MIXING PARAMETERS: one parameter (set of specifications) for each age
60   #-------------------------------------------------------------------------------
61   $ 8  0  0.0  1.0  0  .1
62   #===============================================================================
63   # STOCK-RECRUITMENT PARAMETERS: five parameters so 5 sets of specifications
64   #-------------------------------------------------------------------------------
65    0  0.11d+08  1.D20  0  0.4 maximum recruitment
66    0  0.85d+04  1.D20  0  0.0 spawning biomass scaling parameter
67    0  0.000     0.9    0  0.0 extra parameter (not used yet)
68    0  0         1      0  0   autocorrelation parameter
69    0  0.4       2      0  0   variance of random component (discounting the autocorrelation)
70   #===============================================================================
```

```
# VARIANCE SCALING PARAMETER (lower bound, best estimate, upper bound, indicator, std. dev.)
#   this parameter scales the input variance up or down as desired
#   In principal, if you estimate this you should obtain more accurate estimates of the
#   magnitude of the parameter variances-- all other things being equal.
#   (1 parameter so 1 set of specifications)
#-----------------------------------------------------------------------------
$ 1 0  0.5  1.0  1    .1
$ 1 0  0.5  1.0  -.1  .1
#=============================================================================
# CATCHABILITY PARAMETERS (do not try to estimate q's for indices you are not using!)#
#-----------------------------------------------------------------------------
# index 1
$ 1    0. .0      1.0  1  .2       estimate
$ 24   0. .00001  2.0 -.1 .2       set equal to above estimate
# index 2
$ 1    0. .00001  1.0  1  .2       1975    estimate
$ 23   0. .00001  1.0  3  .2       1976-98 random walk
$ 1    0. .0      1.0  0  .2       1999    ignore (don't estimate)
#=============================================================================
# FRACTION SURVIVING THE INITIAL TAGGING PROCESS (one line for each age)
#-----------------------------------------------------------------------------
$ 8 0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00
#=============================================================================
# TAG SHEDDING RATE
#-----------------------------------------------------------------------------
$ 8  0.0000D+00   0.2600D+00   0.1000D+01      0.0   0.1000D+00
#=============================================================================
# TAG REPORTING RATE
#-----------------------------------------------------------------------------
$ 1   0.0000D+00   0.2331D+00   0.1000D+01     1.0   0.1000D+00
$ 24  0.0000D+00   0.2331D+00   0.1000D+01     -.1    0.1000D+00
#=============================================================================
# pre-mixing adjustment first year
#-----------------------------------------------------------------------------
$ 1    0.0000D+00   1.00000000   0.5000D+01  1.0   0.1000D+00
$ 199  0.0000D+00   1.00000000   0.5000D+01  -.1   0.1000D+00
#=============================================================================
# pre-mixing adjustment first year
#-----------------------------------------------------------------------------
$ 200    0.0000D+00   1.00000000   0.5000D+01 0.0   0.1000D+00
@ end of file
```

7. INDEX

APPENDIX 3. WORKED EXAMPLE:

Atlantic Bluefin Tuna (2 stocks with mixing)

A3.1 Input data Files

There are three input files in this example:
- a Control file,
- an Input Data file,
- a Tagging data file, and
- a Parameter specification file

A3.1.1 Control File

```
###############################################################################
###              CONTROL FILE FOR PROGRAM VPA-2BOX, Version 2.0           ###
###############################################################################
#  INSTRUCTIONS: the control options are entered in the order specified.
#               Additional comment lines may be inserted anywhere in this
#               file provided they are preceded by a #,!, or * in the FIRST
#               column, otherwise the line is perceived as free-format data.
###############################################################################
'diffusion model T5P2R2L'            TITLE OF RUN
'MIX.d01'                DATA FILE
'MIX.p01'                PARAMETER FILE
'MIX.R01'                  RESULTS
'MIX.E01'                   PARAMETER ESTIMATES
'MIX.spd'                   spreadsheet
'tag-all.t01'                  TAGGING DATA FILE
2                            NUMBER OF AREAS
1                            MODEL_TYPE (0=SINGLE STOCK, 1=DIFFUSION, 2=OVERLAP)
 3 1.0  1 1 0 0 0 1 1 1 1 1 1 1 pDF OF TAG DATA,DOWNWEIGHTING DIVISOR, TIME OF YEAR WHEN FISHING SEASON BEGINS, DURATION OF FISHING
SEASON-- (<=0) DO NOT USE TAGGING DATA
-911                         SEED
 30                        maximum number of AMOEBA RESTARTS
 3                           CHECKFLAG
 .4                          PDEV
 -1                          SCALE (DIVIDE INDEX VALUES BY THEIR MEAN)- ANY VALUE > 0 = YES
0 1.0                        INDEX WEIGHTING (999) ESTIMATE BY MLE, (0) INPUT CV's, (+) DEFAULT CV, (-) = DEFAULT STD. DEV.
0                            VARIANCE OPTIONS (0) MULTIPLICATIVE or (1) ADDITIVE
 0 .4                        LINK THE SELECTIVITIES IN THE LAST N YEARS (0 or - = do not link)
 0 .1                        LINK THE RECRUITMENTS IN THE LAST N YEARS  (0 or - = do not link)
 0 .1 1.0                    LINK THE RECRUITMENTS OF THE TWO STOCKS (0 or - = do not link) AND RATIO OF MALES TO FEMALES AND
PENALTY SIGMA
 0  3                        IMPOSE STOCK RECRUITMENT RELATIONSHIP {pdf-- 0=none, 1=lognormal, 2=normal (negative indicates est.
sigma by concentrated likelihood)},{ignore last n years}
 1                           OPTION TO USE (1) F'S OR (2) N'S AS TERMINAL YEAR PARAMETERS
 -1                          ESTIMATE Q IN (+) SEARCH or (<0) by MLE's
 0 `1 -20                       BOOTSTRAP OPTION (0)=NONE, (N)=PERFORM N BOOTSTRAP REPLICATES, (-N)=PERFORM N MONTECARLO REPLICATES
0                            RETROSPECTIVE ANALYSIS, NUMBER OF YEARS TO STEP BACK FOR
84                           printer lines per page for graphics -- a negative integer means no graphics}
@EOF@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

                       OUTPUT OPTIONS: 1 = print N,F,indices for area 1
                                       2 = print N,F for area 1
                                       3 = print N,F,indices for both
                                       4 = print N,F for both areas
```

A.3.1.2 Input Data file

```
###############################################################################
###              INPUT FILE FOR PROGRAM VPA-2BOX, Version 2.0             ###
###############################################################################
#  INSTRUCTIONS: the control options are entered in the order specified by
#               the existing comments.  The existing comment blocks may be
#               expanded to as many lines as desired, however new comment
#               lines may not be placed anywhere in the file other than
#               immediately before or immediately after existing comments.
#               All comment lines must have one of the following four symbols
#               in the first column of the line:  #, !, *, or - .
#               Otherwise the line is perceived as free-format data input.
###############################################################################
# Bluefin Tuna 1970-97                 TITLE FOR THIS RUN
70 97                                FIRST AND LAST YEAR
1 10 10                                 FIRST AGE, LAST AGE AND PLUSGROUP AGE
################################################################################
# BEGIN INPUT FOR AREA 1
################################################################################
 8                    NUMBER OF INDICES TO USE
 6                    SPAWNING SEASON
 0 0 0 0.5 1 1 1 1 1 1 FECUNDITY (MATURITY) AT AGE
# TITLE                    PDF OF CATCH
# |                        |       UNITS (1=no's, 2=wt)
```

```
# |                         |       |
 'EAST'                     2       1
#________________________X__________________________________________________
# NOW ENTER THE CATCH-AT-AGE DATA. ROW=YEAR, COLUMN=AGE
#___________________________________________________________________________
70         131834   73211   26994   17842    9793    6523    4501    3254    6114   25014
71          10384   88198   50413   16589   12777    4390    4529    5157    4906   21189
72         116980  137100   73231   17152    9923    7289    4363    2521    2809   16079
73         140707   68048   71707   11121    3710    3659    6740    7668    7385   17757
74         182955  125976   64125   54045   11608    5786    3665    4894    8649   42935
75         692276  272026   45944   18469    6853    4582    3240    3527    4697   54436
76          96176  195792  236722   48724   18378    6163    3649    2317    3039   39367
77         220444  256835   75831   41725    6345    4861    4180    2639    2613   35976
78         176030  179228  131623   24546    5211    1702    2569    1828    1382   26483
79          77747   48322   82586   43682    8753    2691    2378    3797    3656   22807
80         181555  138196  112676   34813   10919    4745    3159    2246    2340   24568
81         153659  308374  112260   16763   12811    6096    4418    4737    3416   17651
82         610048  255871  180005   35080    6973    3594    5132    8972    5205   38888
83         661161  183593  117908   27771   11486    4906    8530    6412    5103   38832
84         167350  593304   77856   29822   19162    9733    5548    6303   10300   41385
85         211218  329782  277272   58541   14591    9209    4330    3627    3833   33306
86         589053  279348  169783   65035   12138    6547    3553    2306    3160   27540
87         231377  403819  123350   33317   13324    8403    8448    4599    4096   24101
88         764519  194898  224722   45555   12889   10546   12087    6687    5708   33569
89         427685  374544  104582   69006   39704    7228   10436    7301    5099   24004
90         390979  318667  195899   55194   38505    8399    7470   10924   12874   25255
91         257208  399047  189996   53999   40314    8501    5384    6126   13655   40469
92         426527  496269  274484   48134   16089    7918    7096    7639   10185   42593
93         291913  761131  365258   65159   26289   14508    8127    5584    6765   42839
94         273175  505865  160218   54239   37542   25496   20047   18932   22229   85868
95         397190  298948  271217   58546   37126   23756   15577   11943   15399   88172
96         473520  660055  220479  126894   38949   18317   16240   14690   17129   81033
97         310602  476212  160888   51831   43254   28100   18335   24970   29385   68633
-1 end of catch data
#_______________________X______________________________________________________
# NOW ENTER IN THE CPUE SPECIFICATIONS
#________________________X______________________________________________________
# GEAR, PDF, UNITS, SELECTIVITY (1 = fixed, 2 = fractional catches, 3 = partial catches, 4 = Butterworth)
# |     |    |     |     TIMING (-1 = AVERAGE DURING YEAR, POSITIVE INTEGER = NUMBER OF MONTHS ELAPSED)
# |     |    |     |     |       FIRST AGE, LAST AGE
# |     |    |     |     |       |         |       TITLE (IN SINGLE QUOTES)
  1     1    1     1    -1       2         2       'ESP BB'
  2     0    1     1    -1       2         2       'FRA PS Early 2'
  3     0    1     1    -1       2         2       'FRA PS Late 2'
  4     1    1     1    -1       3         3       'FRA PS Early 3'
  5     1    1     1    -1       3         3       'FRA PS Late 3'
  6     1    1     4    -1       4         10      'ESP TRAP 4+'
  7     1    1     4    -1       8         10      'JLL East&Med 8+'
  8     0    1     4    -1       8         10      'JLL Cent 8+'
-1 end index specifications
#_______________________X______________________________________________________
# NOW ENTER IN THE INDICES OF ABUNDANCE
#________________________X______________________________________________________
1       70      36.0200 0.2264         ESP BB  2
1       71      27.4700 0.2264
1       72      26.6600 0.2264
1       73      51.2400 0.2264
1       74      38.8000 0.2264
1       75      81.5200 0.2264
1       76      53.6400 0.2264
1       77      58.5800 0.2264
1       78      32.9900 0.2264
1       79      10.4000 0.2264
1       80      22.5600 0.2264
1       81      33.8500 0.2264
1       82      31.4600 0.2264
1       83      44.2000 0.2264
1       84      140.020 0.2264
1       85      67.8600 0.2264
1       86      48.5400 0.2264
1       87      86.0000 0.2264
1       88      59.7900 0.2264
1       89      63.1900 0.2264
1       90      33.6900 0.2264
1       91      63.8500 0.2264
1       92      64.6700 0.2264
1       93      142.970 0.2264
1       94      32.0100 0.2264
1       95      48.6200 0.2264
1       96      63.8500 0.2264
1       97      39.2000 0.2264
2       70      0.7600  1.6730         FRA PSM 2
2       71      1.1910  3.3900
2       72      1.6520  1.6820
2       73      0.9720  2.9410
2       74      1.6110  2.9460
2       75      6.3090  0.6510
2       76      1.9390  0.6920
2       77      5.6410  0.7150
2       78      2.4790  1.0350
2       79      3.1900  0.7290
2       80      1.3320  0.9440
2       81      7.5230  0.5760
3       82      3.6730  0.5270         FRA PSM Plane   2
3       83      3.3670  2.1230
3       84      4.8260  0.9570
3       85      1.7250  0.5350
```

```
3       86      0.7970  0.9630
3       87      3.0620  0.6850
3       88      1.3030  0.7120
3       89      5.2230  0.5520
3       90      3.5890  0.4680
3       91      3.5320  0.4420
3       92      5.1910  0.4420
3       93      1.6340  0.4430
3       94      0.2700  0.6480
3       95      2.0520  0.4810
3       96      3.9910  0.4880
3       97      6.3030  0.6400
4       70      1.0180  1.4780          FRA PSM 3
4       71      0.9860  1.5310
4       72      1.1130  1.8150
4       73      3.5220  1.4300
4       74      2.5780  2.4500
4       75      1.4380  1.1860
4       76      5.4630  0.6050
4       77      4.7490  1.1580
4       78      3.0500  1.1380
4       79      2.0540  0.9300
4       80      1.2550  1.2090
4       81      1.5160  0.8140
5       82      2.7160  0.5750          FRA PSM Plane   3
5       83      0.6480  4.1170
5       84      0.5220  1.8420
5       85      9.5740  0.4880
5       86      3.1420  0.9580
5       87      3.3500  0.7320
5       88      6.7800  0.6070
5       89      1.3990  0.7030
5       90      2.2640  0.5130
5       91      2.0630  0.4860
5       92      3.2030  0.4650
5       93      2.7260  0.4660
5       94      1.2470  0.5600
5       95      2.8260  0.4620
5       96      2.4400  0.5000
5       97      0.7490  0.9710
6       81      79.9179  0.4426   Spanish trap 4+
6       82      81.2069  0.2565
6       83      90.1072  0.2565
6       84      76.0203  0.2565
6       85      75.6411  0.2565
6       86      39.2127  0.2235
6       87      39.4881  0.2317
6       88      63.2440  0.2235
6       89      67.3565  0.2235
6       90      66.2212  0.2235
6       91      61.8060  0.2235
6       92      50.9070   0.232
6       93      42.1401  0.2313
6       94      41.4712  0.2317
6       95      39.9249  0.2312
6       96      38.4362  0.2235
6       97      94.0663  0.2235
7       75      0.6341  0.2290          Japan  LL E & Med       8+
7       76      0.8375  0.2297
7       77      1.2610  0.2352
7       78      0.6077  0.2329
7       79      0.4925  0.2502
7       80      0.6912  0.2400
7       81      0.5825  0.2438
7       82      0.9978  0.2349
7       83      0.5558  0.2307
7       84      0.5178  0.2268
7       85      0.5739  0.2374
7       86      0.5237  0.2311
7       87      0.9178  0.2389
7       88      0.5203  0.2333
7       89      0.3695  0.2428
7       90      0.4469  0.2334
7       91      0.6236  0.2346
7       92      0.3344  0.2304
7       93      0.3990  0.2371
7       94      0.3557  0.2454
7       95      0.4142  0.2300
7       96      0.1049  0.2384
7       97      0.1880  0.2391
8       90      0.2179  0.3440          Japan  LL Cent  8+
8       91      0.1889  0.3472
8       92      0.2938  0.2975
8       93      0.1455  0.2696
8       94      0.2607  0.3001
8       95      0.5086  0.2748
8       96      0.3809  0.3027
8       97      0.3142  0.3177
-1 end index data
#_______________________X_____________________________________________________________
# NOW ENTER IN THE SELECTIVITIES OR PARTIAL CATCHES FOR THE INDICES OF ABUNDANCE
#________________________X_____________________________________________________________
6         70   0 0 0        0        27        61       259       488      1536      6482   spanish traps 4+
6         71   0 0 0        0         0         6        21        41       186      2557
6         72   0 0 0       24         4        32        48        81        84      1068
6         73   0 0 0        0         0        31        28       154       244      2262
6         74   0 0 0        0         0         0         0         1         4        59
```

```
6    75  0 0 0   0     8     0     0    14    52   1920
6    76  0 0 0   0     0     0     0    14    14   2086
6    77  0 0 0   0     0     0    64   110   124   1504
6    78  0 0 0   0     0    10    34   167   195   1786
6    79  0 0 0   0    81   176   226   343   556   2338
6    80  0 0 0   0    39   125   479   267   252   2790
6    81  0 0 0   0   160   761  1161  1566   520   2192
6    82  0 0 0   0   125   445  1656  1638  1752   6759
6    83  0 0 0   0     0     0     0   268   492   8620
6    84  0 0 0   0    97   135   490  1105  2846   9675
6    85  0 0 0   3   121   611   168   306   514   6128
6    86  0 0 0   0     0    33   114    96   160   3278
6    87  0 0 0   0     8   110   123   130   174   3749
6    88  0 0 0   0    29   358   325   369   457   9779
6    89  0 0 0   1   147   628  1073  1101   583   3391
6    90  0 0 0  28   247   473   915  2032  2329   4760
6    91  0 0 0   5   248   725   365   651   972   3215
6    92  0 0 0  26   184   624  1298   954   925   3394
6    93  0 0 0   0     5    57   114   290   630   4907
6    94  0 0 0   0    15    54   137   226   341   4184
6    95  0 0 0   5    75    32    72   228   739   3815
6    96  0 0 0  31    78   116   136   160   375   4133
6    97  0 0 0  80   882  1347   869  1440  1568   9108
7    72  0 0 0 0 0 0 0 0   131   240   997     Japan E & C 8+
7    73  0 0 0 0 0 0 0 0   78    68    1302
7    74  0 0 0 0 0 0 0 0   1454  1186  19510
7    75  0 0 0 0 0 0 0 0   884   943   26817
7    76  0 0 0 0 0 0 0 0   354   405   14117
7    77  0 0 0 0 0 0 0 0   1224  1736  8539
7    78  0 0 0 0 0 0 0 0   114   21    2968
7    79  0 0 0 0 0 0 0 0   2264  1460  508
7    80  0 0 0 0 0 0 0 0   539   694   2641
7    81  0 0 0 0 0 0 0 0   653   522   2176
7    82  0 0 0 0 0 0 0 0   4691  199   14494
7    83  0 0 0 0 0 0 0 0   2327  1861  10641
7    84  0 0 0 0 0 0 0 0   1924  3684  7409
7    85  0 0 0 0 0 0 0 0   503   451   6042
7    86  0 0 0 0 0 0 0 0   410   547   4584
7    87  0 0 0 0 0 0 0 0   821   781   4688
7    88  0 0 0 0 0 0 0 0   1187  1078  4556
7    89  0 0 0 0 0 0 0 0   1085  890   2852
7    90  0 0 0 0 0 0 0 0   1690  2280  5119
7    91  0 0 0 0 0 0 0 0   2055  3856  9729
7    92  0 0 0 0 0 0 0 0   1979  3244  12551
7    93  0 0 0 0 0 0 0 0   1233  1228  10338
7    94  0 0 0 0 0 0 0 0   2519  2467  7407
7    95  0 0 0 0 0 0 0 0   2935  4191  13361
7    96  0 0 0 0 0 0 0 0   3995  4396  12032
7    97  0 0 0 0 0 0 0 0   3895  5659  8814
8    70  0 0 0 0 0 0 0 0   0     0     0         Japan C 8+
8    71  0 0 0 0 0 0 0 0   3     11    203
8    72  0 0 0 0 0 0 0 0   4     0     4
8    73  0 0 0 0 0 0 0 0   0     0     20
8    74  0 0 0 0 0 0 0 0   32    75    2777
8    75  0 0 0 0 0 0 0 0   0     16    132
8    76  0 0 0 0 0 0 0 0   0     1     1357
8    77  0 0 0 0 0 0 0 0   0     2     489
8    78  0 0 0 0 0 0 0 0   0     0     0
8    79  0 0 0 0 0 0 0 0   0     0     1
8    80  0 0 0 0 0 0 0 0   33    16    18
8    81  0 0 0 0 0 0 0 0   1     1     5
8    82  0 0 0 0 0 0 0 0   2     0     18
8    83  0 0 0 0 0 0 0 0   0     0     0
8    84  0 0 0 0 0 0 0 0   7     18    37
8    85  0 0 0 0 0 0 0 0   39    22    22
8    86  0 0 0 0 0 0 0 0   17    45    277
8    87  0 0 0 0 0 0 0 0   20    60    7
8    88  0 0 0 0 0 0 0 0   12    19    50
8    89  0 0 0 0 0 0 0 0   232   154   101
8    90  0 0 0 0 0 0 0 0   454   706   1650
8    91  0 0 0 0 0 0 0 0   927   1557  4772
8    92  0 0 0 0 0 0 0 0   623   765   2160
8    93  0 0 0 0 0 0 0 0   973   471   1108
8    94  0 0 0 0 0 0 0 0   1114  994   1094
8    95  0 0 0 0 0 0 0 0   2145  2926  1833
8    96  0 0 0 0 0 0 0 0   3589  3930  6303
8    97  0 0 0 0 0 0 0 0   2895  4152  4633
-1 -1 end index selectivities
#_____________________________________X_____________________________________
# NOW ENTER IN THE WEIGHTS AT AGE FOR THE INDICES OF ABUNDANCE (row=year, col=age)
#_____________________________________X_____________________________________
-1
#_____________________________________X_____________________________________
# NOW ENTER IN THE WEIGHTS AT AGE FOR THE SPAWNING STOCK BIOMASS (row=year, col=age)
#_____________________________________X_____________________________________
70   4.5   10     21.7   35.1   53     72.7   95.5   117.6   146.5   219.5
71   4.6   10.1   19     35.3   54.1   72.3   96.1   119.7   144.4   265.4
72   4.5   10.6   20.1   34.6   55.4   73     94.6   117.3   147     274.9
73   4     10.2   19     32.6   54.2   73.2   97.7   121.2   141.9   268
74   4.1   11     21.2   35.7   53.7   74.1   97.1   121.9   152.4   265.1
75   4.2   10.9   21.4   36.8   52.3   72.5   94.2   122     148.7   260.9
76   4.5   11.9   19.8   35.6   53.6   74.9   94.9   120.9   152     278.8
77   4.1   10.9   22.6   35.3   56.1   74.3   94.4   116     140.7   282.6
78   5.3   10.2   21.3   36     54.6   72.7   95     121.6   145.1   278.8
79   4.6   12     21.3   35.5   52     71.6   92.2   113.7   137.9   273.1
80   4.8   10.9   18.7   31.9   51.7   72.7   93.2   116.1   143.4   257.6
81   4.8   11.1   18.6   32     52.8   72     93.5   115.6   143.6   240.6
```

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82      5.4     12.3    21.4    35.1    52.1    73.1    93.6    113.1   142.6   243
83      5       12.2    19.9    34      53.5    73.3    99.7    117.9   144.5   224.3
84      5.1     10.9    22.2    34.7    52      75.4    95.3    118.3   143.4   237.9
85      5.1     11      22.4    35.9    53.3    74.9    96.7    121.2   148.4   240.6
86      5       11.4    19.7    34.8    53.5    72.6    96.7    119.9   145.7   245
87      5.1     10.7    18.7    35.3    53.4    72.8    97      119.5   145.8   238
88      4.9     10.9    20.1    36      53.7    75.4    98.3    121     146.9   240.2
89      5.4     10.7    21.3    32.5    44.9    73.3    97.8    117.6   145.4   247.6
90      4.4     10.1    18.2    33      52.2    72.8    96.3    118.7   145.5   227.4
91      4.8     10.4    19.1    33.8    54.5    73.7    95.8    119.6   146.1   216
92      4.3     11      19.5    32.1    56.4    73.2    96.2    118.5   144.8   217.6
93      4.5     10.2    17.8    34.2    53.2    76.8    97.3    122.8   147.8   243.8
94      5.7     9.6     20.7    36.6    53.7    73.2    96.9    120.7   145.3   240.3
95      5.2     11.6    19.2    32.9    56.4    74.5    96.1    121     144.7   244.3
96      4.8     9.4     21.1    34.2    52.5    73.8    96.3    122.2   148.2   238.3
97      4.9     11.4    20.3    34.7    52.3    72.2    95.3    120     147     217.5
-1
###############################################################################
# BEGIN INPUT FOR AREA 2
###############################################################################
 15                    NUMBER OF INDICES AVAILABLE
 6                     SPAWNING SEASON
 0 0 0 0 0 0 0 1 1 1 FECUNDITY (MATURITY) AT AGE
# TITLE                     PDF OF CATCH
# |                         |       UNITS (1=no's, 2=wt)
```

```
# |                          |       |
 'WEST'                      2       1
#_________________________X_______________________________________________________
# NOW ENTER THE CATCH-AT-AGE DATA. ROW=YEAR, COLUMN=AGE
#_________________________________________________________________________________
      70      64886     105064     127518      21455       3677        914        176        162        514       3673
      71      62998     153364      38360      46074        672       1673       2109       1350       1133       5958
      72      45402      98578      33762       3730       3857        118        569        576        261       5519
      73       5105      74311      30482       7161       2132       1451        953       1544        555       4445
      74      55958      20056      21094       6506       3170        683        916        913       1081      12507
      75      43556     148027       8328      11963        821        547        317        671       1651       9473
      76       5412      19781      72393       2910       2899        344        206       1168        558      14033
      77       1274      22419       9717      32139       4946       3633        957        513       1109      13532
      78       5133      10863      20015       6315      10530       4061        655        472        341      11982
      79       2745      10552      16288      14916       3448       3494       2612        599        557      12281
      80       3160      16183      11068       8881       2866       2982       5533       3454       1061      12214
      81       6087       9616      16541       5244       6023       3721       2884       3211       2764      10621
      82       3528       3729       1654        498        342        751        477        519        896       3077
      83       4173       2438       3268        894        866        911       1402       1353       1039       5628
      84        868       7504       1848       2072       2077       1671        594        759       1091       4575
      85        568       5523      12310       2814       4329       4019       1024        612        696       5603
      86        563       5939       7135       3442       1128       1726        931        520        345       5335
      87       1513      13340       9137       5491       4385       2318       1566       1251       1014       3856
      88       4850       9149      11745       3933       4144       4220       2258       1631       1600       4554
      89        787      12877       1679       3815       1713       2082       2677       1864       1461       5356
      90       2368       4238      17958       1947       2747       1825       1629       2388       1522       4253
      91       3327      14533      10761       2924       1650       2166       2347       1946       1915       4485
      92        420       5985       1997        711       1425        737       1916       1870       1323       4383
      93        329       1130       5215       3689       2089       1883       1598       2456       1479       2922
      94       1990        697       1538       2283       2735       1687       2107       2408       1477       3013
      95       1036       1229       3549       3476       4399       2572        904       1810       1802       3389
      96        261       6753       1449       3894       2120       1643       3029       1021       1311       4006
      97        185        990       6481        827       1669       1403       2238       2190        973       3973
 -1 end of catch data
#________________________X__________________________________________________________
# NOW ENTER IN THE CPUE SPECIFICATIONS
#_________________________X__________________________________________________________
# GEAR, PDF, UNITS, SELECTIVITY (1 = fixed, 2 = fractional catches, 3 = partial catches)
# |     |    |      |     TIMING (-1 = AVERAGE DURING YEAR, POSITIVE INTEGER = NUMBER OF MONTHS ELAPSED)
# |     |    |      |     |       FIRST AGE, LAST AGE
# |     |    |      |     |       |          |      TITLE (IN SINGLE QUOTES)
  1     1    1      1     -1      10         10     'CAN GSL'
  2     1    1      4     -1      7          10     'CAN SWNS'
  3     1    1      1      0      10         10     'JLL GOM'
  4     0    1      4      0      2           9     'DUMMY     '
  5     1    1      4      0      2           9     'JLL NW ATL'
  6     1    2      1     -1      8          10     'LARVAL'
  7     1    1      4      0      8          10     'US LL GOM'
  8     1    1      4      -1     2          3      'US RR 66-114'
  9     1    1      4      -1     4          5      'US RR 115-144'
 10     1    1      4      -1     1          5      'US RR <145'
 11     1    1      1      -1     6          6      'US RR 145-177'
 12     0    1      4      -1     7          10     'US RR >178'
 13     0    1      4      -1     8          10     'US RR >195'
 14     1    1      1    -1       1          3      'TAGGING'
 15     1    1      4    -1       8          10     'US RR >195 C'
-1 end index specifications
```

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#_______________________X_________________________________________________________
# NOW ENTER IN THE INDICES OF ABUNDANCE
#________________________X_________________________________________________________
          1          81       6.072       0.289
          1          82       5.578       0.285
          1          83       7.673       0.273
          1          84       4.414        0.29
          1          85       1.643       0.307
          1          86       1.829        0.35
          1          87       0.963       0.526
          1          88       1.805       0.407
          1          89       2.112       0.412
          1          90       1.048       0.396
          1          91       1.975       0.426
          1          92       2.874       0.357
          1          93       2.153       0.322
          1          94       0.629        0.38
          1          95        2.95       0.286
          1          96       0.767       0.287
          1          97       0.823       0.287
          2          88       2.947       0.332
          2          89       4.907       0.304
          2          90        4.05       0.304
          2          91       3.195       0.304
          2          92       2.845       0.243
          2          93       1.062       0.236
          2          94       2.177       0.249
          2          95       1.851       0.235
          2          96        0.65       0.244
          2          97        0.75       0.246
3    74   0.968   0.266
3    75   0.534   0.205
3    76   0.666   0.207
3    77   0.913   0.216
3    78   0.876   0.225
3    79   1.287   0.283
3    80   1.158   0.265
3    81   0.553   0.239
          4          70          -1           1     this index is not useful
          5          76       0.269       0.468
          5          77       0.933       0.286
          5          78        0.46       0.349
          5          79       0.318       0.373
          5          80       0.551       0.304
          5          81       0.765       0.275
          5          82       0.235       0.418
          5          83       0.109        0.67
          5          84       0.325       0.367
          5          85       0.437       0.324
          5          86       0.066       1.405
          5          87       0.301       0.419
          5          88       0.408       0.335
          5          89       0.333       0.372
          5          90       0.292       0.393
          5          91        0.26       0.421
          5          92       0.552       0.344
          5          93         0.6       0.309
          5          94       0.493       0.316
          5          95       0.402       0.381
          5          96       1.176       0.324
          5          97       0.617       0.344
          6          77       2.435      0.4333
          6          78       5.824      0.2725
          6          79        -999        -999
          6          80        -999        -999
          6          81       1.277      0.4325
          6          82       1.514      0.3112
          6          83       1.235      0.3083
          6          84       0.653      0.8016
          6          85        -999        -999
          6          86       0.261      0.6058
          6          87       0.445      0.5075
          6          88       1.946      0.3262
          6          89       0.798      0.4395
          6          90       0.474      0.2000
          6          91       0.365      0.5940
          6          92       0.614      0.3820
          6          93       0.667      0.6145
          6          94        0.72      0.4049
          6          95       0.465      0.5850
          6          96       1.458      0.6301
          6          97       0.619      0.4483
          7          87        0.88     0.29169
          7          88         0.4     0.45147
          7          89         0.7     0.31119
          7          90        0.85     0.30889
          7          91           1     0.30063
          7          92        0.24     0.52874
          7          93        0.23     0.56165
          7          94         0.1     0.90025
          7          95        0.17      0.6834
          7          96        0.18     0.69573
          7          97        0.31     0.53595
          8          93         0.4       0.472
          8          94        0.09       1.482
          8          95        0.22       0.617
          8          96        0.72       0.341
```

```
           8           97            1        0.286
           9           93        0.461        1.004
           9           94        0.043        4.698
           9           95        0.198        1.327
           9           96            1        0.585
           9           97        0.325        1.373
          10           80         0.38         0.43
          10           81         0.19         0.52
          10           82            1         0.33
          10           83         0.53         0.26
          10           84         -999         -999
          10           85          0.3         0.64
          10           86         0.37         0.43
          10           87         0.58          0.4
          10           88         0.47         0.38
          10           89         0.47         0.43
          10           90         0.43         0.34
          10           91          0.6         0.35
          10           92         0.39         0.42
          11           93        0.409       2.1704
          11           94       1.0959       1.1333
          11           95       1.5322       1.0936
          11           96        1.632       0.9627
          11           97       0.3309       4.7427
          12           93       0.5967        0.553
          12           94       0.6932       0.5256
          12           95       0.9522        0.365
          12           96       1.8196       0.2792
          12           97       0.9382       0.6387
          13           83       2.8049   0.2    0.0995
          13           84       1.2456   0.2    0.1884
          13           85       0.8571       0.2997
          13           86       0.5027       1.0973
          13           87        0.529       0.4761
          13           88       0.9412       0.3639
          13           89       0.7632       0.3636
          13           90        0.626       0.3354
          13           91       0.8205       0.2842
          13           92         0.91       0.2763
          14           70      1065132          0.2
          14           71      1001624          0.2
          14           72       431955          0.2
          14           73       183616          0.2
          14           74       341589          0.2
          14           75       554596          0.2
          14           76       253265          0.2
          14           77       257385          0.2
          14           78       121110          0.2
          14           79        98815          0.2
          14           80       192541          0.2
          14           81       337995        0.242
15    83   1.923    0.242    0.2  0.043
15    84   1.136    0.256    0.2  0.056
15    85   0.714    0.277    0.2  0.092
15    86   0.712    0.602         0.269
15    87   0.711   0.340    0.2  0.120
15    88   0.828    0.287    0.2  0.110
15    89   0.853    0.296    0.2  0.105
15    90   0.755    0.293    0.2  0.092
15    91   0.961    0.276    0.2  0.079
15    92   0.912    0.274    0.2  0.081
15    93   0.681    0.369    0.2  0.146
15    94   0.683    0.384    0.2  0.167
15    95   1.031    0.305    0.2  0.083
15    96   1.772    0.344    0.2  0.119
15    97   1.327    0.333    0.2  0.082
-1 end index data
#________________________X_____________________________________________________________
# NOW ENTER IN THE SELECTIVITIES OR PARTIAL CATCHES FOR THE INDICES OF ABUNDANCE
#_________________________X_____________________________________________________________
      1       70 0 0 0 0 0 0 0 0 0      0.5
      1       71 0 0 0 0 0 0 0 0 0      0.5
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4   77 0   9702   2081   2543    704    260    323   8972  0
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4   84 0   1701   1922   1471    454    409    350    324  0
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4   86 0   2688    999   1492    726    381    161    232  0
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4   88 0   3325   2917   3345   1693    806    296    382  0
4   89 0    685    728   1058   1028    435    187    291  0
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4   95 0    766   1571   2003    148    221     17      0  0
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5   72 0     42     60     21    166     45    166    404     88  0
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5   75 0     35     63     91    185      7    219    503   1491  0
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5   80 0    534   1896   2900   1283   2802   5433   2948    884  0
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      15       86    0 0 0 0 0 0 0     63       68      1019
      15       87    0 0 0 0 0 0 0     96      121       951
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-1 -1 end index selectivities
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```
#____________________________________X_____________________________________
# NOW ENTER IN THE WEIGHTS AT AGE FOR THE INDICES OF ABUNDANCE (row=year, col=age)
#____________________________________X_____________________________________
 6   70   3.2   8.4    17  37.4  56.3  79.7  112.9  148.3    172  270.35
 6   71   3.5   8.4  21.2    32  60.3    82  108.5  135.1  169.2   267.2
 6   72   4.4   9.7  19.3  40.7  57.6  84.8  114.9  137.5  171.9   283.2
 6   73   3.7   8.9  20.8  39.9  62.4  77.5  119.5  142.7  172.7  287.96
 6   74   3.6    10  17.2  36.8  57.1  82.9  102.5  138.5  169.2  295.51
 6   75   3.9   8.7  23.8  34.2  58.6  78.5  114.7  141.3  164.8  278.05
 6   76   3.9  10.3  18.9  34.1  51.9  81.1  119.4  152.2  171.8   277.7
 6   77   4.4  10.3  20.8  35.3  52.4  74.8   97.9  136.5  165.3  292.41
 6   78     5  10.8  21.7  35.5  54.4  73.6    107  145.3    183  318.14
 6   79   5.3  11.2  21.9  39.2  50.8  78.7  105.8  141.1  179.2  307.38
 6   80     5  12.2  21.4  35.7  53.3  84.6  114.4  140.6  186.7  320.53
 6   81   5.6    11  21.5  34.7  52.3  77.6  107.2  141.1  174.2  328.21
 6   82     4  10.8  21.3  34.3  59.6    82  115.3  150.1  181.6  316.21
 6   83   3.9  10.1    20  37.9    59  84.5  116.3    149  184.7  312.89
 6   84   4.7  11.2  23.6  39.5    60  85.9  116.4  148.3    183  299.45
 6   85   3.7  10.2  17.3  33.3    49  70.9   98.4  131.3  170.2  279.13
 6   86   4.2   9.9  20.2  41.2    57  84.8  116.3  148.5  180.9  299.15
 6   87   4.2   9.7  22.7  40.2  58.5  75.8  109.1  138.1  169.4  299.01
 6   88   3.9  11.4  21.1  38.5    58  81.2  108.3  142.9  179.4  293.58
 6   89   3.9    11  22.4  39.5  55.1  84.4  113.9  141.9  176.7  283.79
 6   90   4.5  11.4    19    39  55.7  77.9  111.6  146.6  179.4  286.62
 6   91   5.1  13.1  20.1    42  61.8  86.4  115.7  151.9  181.3  279.37
 6   92   5.7  12.6    19  39.7  58.7    83  112.1  140.9  179.8  275.15
 6   93   4.4  11.2    25  38.2  56.4  82.5  109.6  143.2  174.3   292.6
 6   94   4.8  11.6  23.7  34.5  52.2  74.5  111.1  137.6  176.4  272.81
 6   95   4.4  13.4  23.1  40.3  62.8  85.4  109.3  145.9    175  295.95
 6   96   3.6  11.1  24.6  38.6  55.8  85.6  113.4  144.9  185.8  287.81
 6   97   4.7  12.3  20.6  42.5  60.3  85.5  113.1  142.6  177.6  288.44
 -1
#____________________________________X_____________________________________
# NOW ENTER IN THE WEIGHTS AT AGE FOR THE SPAWNING STOCK BIOMASS (row=year, col=age)
#____________________________________X_____________________________________
     70   3.2   8.4    17  37.4  56.3  79.7  112.9  148.3    172  270.35
     71   3.5   8.4  21.2    32  60.3    82  108.5  135.1  169.2   267.2
     72   4.4   9.7  19.3  40.7  57.6  84.8  114.9  137.5  171.9   283.2
     73   3.7   8.9  20.8  39.9  62.4  77.5  119.5  142.7  172.7  287.96
     74   3.6    10  17.2  36.8  57.1  82.9  102.5  138.5  169.2  295.51
     75   3.9   8.7  23.8  34.2  58.6  78.5  114.7  141.3  164.8  278.05
     76   3.9  10.3  18.9  34.1  51.9  81.1  119.4  152.2  171.8   277.7
     77   4.4  10.3  20.8  35.3  52.4  74.8   97.9  136.5  165.3  292.41
     78     5  10.8  21.7  35.5  54.4  73.6    107  145.3    183  318.14
     79   5.3  11.2  21.9  39.2  50.8  78.7  105.8  141.1  179.2  307.38
     80     5  12.2  21.4  35.7  53.3  84.6  114.4  140.6  186.7  320.53
     81   5.6    11  21.5  34.7  52.3  77.6  107.2  141.1  174.2  328.21
     82     4  10.8  21.3  34.3  59.6    82  115.3  150.1  181.6  316.21
     83   3.9  10.1    20  37.9    59  84.5  116.3    149  184.7  312.89
     84   4.7  11.2  23.6  39.5    60  85.9  116.4  148.3    183  299.45
     85   3.7  10.2  17.3  33.3    49  70.9   98.4  131.3  170.2  279.13
     86   4.2   9.9  20.2  41.2    57  84.8  116.3  148.5  180.9  299.15
     87   4.2   9.7  22.7  40.2  58.5  75.8  109.1  138.1  169.4  299.01
     88   3.9  11.4  21.1  38.5    58  81.2  108.3  142.9  179.4  293.58
     89   3.9    11  22.4  39.5  55.1  84.4  113.9  141.9  176.7  283.79
     90   4.5  11.4    19    39  55.7  77.9  111.6  146.6  179.4  286.62
     91   5.1  13.1  20.1    42  61.8  86.4  115.7  151.9  181.3  279.37
     92   5.7  12.6    19  39.7  58.7    83  112.1  140.9  179.8  275.15
     93   4.4  11.2    25  38.2  56.4  82.5  109.6  143.2  174.3   292.6
     94   4.8  11.6  23.7  34.5  52.2  74.5  111.1  137.6  176.4  272.81
     95   4.4  13.4  23.1  40.3  62.8  85.4  109.3  145.9    175  295.95
```

96	3.6	11.1	24.6	38.6	55.8	85.6	113.4	144.9	185.8	287.81
97	4.7	12.3	20.6	42.5	60.3	85.5	113.1	142.6	177.6	288.44

-1

A.3.1.3 Tagging Data file

```
#-----------------------------------------------------------------------
# Release information
#-----------------------------------------------------------------------
# release area
# |   release year
# |   |   release age
# |   |   |       number released
# |   |   |       |   time of year releaed (in months)
# |   |   |       |   |     weight given to tagging data in objective function (acts like a standard deviation)
# |   |   |       |   |     |
  1   70  0       0.  0.0   1
  1   70  1       0.  0.0   1
  1   70  2       0.  0.0   1
  1   70  3       0.  0.0   1
  1   70  4       0.  0.0   1
  1   70  5       0.  0.0   1
  1   70  6       0.  0.0   1
  1   70  7       0.  0.0   1
  1   70  8       0.  0.0   1
  1   70  9       0.  0.0   1
  1   70 10       0.  0.0   1
  2   70  0       6.  7.3   1
  2   70  1     212.  7.8   1
  2   70  2      24.  7.8   1
  2   70  3      72.  8.1   1
  2   70  4       2.  7.5   1
  2   70  5       1.  8.0   1
  2   70  6       1.  8.0   1
  2   70  7       0.  0.0   1
  2   70  8       3.  7.3   1
  2   70  9      18.  5.6   1
  2   70 10     218.  6.2   1
  1   71  0       0.  0.0   1
  1   71  1       0.  0.0   1
  1   71  2       0.  0.0   1
  1   71  3       0.  0.0   1
  1   71  4       0.  0.0   1
  1   71  5       0.  0.0   1
  1   71  6       0.  0.0   1
  1   71  7       0.  0.0   1
  1   71  8       0.  0.0   1
  1   71  9       0.  0.0   1
  1   71 10       0.  0.0   1
  2   71  0       0.  0.0   1
  2   71  1     162.  8.0   1
  2   71  2     170.  7.9   1
  2   71  3      11.  8.0   1
  2   71  4       5.  7.8   1
  2   71  5       1.  7.0   1
  2   71  6       1.  8.0   1
  2   71  7       0.  0.0   1
  2   71  8       0.  0.0   1
  2   71  9       5.  5.8   1
  2   71 10      77.  6.5   1
  1   72  0       0.  0.0   1
  1   72  1       0.  0.0   1
  1   72  2       0.  0.0   1
  1   72  3       0.  0.0   1
  1   72  4       0.  0.0   1
  1   72  5       0.  0.0   1
  1   72  6       0.  0.0   1
  1   72  7       0.  0.0   1
  1   72  8       0.  0.0   1
  1   72  9       0.  0.0   1
  1   72 10       0.  0.0   1
  2   72  0       1. 10.0   1
  2   72  1     110.  8.4   1
  2   72  2      76.  9.0   1
  2   72  3       8.  8.5   1
  2   72  4       0.  0.0   1
  2   72  5       1.  7.0   1
  2   72  6       2.  7.5   1
  2   72  7       0.  0.0   1
  2   72  8       1.  8.0   1
  2   72  9       2.  8.5   1
  2   72 10      82.  7.1   1
  1   73  0       0.  0.0   1
  1   73  1       0.  0.0   1
  1   73  2       0.  0.0   1
  1   73  3       0.  0.0   1
  1   73  4       0.  0.0   1
  1   73  5       0.  0.0   1
  1   73  6       0.  0.0   1
  1   73  7       0.  0.0   1
  1   73  8       0.  0.0   1
  1   73  9       0.  0.0   1
  1   73 10       0.  0.0   1
  2   73  0      42.  9.8   1
  2   73  1      46.  7.6   1
  2   73  2     187.  7.3   1
  2   73  3      24.  8.0   1
  2   73  4       1.  8.0   1
  2   73  5       0.  0.0   1
```

2	73	6	1.	7.0	1
2	73	7	0.	0.0	1
2	73	8	0.	0.0	1
2	73	9	2.	7.5	1
2	73	10	44.	5.7	1
1	74	0	4.	12.0	1
1	74	1	0.	0.0	1
1	74	2	0.	0.0	1
1	74	3	0.	0.0	1
1	74	4	0.	0.0	1
1	74	5	0.	0.0	1
1	74	6	0.	0.0	1
1	74	7	0.	0.0	1
1	74	8	0.	0.0	1
1	74	9	0.	0.0	1
1	74	10	0.	0.0	1
2	74	0	10.	7.8	1
2	74	1	1326.	7.3	1
2	74	2	189.	7.6	1
2	74	3	137.	7.8	1
2	74	4	10.	8.0	1
2	74	5	0.	0.0	1
2	74	6	0.	0.0	1
2	74	7	0.	0.0	1
2	74	8	0.	0.0	1
2	74	9	0.	0.0	1
2	74	10	32.	6.2	1
1	75	0	0.	0.0	1
1	75	1	0.	0.0	1
1	75	2	0.	0.0	1
1	75	3	0.	0.0	1
1	75	4	0.	0.0	1
1	75	5	0.	0.0	1
1	75	6	0.	0.0	1
1	75	7	0.	0.0	1
1	75	8	0.	0.0	1
1	75	9	0.	0.0	1
1	75	10	0.	0.0	1
2	75	0	5.	6.8	1
2	75	1	134.	7.1	1
2	75	2	78.	6.9	1
2	75	3	15.	7.1	1
2	75	4	38.	7.7	1
2	75	5	7.	8.1	1
2	75	6	3.	8.7	1
2	75	7	1.	7.0	1
2	75	8	1.	7.0	1
2	75	9	3.	7.7	1
2	75	10	30.	7.0	1
1	76	0	0.	0.0	1
1	76	1	0.	0.0	1
1	76	2	1.	9.0	1
1	76	3	0.	0.0	1
1	76	4	0.	0.0	1
1	76	5	0.	0.0	1
1	76	6	0.	0.0	1
1	76	7	0.	0.0	1
1	76	8	0.	0.0	1
1	76	9	0.	0.0	1
1	76	10	0.	0.0	1
2	76	0	2.	7.5	1
2	76	1	729.	7.0	1
2	76	2	939.	7.0	1
2	76	3	589.	7.0	1
2	76	4	0.	0.0	1
2	76	5	0.	0.0	1
2	76	6	0.	0.0	1
2	76	7	0.	0.0	1
2	76	8	0.	0.0	1
2	76	9	1.	7.0	1
2	76	10	34.	7.8	1
1	77	0	0.	0.0	1
1	77	1	9.	7.4	1
1	77	2	6.	8.0	1
1	77	3	0.	0.0	1
1	77	4	0.	0.0	1
1	77	5	0.	0.0	1
1	77	6	0.	0.0	1
1	77	7	0.	0.0	1
1	77	8	0.	0.0	1
1	77	9	0.	0.0	1
1	77	10	0.	0.0	1
2	77	0	46.	8.9	1
2	77	1	177.	6.8	1
2	77	2	1629.	7.0	1
2	77	3	14.	7.0	1
2	77	4	11.	7.1	1
2	77	5	1.	8.0	1
2	77	6	0.	0.0	1
2	77	7	1.	8.0	1
2	77	8	1.	7.0	1
2	77	9	0.	0.0	1
2	77	10	207.	7.3	1
1	78	0	0.	0.0	1
1	78	1	113.	8.0	1
1	78	2	41.	8.0	1
1	78	3	6.	7.0	1

1	78	4	1.	8.0	1
1	78	5	0.	0.0	1
1	78	6	0.	0.0	1
1	78	7	0.	0.0	1
1	78	8	0.	0.0	1
1	78	9	0.	0.0	1
1	78	10	0.	0.0	1
2	78	0	19.	8.1	1
2	78	1	806.	7.9	1
2	78	2	516.	7.8	1
2	78	3	10.	6.5	1
2	78	4	1.	7.0	1
2	78	5	39.	9.0	1
2	78	6	2.	8.0	1
2	78	7	0.	0.0	1
2	78	8	25.	9.9	1
2	78	9	6.	8.0	1
2	78	10	234.	7.7	1
1	79	0	0.	0.0	1
1	79	1	9.	8.9	1
1	79	2	89.	9.0	1
1	79	3	1.	9.0	1
1	79	4	0.	0.0	1
1	79	5	0.	0.0	1
1	79	6	0.	0.0	1
1	79	7	0.	0.0	1
1	79	8	0.	0.0	1
1	79	9	0.	0.0	1
1	79	10	0.	0.0	1
2	79	0	4.	6.8	1
2	79	1	109.	6.4	1
2	79	2	54.	6.3	1
2	79	3	100.	7.0	1
2	79	4	14.	6.1	1
2	79	5	78.	7.0	1
2	79	6	174.	6.2	1
2	79	7	2.	7.5	1
2	79	8	20.	6.3	1
2	79	9	1.	8.0	1
2	79	10	562.	8.7	1
1	80	0	2.	8.0	1
1	80	1	218.	8.0	1
1	80	2	54.	8.0	1
1	80	3	9.	8.0	1
1	80	4	6.	8.0	1
1	80	5	1.	8.0	1
1	80	6	4.	8.0	1
1	80	7	0.	0.0	1
1	80	8	0.	0.0	1
1	80	9	0.	0.0	1
1	80	10	0.	0.0	1
2	80	0	7.	7.9	1
2	80	1	41.	6.5	1
2	80	2	1938.	6.0	1
2	80	3	205.	6.1	1
2	80	4	68.	6.2	1
2	80	5	0.	0.0	1
2	80	6	0.	0.0	1
2	80	7	0.	0.0	1
2	80	8	1.	9.0	1
2	80	9	0.	0.0	1
2	80	10	5.	5.8	1
1	81	0	0.	0.0	1
1	81	1	68.	8.0	1
1	81	2	229.	8.0	1
1	81	3	1.	8.0	1
1	81	4	0.	0.0	1
1	81	5	0.	0.0	1
1	81	6	0.	0.0	1
1	81	7	0.	0.0	1
1	81	8	0.	0.0	1
1	81	9	0.	0.0	1
1	81	10	0.	0.0	1
2	81	0	4.	8.3	1
2	81	1	132.	8.0	1
2	81	2	37.	7.6	1
2	81	3	12.	6.6	1
2	81	4	0.	0.0	1
2	81	5	0.	0.0	1
2	81	6	0.	0.0	1
2	81	7	0.	0.0	1
2	81	8	0.	0.0	1
2	81	9	0.	0.0	1
2	81	10	4.	6.8	1
1	82	0	0.	0.0	1
1	82	1	215.	8.0	1
1	82	2	70.	8.0	1
1	82	3	75.	8.0	1
1	82	4	28.	8.0	1
1	82	5	1.	8.0	1
1	82	6	1.	8.0	1
1	82	7	0.	0.0	1
1	82	8	0.	0.0	1
1	82	9	0.	0.0	1
1	82	10	0.	0.0	1
2	82	0	0.	0.0	1
2	82	1	90.	6.6	1

2	82	2	33.	6.5	1
2	82	3	1.	6.0	1
2	82	4	1.	6.0	1
2	82	5	7.	9.0	1
2	82	6	0.	0.0	1
2	82	7	1.	9.0	1
2	82	8	5.	9.0	1
2	82	9	8.	8.9	1
2	82	10	63.	8.5	1
1	83	0	331.	11.0	1
1	83	1	37.	7.9	1
1	83	2	332.	8.0	1
1	83	3	1.	9.0	1
1	83	4	1.	9.0	1
1	83	5	2.	9.0	1
1	83	6	0.	0.0	1
1	83	7	0.	0.0	1
1	83	8	0.	0.0	1
1	83	9	0.	0.0	1
1	83	10	0.	0.0	1
2	83	0	1.	9.0	1
2	83	1	81.	9.1	1
2	83	2	10.	8.8	1
2	83	3	3.	10.0	1
2	83	4	7.	9.1	1
2	83	5	0.	0.0	1
2	83	6	0.	0.0	1
2	83	7	0.	0.0	1
2	83	8	0.	0.0	1
2	83	9	1.	9.0	1
2	83	10	27.	9.0	1
1	84	0	52.	9.0	1
1	84	1	1.	8.0	1
1	84	2	394.	8.0	1
1	84	3	96.	8.0	1
1	84	4	8.	8.0	1
1	84	5	7.	8.0	1
1	84	6	0.	0.0	1
1	84	7	2.	8.0	1
1	84	8	0.	0.0	1
1	84	9	0.	0.0	1
1	84	10	0.	0.0	1
2	84	0	0.	0.0	1
2	84	1	15.	6.8	1
2	84	2	46.	7.0	1
2	84	3	11.	8.0	1
2	84	4	4.	9.0	1
2	84	5	4.	7.8	1
2	84	6	1.	8.0	1
2	84	7	0.	0.0	1
2	84	8	0.	0.0	1
2	84	9	0.	0.0	1
2	84	10	3.	6.7	1
1	85	0	0.	0.0	1
1	85	1	30.	8.0	1
1	85	2	227.	8.0	1
1	85	3	50.	7.9	1
1	85	4	2.	7.5	1
1	85	5	0.	0.0	1
1	85	6	0.	0.0	1
1	85	7	0.	0.0	1
1	85	8	0.	0.0	1
1	85	9	0.	0.0	1
1	85	10	0.	0.0	1
2	85	0	1.	9.0	1
2	85	1	40.	8.8	1
2	85	2	22.	8.4	1
2	85	3	34.	8.1	1
2	85	4	15.	7.7	1
2	85	5	2.	7.5	1
2	85	6	0.	0.0	1
2	85	7	1.	6.0	1
2	85	8	0.	0.0	1
2	85	9	2.	6.0	1
2	85	10	12.	4.7	1
1	86	0	0.	0.0	1
1	86	1	800.	9.6	1
1	86	2	27.	9.8	1
1	86	3	4.	9.5	1
1	86	4	1.	8.0	1
1	86	5	1.	8.0	1
1	86	6	0.	0.0	1
1	86	7	0.	0.0	1
1	86	8	0.	0.0	1
1	86	9	0.	0.0	1
1	86	10	0.	0.0	1
2	86	0	0.	0.0	1
2	86	1	4.	7.5	1
2	86	2	6.	7.5	1
2	86	3	7.	7.9	1
2	86	4	7.	7.9	1
2	86	5	0.	0.0	1
2	86	6	0.	0.0	1
2	86	7	0.	0.0	1
2	86	8	0.	0.0	1
2	86	9	1.	5.0	1
2	86	10	17.	4.6	1

1	87	0	0.	0.0	1
1	87	1	0.	0.0	1
1	87	2	0.	0.0	1
1	87	3	0.	0.0	1
1	87	4	0.	0.0	1
1	87	5	0.	0.0	1
1	87	6	0.	0.0	1
1	87	7	0.	0.0	1
1	87	8	0.	0.0	1
1	87	9	0.	0.0	1
1	87	10	0.	0.0	1
2	87	0	0.	0.0	1
2	87	1	17.	7.5	1
2	87	2	5.	7.4	1
2	87	3	6.	8.2	1
2	87	4	4.	8.3	1
2	87	5	4.	8.0	1
2	87	6	2.	8.0	1
2	87	7	0.	0.0	1
2	87	8	0.	0.0	1
2	87	9	1.	4.0	1
2	87	10	17.	4.7	1
1	88	0	0.	0.0	1
1	88	1	1121.	7.8	1
1	88	2	26.	7.0	1
1	88	3	1.	7.0	1
1	88	4	0.	0.0	1
1	88	5	0.	0.0	1
1	88	6	0.	0.0	1
1	88	7	0.	0.0	1
1	88	8	0.	0.0	1
1	88	9	0.	0.0	1
1	88	10	0.	0.0	1
2	88	0	1.	10.0	1
2	88	1	36.	8.6	1
2	88	2	26.	8.6	1
2	88	3	1.	7.0	1
2	88	4	0.	0.0	1
2	88	5	3.	8.0	1
2	88	6	3.	8.0	1
2	88	7	1.	8.0	1
2	88	8	1.	7.0	1
2	88	9	0.	0.0	1
2	88	10	8.	4.1	1
1	89	0	0.	0.0	1
1	89	1	118.	8.6	1
1	89	2	7.	8.0	1
1	89	3	0.	0.0	1
1	89	4	0.	0.0	1
1	89	5	0.	0.0	1
1	89	6	2.	7.0	1
1	89	7	0.	0.0	1
1	89	8	0.	0.0	1
1	89	9	0.	0.0	1
1	89	10	0.	0.0	1
2	89	0	0.	0.0	1
2	89	1	10.	7.4	1
2	89	2	33.	8.1	1
2	89	3	18.	8.7	1
2	89	4	22.	8.5	1
2	89	5	9.	9.6	1
2	89	6	7.	9.3	1
2	89	7	1.	10.0	1
2	89	8	0.	0.0	1
2	89	9	1.	5.0	1
2	89	10	2.	6.0	1
1	90	0	536.	10.8	1
1	90	1	841.	8.1	1
1	90	2	6.	8.2	1
1	90	3	0.	0.0	1
1	90	4	0.	0.0	1
1	90	5	0.	0.0	1
1	90	6	0.	0.0	1
1	90	7	0.	0.0	1
1	90	8	0.	0.0	1
1	90	9	0.	0.0	1
1	90	10	7.	7.7	1
2	90	0	2.	9.0	1
2	90	1	110.	8.1	1
2	90	2	64.	8.2	1
2	90	3	66.	8.9	1
2	90	4	77.	8.7	1
2	90	5	44.	8.6	1
2	90	6	19.	9.0	1
2	90	7	56.	8.8	1
2	90	8	11.	8.4	1
2	90	9	1.	9.0	1
2	90	10	2.	6.0	1
1	91	0	2101.	11.0	1
1	91	1	248.	10.5	1
1	91	2	12.	10.3	1
1	91	3	1.	11.0	1
1	91	4	0.	0.0	1
1	91	5	0.	0.0	1
1	91	6	0.	0.0	1
1	91	7	0.	0.0	1
1	91	8	1.	8.0	1

1	91	9	0.	0.0	1
1	91	10	1.	9.0	1
2	91	0	2.	9.0	1
2	91	1	324.	8.3	1
2	91	2	327.	9.1	1
2	91	3	253.	9.1	1
2	91	4	26.	8.5	1
2	91	5	23.	8.6	1
2	91	6	20.	7.6	1
2	91	7	18.	8.3	1
2	91	8	27.	8.0	1
2	91	9	24.	8.5	1
2	91	10	26.	7.8	1
1	92	0	476.	10.9	1
1	92	1	0.	0.0	1
1	92	2	1.	6.0	1
1	92	3	0.	0.0	1
1	92	4	0.	0.0	1
1	92	5	0.	0.0	1
1	92	6	0.	0.0	1
1	92	7	1.	8.0	1
1	92	8	1.	8.0	1
1	92	9	0.	0.0	1
1	92	10	0.	0.0	1
2	92	0	3.	5.3	1
2	92	1	27.	7.1	1
2	92	2	436.	8.7	1
2	92	3	361.	8.9	1
2	92	4	32.	7.5	1
2	92	5	16.	6.6	1
2	92	6	34.	6.3	1
2	92	7	20.	7.5	1
2	92	8	6.	7.5	1
2	92	9	6.	8.0	1
2	92	10	7.	6.9	1
1	93	0	3.	10.0	1
1	93	1	1.	10.0	1
1	93	2	1.	10.0	1
1	93	3	1.	5.0	1
1	93	4	1.	7.0	1
1	93	5	0.	0.0	1
1	93	6	0.	0.0	1
1	93	7	1.	7.0	1
1	93	8	1.	9.0	1
1	93	9	1.	7.0	1
1	93	10	0.	0.0	1
2	93	0	0.	0.0	1
2	93	1	29.	7.0	1
2	93	2	120.	8.9	1
2	93	3	302.	8.7	1
2	93	4	77.	8.5	1
2	93	5	33.	7.4	1
2	93	6	14.	5.2	1
2	93	7	8.	7.8	1
2	93	8	1.	4.0	1
2	93	9	2.	6.5	1
2	93	10	7.	8.6	1
1	94	0	651.	9.8	1
1	94	1	15.	11.1	1
1	94	2	2.	11.5	1
1	94	3	0.	0.0	1
1	94	4	0.	0.0	1
1	94	5	0.	0.0	1
1	94	6	0.	0.0	1
1	94	7	0.	0.0	1
1	94	8	0.	0.0	1
1	94	9	0.	0.0	1
1	94	10	0.	0.0	1
2	94	0	0.	0.0	1
2	94	1	18.	7.6	1
2	94	2	26.	8.6	1
2	94	3	48.	8.5	1
2	94	4	42.	8.6	1
2	94	5	30.	7.8	1
2	94	6	30.	5.7	1
2	94	7	29.	6.9	1
2	94	8	37.	6.9	1
2	94	9	52.	7.2	1
2	94	10	74.	7.5	1
1	95	0	5.	9.8	1
1	95	1	2.	10.0	1
1	95	2	0.	0.0	1
1	95	3	0.	0.0	1
1	95	4	0.	0.0	1
1	95	5	1.	11.0	1
1	95	6	0.	0.0	1
1	95	7	1.	9.0	1
1	95	8	1.	8.0	1
1	95	9	1.	9.0	1
1	95	10	0.	0.0	1
2	95	0	1.	12.0	1
2	95	1	606.	8.0	1
2	95	2	73.	8.6	1
2	95	3	34.	6.8	1
2	95	4	24.	7.3	1
2	95	5	11.	6.9	1
2	95	6	29.	6.1	1

2	95	7	73.	4.1	1
2	95	8	113.	3.1	1
2	95	9	208.	2.9	1
2	95	10	341.	3.6	1
1	96	0	0.	0.0	1
1	96	1	2.	7.5	1
1	96	2	1.	8.0	1
1	96	3	0.	0.0	1
1	96	4	1.	9.0	1
1	96	5	0.	0.0	1
1	96	6	0.	0.0	1
1	96	7	0.	0.0	1
1	96	8	0.	0.0	1
1	96	9	0.	0.0	1
1	96	10	0.	0.0	1
2	96	0	1.	6.0	1
2	96	1	70.	7.1	1
2	96	2	147.	6.7	1
2	96	3	19.	6.2	1
2	96	4	54.	3.3	1
2	96	5	111.	2.8	1
2	96	6	455.	2.2	1
2	96	7	651.	2.5	1
2	96	8	449.	2.8	1
2	96	9	240.	3.0	1
2	96	10	230.	3.9	1
1	97	0	0.	0.0	1
1	97	1	0.	0.0	1
1	97	2	1.	9.0	1
1	97	3	2.	8.5	1
1	97	4	0.	0.0	1
1	97	5	0.	0.0	1
1	97	6	0.	0.0	1
1	97	7	0.	0.0	1
1	97	8	0.	0.0	1
1	97	9	1.	8.0	1
1	97	10	13.	8.5	1
2	97	0	2.	9.5	1
2	97	1	170.	8.6	1
2	97	2	216.	8.2	1
2	97	3	222.	7.2	1
2	97	4	90.	4.2	1
2	97	5	262.	3.3	1

```
  2   97  6     372.   2.7   1
  2   97  7     726.   2.3   1
  2   97  8     465.   2.5   1
  2   97  9     222.   2.9   1
  2   97 10     121.   4.5   1
  -1 -1 end release data
#-----------------------------------------------------------------------
# Recapture data
#-----------------------------------------------------------------------
# release area
# |     release year
# |     |   release age
# |     |   |  recapture area
# |     |   |  |     number recaptured by year (from first to last-- so there should be zero entries prior to the year of release)
# |     |   |  |     |
  1   70  0  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  0  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  1  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  1  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  2  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  2  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  3  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  3  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  4  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  4  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  5  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  5  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  6  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  6  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  7  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  7  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  8  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  8  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  9  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70  9  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70 10  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   70 10  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  0  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  0  2    0.    0.    0.    1.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  1  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  1  2    4.   12.    5.    3.    1.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  2  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  2  2    1.    4.    3.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  3  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  3  2    9.    2.    0.    3.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  4  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  4  2    1.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  5  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  5  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  6  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  6  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  7  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  7  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  8  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  8  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  9  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70  9  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70 10  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  2   70 10  2    2.    0.    0.    0.    1.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  0  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  0  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  1  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  1  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  2  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  2  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  3  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  3  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  4  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  4  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  5  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  5  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  6  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  6  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  7  1    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
  1   71  7  2    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.    0.
```

1	71	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	71	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	71	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	71	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	71	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	71	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	1	2	0.	2.	28.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	2	2	0.	14.	12.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	3	2	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	4	2	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	5	2	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	71	10	2	0.	0.	0.	3.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	72	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	1	2	0.	0.	7.	27.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	2	2	0.	0.	2.	6.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	3	2	0.	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	5	2	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	6	2	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	10	1	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	72	10	2	0.	0.	1.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

1	73	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	73	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	0	2	0.	0.	0.	0.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	1	2	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	2	2	0.	0.	0.	25.	7.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	3	2	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	4	2	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	6	2	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	10	1	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	73	10	2	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	74	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	1	2	0.	0.	0.	0.	55.	79.	32.	10.	6.	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	2	2	0.	0.	0.	0.	6.	5.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	3	2	0.	0.	0.	0.	3.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

2	74	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	74	10	2	0.	0.	0.	0.	2.	2.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	75	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	1	2	0.	0.	0.	0.	0.	8.	12.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	2	2	0.	0.	0.	0.	0.	9.	7.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	3	2	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	4	2	0.	0.	0.	0.	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	75	10	2	0.	0.	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	76	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

2	76	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	1	2	0.	0.	0.	0.	0.	0.	23.	33.	41.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	2	2	0.	0.	0.	0.	0.	0.	61.	4.	20.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	3	2	0.	0.	0.	0.	0.	0.	25.	19.	5.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.
2	76	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	76	10	2	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	1	1	0.	0.	0.	0.	0.	0.	0.	3.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	77	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	1	2	0.	0.	0.	0.	0.	0.	0.	4.	12.	12.	1.	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	2	1	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	2	2	0.	0.	0.	0.	0.	0.	0.	39.	154.	60.	0.	0.	0.	0.	1.	1.	1.	1.	2.	0.	0.	0.	1.	0.	0.	0.	0.	0.
2	77	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	4	2	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	8	2	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	77	10	2	0.	0.	0.	0.	0.	0.	0.	13.	5.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	1	1	0.	0.	0.	0.	0.	0.	0.	0.	23.	1.	3.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	2	1	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

1	78	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	78	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	1	2	0.	0.	0.	0.	0.	0.	0.	0.	10.	58.	16.	1.	3.	1.	0.	0.	0.	0.	1.	1.	0.	0.	1.	0.	0.	0.	0.	0.
2	78	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	2	2	0.	0.	0.	0.	0.	0.	0.	0.	7.	36.	4.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	3	2	0.	0.	0.	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	78	10	2	0.	0.	0.	0.	0.	0.	0.	0.	7.	4.	5.	2.	3.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	6.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	79	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	7.	7.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	4.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	79	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	8.	2.	1.	3.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

1	80	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	13.	3.	2.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	80	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	130.	88.	5.	2.	4.	2.	1.	2.	4.	1.	2.	1.	0.	2.	0.	0.	0.	0.
2	80	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	1.	0.	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
2	80	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	80	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	81	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	16.	2.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

2	81	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	81	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.	6.	3.	2.	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
1	82	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	82	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	2.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
2	82	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	82	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	37.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

1	83	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	83	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	2.	3.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
2	83	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	83	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	8.	8.	1.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
1	84	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	84	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	84	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	12.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

1	85	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	85	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	85	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	85	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	36.	8.	5.	1.	1.	0.	0.	0.	0.	0.	0.	0.
1	86	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	1.	1.	0.	0.	0.	0.	0.	0.	0.
1	86	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	86	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
2	86	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

2	86	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	86	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	87	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	87	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	28.	19.	5.	0.	2.	0.	1.	0.	0.	0.
1	88	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	88	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
2	88	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

2	88	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	88	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	2.	2.	0.	0.	0.	0.	0.
1	89	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	89	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
2	89	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	89	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	2.	1.	3.	0.	0.	0.	0.
1	90	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	8.	20.	3.	5.	3.	0.	0.	0.
1	90	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	1.	0.	0.	0.	0.
1	90	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

1	90	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	90	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	4.	1.	0.	0.	0.	0.	0.
2	90	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
2	90	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	3.	0.	0.	0.	1.	0.	0.
2	90	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.
2	90	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
2	90	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	1.
2	90	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
2	90	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	90	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
2	90	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.	2.	0.	0.	0.	0.	0.
2	90	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
2	90	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
2	90	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	90	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	8.	2.	0.	0.	0.
1	91	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	2.	4.	2.	0.	0.	0.
1	91	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
1	91	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	91	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	6.	4.	1.	0.	0.	2.	1.
2	91	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
2	91	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	2.	6.	1.	1.	3.	0.
2	91	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.
2	91	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.	0.	0.	0.	0.	0.
2	91	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	91	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.
2	91	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
2	91	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	91	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	1.	0.	0.	0.
2	91	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.	0.	0.	0.
2	91	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	91	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.	0.	0.	0.	0.
1	92	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.
1	92	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

1	92	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	92	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
2	92	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	6.	3.	0.	2.	1.
2	92	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
2	92	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.	4.	2.	1.	1.
2	92	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	1.
2	92	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.
2	92	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	92	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	92	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
1	93	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
1	93	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	93	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
2	93	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.	0.	2.	2.
2	93	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.	3.	0.	3.	0.
2	93	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	1.	0.
2	93	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
2	93	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

2	93	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	93	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	93	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	51.	1.	0.	0.
1	94	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	94	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	94	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
2	94	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
2	94	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	1.
2	94	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
2	94	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	94	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	94	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.
2	94	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	94	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	94	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
2	94	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	94	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	3.	0.
1	95	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.
1	95	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	95	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

2	95	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	7.	5.	2.
2	95	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
2	95	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
2	95	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.	1.
2	95	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	95	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
2	95	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
2	95	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.
2	95	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	95	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9.	4.	3.
1	96	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	96	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
2	96	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
2	96	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
2	96	6	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	6	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	6.
2	96	7	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	7	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	10.	9.
2	96	8	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	8	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	11.	4.
2	96	9	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	9	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	6.	2.
2	96	10	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	96	10	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.
1	97	0	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	0	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	1	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	1	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	2	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	2	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	3	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	3	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	4	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	4	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	5	1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	97	5	2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

```
1    97  6  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97  6  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97  7  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97  7  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97  8  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97  8  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97  9  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97  9  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97 10  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
1    97 10  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  0  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  0  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  1  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  1  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  1.
2    97  2  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  2  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  3  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  3  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  1.
2    97  4  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  4  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  5  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  5  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  2.
2    97  6  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  6  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  9.
2    97  7  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  7  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0. 20.
2    97  8  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  8  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  7.
2    97  9  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97  9  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97 10  1   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
2    97 10  2   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  1.
 -1 end of recapture data
```

A.3.1.4 Parameter specification file

```
# terminal age structure of population
  0.0000D+00   0.6000D+00   0.3000D+01     0.0   0.2000D+01     1
  0.1000D-01   0.6703D+00   0.5000D+01     1.0   0.1000D+00     2
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.2000D+01     3
  0.1000D-01   0.2174D+00   0.5000D+01     1.0   0.1000D+00     4
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.4000D+01     5
  0.1000D-01   0.1000D+01   0.5000D+01     0.0   0.4000D+01     6
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.4000D+01     7
  0.1000D-01   0.6286D+00   0.5000D+01     1.0   0.1000D+00     8
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.8000D+01     9
# terminal-age f-ratios
  0.1000D+00   0.1000D+01   0.5000D+01     0.0   0.2000D+00    10
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    11
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    12
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    13
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    14
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    15
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    16
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    17
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    18
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    19
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    20
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    21
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    22
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    23
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    24
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    25
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    26
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    27
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    28
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    29
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    30
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    31
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    32
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    33
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    34
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    35
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    36
 -0.1000D+02   0.1000D+01   0.1001D+02     0.0   0.1000D+00    37
# natural mortality
  0.0000D+00   0.4900D+00   0.1000D+01     0.0   0.1000D+00    38
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00    39
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00    40
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00    41
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00    42
  0.0000D+00   0.2000D+00   0.1000D+01     0.0   0.1000D+00    43
  0.0000D+00   0.1750D+00   0.1000D+01     0.0   0.1000D+00    44
  0.0000D+00   0.1500D+00   0.1000D+01     0.0   0.1000D+00    45
  0.0000D+00   0.1250D+00   0.1000D+01     0.0   0.1000D+00    46
  0.0000D+00   0.1000D+00   0.1000D+01     0.0   0.1000D+00    47
# transfer coefficients
  0.0000D+00   0.0000D+00   0.1000D+01     0.0   0.1000D+00    48
  0.0000D+00   0.8968D-02   0.1000D+01     1.0   0.1000D+00    49
  0.0000D+00   0.8968D-02   0.1000D+01    -0.1   0.1000D+00    50
  0.0000D+00   0.3849D-01   0.1000D+01     1.0   0.1000D+00    51
  0.0000D+00   0.3849D-01   0.1000D+01    -0.1   0.1000D+00    52
  0.0000D+00   0.3849D-01   0.1000D+01    -0.1   0.1000D+00    53
  0.0000D+00   0.3849D-01   0.1000D+01    -0.1   0.1000D+00    54
  0.0000D+00   0.3849D-01   0.1000D+01    -0.1   0.1000D+00    55
  0.0000D+00   0.3849D-01   0.1000D+01    -0.1   0.1000D+00    56
  0.0000D+00   0.3849D-01   0.1000D+01    -0.1   0.1000D+00    57
# Stock recruitment relationship
  0.0000D+00   0.2507D+06   0.1000D+21     0.0   0.4000D+00    58
  0.0000D+00   0.1660D+05   0.1000D+21     0.0   0.0000D+00    59
  0.0000D+00   0.1580D+00   0.9000D+00     0.0   0.0000D+00    60
  0.0000D+00   0.1000D+01   0.2000D+01     0.0   0.0000D+00    61
  0.0000D+00   0.1000D+01   0.2000D+01     0.0   0.0000D+00    62
# Variance scaling parameters
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    63
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    64
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    65
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    66
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    67
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    68
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    69
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00    70
# fraction surviving the intial tagging process
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    71
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    72
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    73
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    74
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    75
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    76
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    77
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    78
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    79
  0.0000D+00   0.8000D+00   0.1000D+01     0.0   0.1000D+00    80
# tag shedding rate
  0.0000D+00   0.2600D+00   0.1000D+01     1.0   0.1000D+00    81
  0.0000D+00   0.2600D+00   0.1000D+01      -.1  0.1000D+00    82
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   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    83
   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    84
   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    85
   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    86
   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    87
   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    88
   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    89
   0.0000D+00   0.2600D+00   0.1000D+01     -.1   0.1000D+00    90
# tag reporting rate
$ 1   0.0000D+00   0.2331D+00   0.1000D+01     1.0   0.1000D+00    84
$ 19  0.0000D+00   0.2331D+00   0.1000D+01     -.1    0.1000D+00    83     6.
$ 1   0.0000D+00   0.2331D+00   0.1000D+01     1.0   0.1000D+00    84
$ 7  0.0000D+00   0.2331D+00   0.1000D+01     -.1    0.1000D+00    83     6.
# tag nonmixing factor for first year
   0.0000D+00   0.3260D+01   0.5000D+01     1.0   0.1000D+00   119   70    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   120   70    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   121   70    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   122   70    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   123   70    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   124   70    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   125   70    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   126   70    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   127   70    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   128   70   10
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   129   71    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   130   71    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   131   71    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   132   71    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   133   71    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   134   71    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   135   71    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   136   71    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   137   71    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   138   71   10
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   139   72    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   140   72    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   141   72    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   142   72    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   143   72    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   144   72    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   145   72    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   146   72    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   147   72    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   148   72   10
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   149   73    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   150   73    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   151   73    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   152   73    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   153   73    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   154   73    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   155   73    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   156   73    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   157   73    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   158   73   10
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   159   74    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   160   74    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   161   74    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   162   74    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   163   74    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   164   74    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   165   74    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   166   74    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   167   74    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   168   74   10
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   169   75    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   170   75    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   171   75    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   172   75    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   173   75    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   174   75    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   175   75    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   176   75    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   177   75    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   178   75   10
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   179   76    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   180   76    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   181   76    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   182   76    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   183   76    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   184   76    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   185   76    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   186   76    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   187   76    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   188   76   10
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   189   77    1
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   190   77    2
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   191   77    3
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   192   77    4
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   193   77    5
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   194   77    6
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   195   77    7
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   196   77    8
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   197   77    9
   0.0000D+00   0.3260D+01   0.5000D+01    -0.1   0.1000D+00   198   77   10
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0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	199	78	1
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	200	78	2
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	201	78	3
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	202	78	4
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	203	78	5
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	204	78	6
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	205	78	7
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	206	78	8
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	207	78	9
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	208	78	10
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	209	79	1
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	210	79	2
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	211	79	3
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	212	79	4
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	213	79	5
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	214	79	6
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	215	79	7
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	216	79	8
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	217	79	9
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	218	79	10
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	219	80	1
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	220	80	2
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	221	80	3
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	222	80	4
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	223	80	5
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	224	80	6
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	225	80	7
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	226	80	8
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	227	80	9
0.0000D+00	0.3260D+01	0.5000D+01	-0.1	0.1000D+00	228	80	10
0.0000D+00	0.3541D+00	0.5000D+01	1.0	0.1000D+00	229	81	1
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	230	81	2
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	231	81	3
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	232	81	4
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	233	81	5
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	234	81	6
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	235	81	7
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	236	81	8
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	237	81	9
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	238	81	10
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	239	82	1
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	240	82	2
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	241	82	3
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	242	82	4
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	243	82	5
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	244	82	6
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	245	82	7
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	246	82	8
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	247	82	9
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	248	82	10
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	249	83	1
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	250	83	2
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	251	83	3
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	252	83	4
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	253	83	5
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	254	83	6
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	255	83	7
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	256	83	8
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	257	83	9
0.0000D+00	0.3541D+00	0.5000D+01	-0.1	0.1000D+00	258	83	10
0.0000D+00	0.2209D+00	0.5000D+01	1.0	0.1000D+00	259	84	1
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	260	84	2
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	261	84	3
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	262	84	4
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	263	84	5
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	264	84	6
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	265	84	7
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	266	84	8
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	267	84	9
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	268	84	10
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	269	85	1
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	270	85	2
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	271	85	3
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	272	85	4
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	273	85	5
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	274	85	6
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	275	85	7
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	276	85	8
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	277	85	9
0.0000D+00	0.2209D+00	0.5000D+01	-0.1	0.1000D+00	278	85	10
0.0000D+00	0.2414D+01	0.5000D+01	1.0	0.1000D+00	279	86	1
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	280	86	2
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	281	86	3
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	282	86	4
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	283	86	5
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	284	86	6
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	285	86	7
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	286	86	8
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	287	86	9
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	288	86	10
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	289	87	1
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	290	87	2
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	291	87	3
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	292	87	4

0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	293	87	5
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	294	87	6
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	295	87	7
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	296	87	8
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	297	87	9
0.0000D+00	0.2414D+01	0.5000D+01	-0.1	0.1000D+00	298	87	10
0.0000D+00	0.5953D+00	0.5000D+01	1.0	0.1000D+00	299	88	1
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	300	88	2
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	301	88	3
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	302	88	4
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	303	88	5
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	304	88	6
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	305	88	7
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	306	88	8
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	307	88	9
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	308	88	10
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	309	89	1
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	310	89	2
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	311	89	3
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	312	89	4
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	313	89	5
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	314	89	6
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	315	89	7
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	316	89	8
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	317	89	9
0.0000D+00	0.5953D+00	0.5000D+01	-0.1	0.1000D+00	318	89	10
0.0000D+00	0.7863D+00	0.5000D+01	1.0	0.1000D+00	319	90	1
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	320	90	2
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	321	90	3
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	322	90	4
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	323	90	5
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	324	90	6
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	325	90	7
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	326	90	8
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	327	90	9
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	328	90	10
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	329	91	1
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	330	91	2
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	331	91	3
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	332	91	4
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	333	91	5
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	334	91	6
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	335	91	7
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	336	91	8
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	337	91	9
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	338	91	10
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	339	92	1
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	340	92	2
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	341	92	3
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	342	92	4
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	343	92	5
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	344	92	6
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	345	92	7
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	346	92	8
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	347	92	9
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	348	92	10
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	349	93	1
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	350	93	2
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	351	93	3
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	352	93	4
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	353	93	5
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	354	93	6
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	355	93	7
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	356	93	8
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	357	93	9
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	358	93	10
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	359	94	1
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	360	94	2
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	361	94	3
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	362	94	4
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	363	94	5
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	364	94	6
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	365	94	7
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	366	94	8
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	367	94	9
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	368	94	10
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	369	95	1
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	370	95	2
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	371	95	3
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	372	95	4
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	373	95	5
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	374	95	6
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	375	95	7
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	376	95	8
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	377	95	9
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	378	95	10
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	379	96	1
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	380	96	2
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	381	96	3
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	382	96	4
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	383	96	5
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	384	96	6
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	385	96	7
0.0000D+00	0.7863D+00	0.5000D+01	-0.1	0.1000D+00	386	96	8

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   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   387   96    9
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   388   96   10
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   389   97    1
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   390   97    2
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   391   97    3
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   392   97    4
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   393   97    5
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   394   97    6
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   395   97    7
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   396   97    8
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   397   97    9
   0.0000D+00   0.7863D+00   0.5000D+01     -0.1   0.1000D+00   398   97   10
# tag nonmixing factor for second year
   0.0000D+00   0.1000D+01   0.5000D+01      1.0   0.1000D+00   399   98    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   400   98    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   401   98    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   402   98    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   403   98    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   404   98    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   405   98    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   406   98    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   407   98    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   408   98   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   409   99    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   410   99    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   411   99    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   412   99    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   413   99    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   414   99    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   415   99    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   416   99    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   417   99    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   418   99   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   419  100    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   420  100    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   421  100    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   422  100    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   423  100    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   424  100    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   425  100    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   426  100    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   427  100    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   428  100   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   429  101    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   430  101    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   431  101    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   432  101    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   433  101    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   434  101    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   435  101    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   436  101    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   437  101    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   438  101   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   439  102    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   440  102    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   441  102    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   442  102    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   443  102    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   444  102    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   445  102    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   446  102    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   447  102    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   448  102   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   449  103    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   450  103    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   451  103    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   452  103    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   453  103    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   454  103    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   455  103    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   456  103    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   457  103    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   458  103   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   459  104    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   460  104    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   461  104    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   462  104    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   463  104    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   464  104    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   465  104    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   466  104    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   467  104    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   468  104   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   469  105    1
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   470  105    2
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   471  105    3
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   472  105    4
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   473  105    5
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   474  105    6
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   475  105    7
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   476  105    8
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   477  105    9
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   478  105   10
   0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00   479  106    1
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0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	480	106	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	481	106	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	482	106	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	483	106	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	484	106	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	485	106	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	486	106	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	487	106	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	488	106	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	489	107	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	490	107	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	491	107	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	492	107	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	493	107	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	494	107	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	495	107	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	496	107	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	497	107	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	498	107	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	499	108	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	500	108	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	501	108	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	502	108	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	503	108	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	504	108	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	505	108	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	506	108	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	507	108	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	508	108	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	509	109	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	510	109	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	511	109	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	512	109	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	513	109	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	514	109	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	515	109	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	516	109	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	517	109	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	518	109	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	519	110	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	520	110	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	521	110	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	522	110	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	523	110	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	524	110	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	525	110	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	526	110	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	527	110	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	528	110	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	529	111	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	530	111	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	531	111	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	532	111	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	533	111	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	534	111	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	535	111	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	536	111	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	537	111	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	538	111	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	539	112	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	540	112	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	541	112	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	542	112	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	543	112	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	544	112	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	545	112	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	546	112	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	547	112	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	548	112	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	549	113	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	550	113	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	551	113	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	552	113	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	553	113	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	554	113	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	555	113	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	556	113	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	557	113	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	558	113	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	559	114	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	560	114	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	561	114	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	562	114	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	563	114	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	564	114	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	565	114	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	566	114	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	567	114	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	568	114	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	569	115	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	570	115	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	571	115	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	572	115	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	573	115	5

0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	574	115	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	575	115	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	576	115	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	577	115	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	578	115	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	579	116	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	580	116	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	581	116	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	582	116	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	583	116	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	584	116	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	585	116	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	586	116	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	587	116	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	588	116	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	589	117	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	590	117	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	591	117	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	592	117	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	593	117	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	594	117	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	595	117	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	596	117	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	597	117	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	598	117	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	599	118	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	600	118	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	601	118	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	602	118	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	603	118	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	604	118	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	605	118	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	606	118	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	607	118	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	608	118	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	609	119	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	610	119	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	611	119	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	612	119	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	613	119	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	614	119	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	615	119	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	616	119	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	617	119	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	618	119	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	619	120	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	620	120	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	621	120	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	622	120	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	623	120	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	624	120	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	625	120	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	626	120	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	627	120	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	628	120	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	629	121	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	630	121	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	631	121	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	632	121	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	633	121	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	634	121	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	635	121	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	636	121	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	637	121	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	638	121	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	639	122	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	640	122	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	641	122	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	642	122	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	643	122	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	644	122	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	645	122	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	646	122	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	647	122	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	648	122	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	649	123	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	650	123	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	651	123	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	652	123	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	653	123	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	654	123	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	655	123	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	656	123	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	657	123	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	658	123	10
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	659	124	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	660	124	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	661	124	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	662	124	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	663	124	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	664	124	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	665	124	7
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	666	124	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	667	124	9

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  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   668  124   10
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   669  125    1
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   670  125    2
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   671  125    3
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   672  125    4
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   673  125    5
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   674  125    6
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   675  125    7
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   676  125    8
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   677  125    9
  0.0000D+00   0.1000D+01   0.5000D+01    -0.1   0.1000D+00   678  125   10
# terminal age structure of population
  0.0000D+00   0.3180D+00   0.3000D+01     0.0   0.2000D+01   679
  0.1000D-01   0.4111D-01   0.3000D+01     1.0   0.1000D+00   680
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.2000D+01   681
  0.1000D-01   0.4193D-01   0.3000D+01     1.0   0.1000D+00   682
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.4000D+01   683
  0.1000D-01   0.1275D+00   0.3000D+01     1.0   0.1000D+00   684
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.6000D+01   685
  0.1000D-01   0.1629D+00   0.3000D+01     1.0   0.1000D+00   686
  0.0000D+00   0.1000D+01   0.3000D+01     0.0   0.8000D+01   687
# terminal-age f-ratios
  0.0000D+00   0.1000D+01   0.4000D+01     0.0   0.2000D+00   688
  0.0000D+00   0.1000D+01   0.4000D+01     0.0   0.2000D+00   689
  0.0000D+00   0.1000D+01   0.4000D+01     0.0   0.2000D+00   690
  0.0000D+00   0.1000D+01   0.4000D+01     0.0   0.2000D+00   691
  0.1000D-01   0.8845D+00   0.4000D+01     1.0   0.2000D+00   692
  0.1000D-01   0.8845D+00   0.4000D+01    -0.1   0.1000D+00   693
  0.1000D-01   0.8845D+00   0.4000D+01    -0.1   0.1000D+00   694
  0.1000D-01   0.8845D+00   0.4000D+01    -0.1   0.1000D+00   695
  0.1000D-01   0.8845D+00   0.4000D+01    -0.1   0.1000D+00   696
  0.1000D-01   0.8845D+00   0.4000D+01    -0.1   0.1000D+00   697
  0.1000D-01   0.8845D+00   0.4000D+01    -0.1   0.1000D+00   698
  0.1000D-01   0.8845D+00   0.4000D+01    -0.1   0.1000D+00   699
  0.1000D-01   0.1140D+01   0.4000D+01     0.3   0.2500D+00   700
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   701
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   702
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   703
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   704
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   705
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   706
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   707
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   708
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   709
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   710
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   711
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   712
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   713
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   714
  0.1000D-01   0.1140D+01   0.4000D+01    -0.1   0.1000D+00   715
# natural mortality
  0.0000D+00   0.4900D+00   0.1000D+01     0.0   0.1000D+00   716
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00   717
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00   718
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00   719
  0.0000D+00   0.2400D+00   0.1000D+01     0.0   0.1000D+00   720
  0.0000D+00   0.2000D+00   0.1000D+01     0.0   0.1000D+00   721
  0.0000D+00   0.1750D+00   0.1000D+01     0.0   0.1000D+00   722
  0.0000D+00   0.1500D+00   0.1000D+01     0.0   0.1000D+00   723
  0.0000D+00   0.1250D+00   0.1000D+01     0.0   0.1000D+00   724
  0.0000D+00   0.1000D+00   0.1000D+01     0.0   0.1000D+00   725
# transfer coefficients
  0.0000D+00   0.0000D+00   0.1000D+01     0.0   0.1000D+00   726
  0.0000D+00   0.2427D-02   0.1000D+01     1.0   0.1000D+00   727
  0.0000D+00   0.2427D-02   0.1000D+01    -0.1   0.1000D+00   728
  0.0000D+00   0.2490D-01   0.1000D+01     1.0   0.1000D+00   729
  0.0000D+00   0.2490D-01   0.1000D+01    -0.1   0.1000D+00   730
  0.0000D+00   0.2490D-01   0.1000D+01    -0.1   0.1000D+00   731
  0.0000D+00   0.2490D-01   0.1000D+01    -0.1   0.1000D+00   732
  0.0000D+00   0.1553D-01   0.1000D+01     1.0   0.1000D+00   733
  0.0000D+00   0.1553D-01   0.1000D+01    -0.1   0.1000D+00   734
  0.0000D+00   0.1553D-01   0.1000D+01    -0.1   0.1000D+00   735
# Stock recruitment relationship
 -0.1000D+21   0.3141D+06   0.1000D+21     0.0   0.4000D+00   736
 -0.1000D+21   0.1638D+06   0.1000D+21     0.0   0.0000D+00   737
 -0.1000D+02   0.1500D+01   0.9000D+00     0.0   0.0000D+00   738
  0.0000D+00   0.5000D+00   0.2000D+01     0.0   0.0000D+00   739
  0.0000D+00   0.3464D+00   0.2000D+01     0.0   0.0000D+00   740
# Variance scaling parameters
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   741
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   742
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   743
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   744
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   745
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   746
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   747
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   748
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   749
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   750
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   751
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   752
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   753
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   754
  0.0000D+00   0.1000D+01   0.1000D+21     0.0   0.4000D+00   755
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# fraction surviving the intial tagging process
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   756
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   757
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   758
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   759
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   760
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   761
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   762
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   763
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   764
  0.0000D+00   0.8000D+00   0.1000D+01      0.0   0.1000D+00   765
# tag shedding rate
  0.0000D+00   0.2600D+00   0.1000D+01      1.0   0.1000D+00    81
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    82
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    83
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    84
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    85
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    86
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    87
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    88
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    89
  0.0000D+00   0.2600D+00   0.1000D+01      -.1   0.1000D+00    90
# tag reporting rate
$ 1   0.0000D+00   0.2331D+00   0.1000D+01     1.0   0.1000D+00    84
$ 19  0.0000D+00   0.2331D+00   0.1000D+01     -.1    0.1000D+00    83     6.
$ 1   0.0000D+00   0.2331D+00   0.1000D+01     1.0   0.1000D+00    84
$ 7  0.0000D+00   0.2331D+00   0.1000D+01     -.1    0.1000D+00    83     6.
# tag nonmixing factor for first year
  0.0000D+00   0.6740D+00   0.5000D+01      1.0   0.1000D+00   804   70    1
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   805   70    2
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   806   70    3
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   807   70    4
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   808   70    5
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   809   70    6
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   810   70    7
  0.0000D+00   0.1120D+01   0.5000D+01      1.0   0.1000D+00   811   70    8
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   812   70    9
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   813   70   10
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   814   71    1
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   815   71    2
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   816   71    3
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   817   71    4
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   818   71    5
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   819   71    6
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   820   71    7
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   821   71    8
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   822   71    9
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   823   71   10
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   824   72    1
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   825   72    2
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   826   72    3
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   827   72    4
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   828   72    5
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   829   72    6
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   830   72    7
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   831   72    8
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   832   72    9
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   833   72   10
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   834   73    1
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   835   73    2
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   836   73    3
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   837   73    4
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   838   73    5
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   839   73    6
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   840   73    7
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   841   73    8
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   842   73    9
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   843   73   10
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   844   74    1
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   845   74    2
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   846   74    3
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   847   74    4
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   848   74    5
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   849   74    6
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   850   74    7
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   851   74    8
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   852   74    9
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   853   74   10
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   854   75    1
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   855   75    2
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   856   75    3
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   857   75    4
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   858   75    5
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   859   75    6
  0.0000D+00   0.6740D+00   0.5000D+01   -804.0   0.1000D+00   860   75    7
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   861   75    8
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   862   75    9
  0.0000D+00   0.1120D+01   0.5000D+01   -811.0   0.1000D+00   863   75   10
  0.0000D+00   0.7007D+00   0.5000D+01      1.0   0.1000D+00   864   76    1
  0.0000D+00   0.7007D+00   0.5000D+01     -0.1   0.1000D+00   865   76    2
  0.0000D+00   0.7007D+00   0.5000D+01     -0.1   0.1000D+00   866   76    3
  0.0000D+00   0.7007D+00   0.5000D+01     -0.1   0.1000D+00   867   76    4
  0.0000D+00   0.7007D+00   0.5000D+01     -0.1   0.1000D+00   868   76    5
  0.0000D+00   0.7007D+00   0.5000D+01     -0.1   0.1000D+00   869   76    6
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0.0000D+00	0.7007D+00	0.5000D+01	-0.1	0.1000D+00	870	76	7
0.0000D+00	0.1120D+01	0.5000D+01	-811.0	0.1000D+00	871	76	8
0.0000D+00	0.1120D+01	0.5000D+01	-811.0	0.1000D+00	872	76	9
0.0000D+00	0.1120D+01	0.5000D+01	-811.0	0.1000D+00	873	76	10
0.0000D+00	0.3272D+00	0.5000D+01	1.0	0.1000D+00	874	77	1
0.0000D+00	0.3272D+00	0.5000D+01	-0.1	0.1000D+00	875	77	2
0.0000D+00	0.3272D+00	0.5000D+01	-0.1	0.1000D+00	876	77	3
0.0000D+00	0.3272D+00	0.5000D+01	-0.1	0.1000D+00	877	77	4
0.0000D+00	0.3272D+00	0.5000D+01	-0.1	0.1000D+00	878	77	5
0.0000D+00	0.3272D+00	0.5000D+01	-0.1	0.1000D+00	879	77	6
0.0000D+00	0.3272D+00	0.5000D+01	-0.1	0.1000D+00	880	77	7
0.0000D+00	0.1825D+01	0.5000D+01	1.0	0.1000D+00	881	77	8
0.0000D+00	0.1825D+01	0.5000D+01	-0.1	0.1000D+00	882	77	9
0.0000D+00	0.1825D+01	0.5000D+01	-0.1	0.1000D+00	883	77	10
0.0000D+00	0.3509D+00	0.5000D+01	1.0	0.1000D+00	884	78	1
0.0000D+00	0.3509D+00	0.5000D+01	-0.1	0.1000D+00	885	78	2
0.0000D+00	0.3509D+00	0.5000D+01	-0.1	0.1000D+00	886	78	3
0.0000D+00	0.3509D+00	0.5000D+01	-0.1	0.1000D+00	887	78	4
0.0000D+00	0.3509D+00	0.5000D+01	-0.1	0.1000D+00	888	78	5
0.0000D+00	0.3509D+00	0.5000D+01	-0.1	0.1000D+00	889	78	6
0.0000D+00	0.3509D+00	0.5000D+01	-0.1	0.1000D+00	890	78	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	891	78	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	892	78	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	893	78	10
0.0000D+00	0.3509D+00	0.5000D+01	-884.0	0.1000D+00	894	79	1
0.0000D+00	0.3509D+00	0.5000D+01	-884.0	0.1000D+00	895	79	2
0.0000D+00	0.3509D+00	0.5000D+01	-884.0	0.1000D+00	896	79	3
0.0000D+00	0.3509D+00	0.5000D+01	-884.0	0.1000D+00	897	79	4
0.0000D+00	0.3509D+00	0.5000D+01	-884.0	0.1000D+00	898	79	5
0.0000D+00	0.3509D+00	0.5000D+01	-884.0	0.1000D+00	899	79	6
0.0000D+00	0.3509D+00	0.5000D+01	-884.0	0.1000D+00	900	79	7
0.0000D+00	0.2158D+00	0.5000D+01	1.0	0.1000D+00	901	79	8
0.0000D+00	0.2158D+00	0.5000D+01	-0.1	0.1000D+00	902	79	9
0.0000D+00	0.2158D+00	0.5000D+01	-0.1	0.1000D+00	903	79	10
0.0000D+00	0.7298D+00	0.5000D+01	1.0	0.1000D+00	904	80	1
0.0000D+00	0.7298D+00	0.5000D+01	-0.1	0.1000D+00	905	80	2
0.0000D+00	0.7298D+00	0.5000D+01	-0.1	0.1000D+00	906	80	3
0.0000D+00	0.7298D+00	0.5000D+01	-0.1	0.1000D+00	907	80	4
0.0000D+00	0.7298D+00	0.5000D+01	-0.1	0.1000D+00	908	80	5
0.0000D+00	0.7298D+00	0.5000D+01	-0.1	0.1000D+00	909	80	6
0.0000D+00	0.7298D+00	0.5000D+01	-0.1	0.1000D+00	910	80	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	911	80	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	912	80	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	913	80	10
0.0000D+00	0.1312D+01	0.5000D+01	1.0	0.1000D+00	914	81	1
0.0000D+00	0.1312D+01	0.5000D+01	-0.1	0.1000D+00	915	81	2
0.0000D+00	0.1312D+01	0.5000D+01	-0.1	0.1000D+00	916	81	3
0.0000D+00	0.1312D+01	0.5000D+01	-0.1	0.1000D+00	917	81	4
0.0000D+00	0.1312D+01	0.5000D+01	-0.1	0.1000D+00	918	81	5
0.0000D+00	0.1312D+01	0.5000D+01	-0.1	0.1000D+00	919	81	6
0.0000D+00	0.1312D+01	0.5000D+01	-0.1	0.1000D+00	920	81	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	921	81	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	922	81	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	923	81	10
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	924	82	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	925	82	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	926	82	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	927	82	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	928	82	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	929	82	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	930	82	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	931	82	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	932	82	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	933	82	10
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	934	83	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	935	83	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	936	83	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	937	83	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	938	83	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	939	83	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	940	83	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	941	83	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	942	83	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	943	83	10
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	944	84	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	945	84	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	946	84	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	947	84	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	948	84	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	949	84	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	950	84	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	951	84	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	952	84	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	953	84	10
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	954	85	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	955	85	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	956	85	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	957	85	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	958	85	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	959	85	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	960	85	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	961	85	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	962	85	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	963	85	10

0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	964	86	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	965	86	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	966	86	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	967	86	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	968	86	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	969	86	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	970	86	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	971	86	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	972	86	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	973	86	10
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	974	87	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	975	87	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	976	87	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	977	87	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	978	87	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	979	87	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	980	87	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	981	87	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	982	87	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	983	87	10
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	984	88	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	985	88	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	986	88	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	987	88	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	988	88	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	989	88	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	990	88	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	991	88	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	992	88	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	993	88	10
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	994	89	1
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	995	89	2
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	996	89	3
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	997	89	4
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	998	89	5
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	999	89	6
0.0000D+00	0.1312D+01	0.5000D+01	-914.0	0.1000D+00	1000	89	7
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	1001	89	8
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	1002	89	9
0.0000D+00	0.1825D+01	0.5000D+01	-881.0	0.1000D+00	1003	89	10
0.0000D+00	0.5488D+00	0.5000D+01	1.0	0.1000D+00	1004	90	1
0.0000D+00	0.5488D+00	0.5000D+01	-0.1	0.1000D+00	1005	90	2
0.0000D+00	0.5488D+00	0.5000D+01	-0.1	0.1000D+00	1006	90	3
0.0000D+00	0.4299D+00	0.5000D+01	1.0	0.1000D+00	1007	90	4
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1008	90	5
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1009	90	6
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1010	90	7
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1011	90	8
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1012	90	9
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1013	90	10
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1014	91	1
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1015	91	2
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1016	91	3
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1017	91	4
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1018	91	5
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1019	91	6
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1020	91	7
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1021	91	8
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1022	91	9
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1023	91	10
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1024	92	1
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1025	92	2
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1026	92	3
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1027	92	4
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1028	92	5
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1029	92	6
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1030	92	7
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1031	92	8
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1032	92	9
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1033	92	10
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1034	93	1
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1035	93	2
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1036	93	3
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1037	93	4
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1038	93	5
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1039	93	6
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1040	93	7
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1041	93	8
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1042	93	9
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1043	93	10
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1044	94	1
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1045	94	2
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1046	94	3
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1047	94	4
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1048	94	5
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1049	94	6
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1050	94	7
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1051	94	8
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1052	94	9
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1053	94	10
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1054	95	1
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1055	95	2
0.0000D+00	0.5488D+00	0.5000D+01	-1004.0	0.1000D+00	1056	95	3
0.0000D+00	0.4299D+00	0.5000D+01	-1007.0	0.1000D+00	1057	95	4

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  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1058   95    5
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  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1060   95    7
  0.0000D+00   0.3982D+00   0.5000D+01      1.0   0.1000D+00  1061   95    8
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1062   95    9
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1063   95   10
  0.0000D+00   0.5488D+00   0.5000D+01  -1004.0   0.1000D+00  1064   96    1
  0.0000D+00   0.5488D+00   0.5000D+01  -1004.0   0.1000D+00  1065   96    2
  0.0000D+00   0.5488D+00   0.5000D+01  -1004.0   0.1000D+00  1066   96    3
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1067   96    4
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1068   96    5
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1069   96    6
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1070   96    7
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1071   96    8
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1072   96    9
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1073   96   10
  0.0000D+00   0.5488D+00   0.5000D+01  -1004.0   0.1000D+00  1074   97    1
  0.0000D+00   0.5488D+00   0.5000D+01  -1004.0   0.1000D+00  1075   97    2
  0.0000D+00   0.5488D+00   0.5000D+01  -1004.0   0.1000D+00  1076   97    3
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1077   97    4
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1078   97    5
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1079   97    6
  0.0000D+00   0.4299D+00   0.5000D+01  -1007.0   0.1000D+00  1080   97    7
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1081   97    8
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1082   97    9
  0.0000D+00   0.3982D+00   0.5000D+01  -1061.0   0.1000D+00  1083   97   10
# tag nonmixing factor for second year
  0.0000D+00   0.1000D+01   0.5000D+01      1.0   0.1000D+00  1084   98    1
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1085   98    2
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1086   98    3
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1087   98    4
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1088   98    5
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1089   98    6
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1090   98    7
  0.0000D+00   0.1000D+01   0.5000D+01      1.0   0.1000D+00  1091   98    8
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1092   98    9
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1093   98   10
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1094   99    1
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1095   99    2
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1096   99    3
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1097   99    4
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1098   99    5
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1099   99    6
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1100   99    7
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1101   99    8
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1102   99    9
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1103   99   10
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1104  100    1
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1105  100    2
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1106  100    3
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1107  100    4
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1108  100    5
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1109  100    6
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1110  100    7
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1111  100    8
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1112  100    9
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1113  100   10
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1114  101    1
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1115  101    2
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1116  101    3
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1117  101    4
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1118  101    5
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1119  101    6
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1120  101    7
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1121  101    8
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1122  101    9
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1123  101   10
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1124  102    1
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1125  102    2
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1126  102    3
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1127  102    4
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1128  102    5
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1129  102    6
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1130  102    7
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1131  102    8
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1132  102    9
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1133  102   10
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1134  103    1
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1135  103    2
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1136  103    3
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1137  103    4
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1138  103    5
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1139  103    6
  0.0000D+00   0.1000D+01   0.5000D+01    -1084.0   0.1000D+00  1140  103    7
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1141  103    8
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1142  103    9
  0.0000D+00   0.1000D+01   0.5000D+01    -1091.0   0.1000D+00  1143  103   10
  0.0000D+00   0.1000D+01   0.5000D+01      1.0   0.1000D+00  1144  104    1
  0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00  1145  104    2
  0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00  1146  104    3
  0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00  1147  104    4
  0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00  1148  104    5
  0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00  1149  104    6
  0.0000D+00   0.1000D+01   0.5000D+01     -0.1   0.1000D+00  1150  104    7
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0.0000D+00	0.1000D+01	0.5000D+01	-1091.0	0.1000D+00	1151	104	8
0.0000D+00	0.1000D+01	0.5000D+01	-1091.0	0.1000D+00	1152	104	9
0.0000D+00	0.1000D+01	0.5000D+01	-1091.0	0.1000D+00	1153	104	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1154	105	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1155	105	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1156	105	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1157	105	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1158	105	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1159	105	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1160	105	7
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1161	105	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1162	105	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1163	105	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1164	106	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1165	106	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1166	106	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1167	106	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1168	106	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1169	106	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1170	106	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1171	106	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1172	106	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1173	106	10
0.0000D+00	0.1000D+01	0.5000D+01	-1164.0	0.1000D+00	1174	107	1
0.0000D+00	0.1000D+01	0.5000D+01	-1164.0	0.1000D+00	1175	107	2
0.0000D+00	0.1000D+01	0.5000D+01	-1164.0	0.1000D+00	1176	107	3
0.0000D+00	0.1000D+01	0.5000D+01	-1164.0	0.1000D+00	1177	107	4
0.0000D+00	0.1000D+01	0.5000D+01	-1164.0	0.1000D+00	1178	107	5
0.0000D+00	0.1000D+01	0.5000D+01	-1164.0	0.1000D+00	1179	107	6
0.0000D+00	0.1000D+01	0.5000D+01	-1164.0	0.1000D+00	1180	107	7
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1181	107	8
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1182	107	9
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1183	107	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1184	108	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1185	108	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1186	108	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1187	108	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1188	108	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1189	108	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1190	108	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1191	108	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1192	108	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1193	108	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1194	109	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1195	109	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1196	109	3
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1197	109	4
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1198	109	5
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1199	109	6
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1200	109	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1201	109	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1202	109	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1203	109	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1204	110	1
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1205	110	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1206	110	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1207	110	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1208	110	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1209	110	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1210	110	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1211	110	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1212	110	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1213	110	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1214	111	1
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1215	111	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1216	111	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1217	111	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1218	111	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1219	111	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1220	111	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1221	111	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1222	111	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1223	111	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1224	112	1
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1225	112	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1226	112	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1227	112	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1228	112	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1229	112	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1230	112	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1231	112	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1232	112	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1233	112	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1234	113	1
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1235	113	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1236	113	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1237	113	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1238	113	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1239	113	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1240	113	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1241	113	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1242	113	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1243	113	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1244	114	1

0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1245	114	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1246	114	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1247	114	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1248	114	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1249	114	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1250	114	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1251	114	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1252	114	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1253	114	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1254	115	1
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1255	115	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1256	115	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1257	115	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1258	115	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1259	115	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1260	115	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1261	115	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1262	115	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1263	115	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1264	116	1
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1265	116	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1266	116	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1267	116	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1268	116	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1269	116	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1270	116	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1271	116	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1272	116	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1273	116	10
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1274	117	1
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1275	117	2
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1276	117	3
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1277	117	4
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1278	117	5
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1279	117	6
0.0000D+00	0.1000D+01	0.5000D+01	-1194.0	0.1000D+00	1280	117	7
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1281	117	8
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1282	117	9
0.0000D+00	0.1000D+01	0.5000D+01	-1161.0	0.1000D+00	1283	117	10
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1284	118	1
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1285	118	2
0.0000D+00	0.1000D+01	0.5000D+01	-0.1	0.1000D+00	1286	118	3
0.0000D+00	0.1000D+01	0.5000D+01	1.0	0.1000D+00	1287	118	4
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1288	118	5
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1289	118	6
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1290	118	7
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1291	118	8
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1292	118	9
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1293	118	10
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1294	119	1
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1295	119	2
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1296	119	3
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1297	119	4
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1298	119	5
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1299	119	6
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1300	119	7
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1301	119	8
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1302	119	9
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1303	119	10
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1304	120	1
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1305	120	2
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1306	120	3
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1307	120	4
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1308	120	5
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1309	120	6
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1310	120	7
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1311	120	8
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1312	120	9
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1313	120	10
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1314	121	1
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1315	121	2
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1316	121	3
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1317	121	4
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1318	121	5
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1319	121	6
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1320	121	7
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1321	121	8
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1322	121	9
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1323	121	10
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1324	122	1
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1325	122	2
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1326	122	3
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1327	122	4
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1328	122	5
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1329	122	6
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1330	122	7
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1331	122	8
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1332	122	9
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1333	122	10
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1334	123	1
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1335	123	2
0.0000D+00	0.1000D+01	0.5000D+01	-1284.0	0.1000D+00	1336	123	3
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1337	123	4
0.0000D+00	0.1000D+01	0.5000D+01	-1287.0	0.1000D+00	1338	123	5

```
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1339  123    6
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1340  123    7
  0.0000D+00   0.1000D+01   0.5000D+01      1.0   0.1000D+00  1341  123    8
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1342  123    9
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1343  123   10
  0.0000D+00   0.1000D+01   0.5000D+01  -1284.0   0.1000D+00  1344  124    1
  0.0000D+00   0.1000D+01   0.5000D+01  -1284.0   0.1000D+00  1345  124    2
  0.0000D+00   0.1000D+01   0.5000D+01  -1284.0   0.1000D+00  1346  124    3
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1347  124    4
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1348  124    5
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1349  124    6
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1350  124    7
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1351  124    8
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1352  124    9
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1353  124   10
  0.0000D+00   0.1000D+01   0.5000D+01  -1284.0   0.1000D+00  1354  125    1
  0.0000D+00   0.1000D+01   0.5000D+01  -1284.0   0.1000D+00  1355  125    2
  0.0000D+00   0.1000D+01   0.5000D+01  -1284.0   0.1000D+00  1356  125    3
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1357  125    4
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1358  125    5
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1359  125    6
  0.0000D+00   0.1000D+01   0.5000D+01  -1287.0   0.1000D+00  1360  125    7
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1361  125    8
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1362  125    9
  0.0000D+00   0.1000D+01   0.5000D+01  -1341.0   0.1000D+00  1363  125   10
# Number of parameters =         1363
```

A.3.2 Output Files

There is a parameter estimate file that uses the same structure as the Parameter specification input file. The results are summarized in an output file as follows:

```
              ****************************************
                                VPA-2BOX
                SUMMARY STATISTICS AND DIAGNOSTIC OUTPUT
                ****************************************

diffusion model T5P2R2L
 9:04, 15  January  2002

=======================================================================
Total objective function =   10602.56
Number of parameters     =         73
Number of data points    =       8691
AIC  {Deviance+2P     }  =    2531.44
AICc {Deviance+2P(...)}  =    2532.69
BIC  {Deviance+Plog(nd)} =    3047.55
Chi-square discrepancy   =     869.30
Log-likelihood (deviance)=  -10600.77 (   2385.44)
   effort data           =     -54.67 (    326.16)
   tagging data          =  -10546.10 (   2059.27)
Log-posteriors           =      -1.79
   catchability          =       0.00
   f-ratio               =      -1.79
   natural mortality     =       0.00
   mixing coeff.         =       0.00
   initial tag survival  =       0.00
   tag shedding rate     =       0.00
   tag reporting rate    =       0.00
   tag nomixing factor   =       0.00
Constraints              =       0.00
   terminal F            =       0.00
   stock-rec./sex ratio  =       0.00
Out of bounds penalty    =       0.00
=======================================================================


11111111111111111111111111111111111111111111111111
EAST
11111111111111111111111111111111111111111111111111


TABLE 1.1 FISHING MORTALITY RATE FOR EAST
=============================================================================
          1      2      3      4      5      6      7      8      9     10
-----------------------------------------------------------------------------
   70   0.219  0.231  0.129  0.099  0.037  0.020  0.039  0.029  0.066  0.066
   71   0.011  0.281  0.267  0.112  0.098  0.021  0.017  0.055  0.052  0.052
   72   0.171  0.235  0.433  0.140  0.094  0.075  0.026  0.011  0.036  0.036
   73   0.145  0.178  0.200  0.111  0.042  0.046  0.089  0.055  0.038  0.038
   74   0.127  0.234  0.273  0.237  0.168  0.086  0.059  0.080  0.075  0.075
   75   0.553  0.356  0.134  0.121  0.044  0.094  0.062  0.070  0.094  0.094
   76   0.066  0.380  0.660  0.213  0.177  0.052  0.099  0.054  0.074  0.074
   77   0.219  0.317  0.267  0.233  0.040  0.066  0.045  0.092  0.074  0.074
   78   0.237  0.354  0.287  0.134  0.042  0.013  0.044  0.024  0.059  0.059
   79   0.080  0.117  0.296  0.151  0.067  0.028  0.023  0.081  0.056  0.056
   80   0.129  0.249  0.471  0.204  0.053  0.048  0.040  0.026  0.061  0.061
```

81	0.121	0.428	0.357	0.121	0.111	0.039	0.056	0.074	0.046	0.046
82	0.316	0.384	0.522	0.187	0.071	0.042	0.041	0.147	0.101	0.101
83	0.234	0.184	0.331	0.144	0.089	0.066	0.130	0.062	0.108	0.108
84	0.100	0.435	0.119	0.135	0.145	0.103	0.098	0.128	0.126	0.126
85	0.146	0.369	0.406	0.129	0.094	0.098	0.060	0.082	0.100	0.100
86	0.261	0.371	0.358	0.162	0.037	0.056	0.049	0.039	0.090	0.090
87	0.172	0.365	0.300	0.114	0.047	0.033	0.094	0.079	0.084	0.084
88	0.385	0.270	0.387	0.179	0.061	0.048	0.060	0.096	0.123	0.123
89	0.226	0.425	0.245	0.204	0.243	0.045	0.061	0.045	0.092	0.092
90	0.192	0.333	0.450	0.205	0.174	0.075	0.059	0.080	0.097	0.097
91	0.119	0.389	0.369	0.222	0.236	0.054	0.062	0.060	0.127	0.127
92	0.188	0.450	0.556	0.156	0.099	0.067	0.057	0.112	0.125	0.125
93	0.134	0.789	0.784	0.255	0.124	0.124	0.089	0.056	0.127	0.127
94	0.192	0.463	0.405	0.255	0.238	0.174	0.246	0.293	0.300	0.300
95	0.225	0.423	0.532	0.264	0.289	0.236	0.150	0.217	0.378	0.378
96	0.298	0.966	0.703	0.537	0.294	0.228	0.247	0.198	0.502	0.502
97	0.440	0.734	0.734	0.365	0.365	0.365	0.365	0.691	0.691	0.691

TABLE 2.1 ABUNDANCE AT THE BEGINNING OF THE YEAR [BY AREA] FOR EAST

	1	2	3	4	5	6	7	8	9	10
70	839440.	407538.	256252.	207707.	305586.	364638.	126228.	118275.	99400.	396483.
71	1244733.	413005.	247664.	172667.	150988.	232915.	294102.	102356.	101107.	429238.
72	933262.	754513.	238717.	145232.	123160.	109621.	187605.	243909.	83890.	465408.
73	1313402.	481718.	456478.	118423.	100363.	88710.	84861.	154173.	208845.	488368.
74	1931654.	696225.	308705.	285930.	83930.	76559.	69722.	66454.	126344.	612947.
75	2017543.	1042334.	421733.	179783.	177808.	56099.	58126.	55470.	54132.	626838.
76	1897194.	711319.	558914.	282189.	126302.	134081.	41988.	46362.	44779.	568036.
77	1402939.	1087941.	372116.	221117.	181307.	83818.	104415.	32059.	38329.	521170.
78	1045263.	690161.	606207.	217929.	140170.	138707.	64720.	83991.	25312.	475673.
79	1274454.	505248.	370351.	347887.	150997.	107302.	113271.	52296.	70766.	431971.
80	1888648.	720711.	343692.	210649.	236533.	111868.	86509.	93835.	41828.	432913.
81	1698843.	1017078.	429485.	164056.	135911.	177213.	87893.	70541.	79619.	407049.
82	2815364.	922264.	507161.	229852.	114585.	96120.	140169.	70158.	57050.	422323.
83	3976412.	1258018.	480514.	230237.	150592.	84131.	75745.	113368.	52463.	393999.
84	2212986.	1928529.	799984.	263841.	157701.	108869.	64575.	56018.	92078.	364258.
85	1957136.	1226575.	954070.	542981.	182137.	107979.	80786.	49221.	42602.	364767.
86	3211738.	1036280.	648178.	486214.	376218.	131057.	80731.	64177.	39094.	334947.
87	1840207.	1515917.	547061.	346511.	326308.	285772.	101842.	64951.	53431.	310531.
88	2976730.	949305.	804377.	309914.	244067.	245789.	226813.	78105.	52097.	303314.
89	2644878.	1240326.	554388.	417813.	204775.	181199.	192335.	179653.	61371.	285074.
90	2810752.	1291925.	619783.	331903.	268984.	126950.	142226.	152333.	148177.	286231.
91	2887311.	1421308.	707628.	302192.	213597.	178469.	97009.	112845.	121412.	355200.
92	3129725.	1570485.	736369.	374188.	191009.	133392.	139073.	77006.	91739.	378744.
93	2920158.	1589330.	765625.	322894.	252323.	136680.	102754.	110727.	59691.	374937.
94	1967060.	1563985.	552007.	267293.	197729.	175629.	99310.	79379.	90608.	346233.
95	2472383.	995020.	752369.	281478.	164062.	123281.	121078.	65452.	51404.	292391.
96	2297416.	1209645.	498429.	337954.	170573.	97566.	80163.	87602.	45656.	213530.
97	1083913.	1044910.	352331.	188726.	156441.	100406.	64258.	52938.	62024.	142323.
98		427574.	383569.	129589.	103480.	86356.	57346.	37932.	23039.	92649.

TABLE 3.1 CATCH OF EAST

	1	2	3	4	5	6	7	8	9	10
70	131834.	73211.	26994.	17842.	9793.	6523.	4501.	3254.	6114.	25014.
71	10384.	88198.	50413.	16589.	12777.	4390.	4529.	5157.	4906.	21189.
72	116980.	137100.	73231.	17152.	9923.	7289.	4363.	2521.	2809.	16079.
73	140707.	68048.	71707.	11121.	3710.	3659.	6740.	7668.	7385.	17757.
74	182955.	125976.	64125.	54045.	11608.	5786.	3665.	4894.	8649.	42935.
75	692276.	272026.	45944.	18469.	6853.	4582.	3240.	3527.	4697.	54436.
76	96176.	195792.	236722.	48724.	18378.	6163.	3649.	2317.	3039.	39367.
77	220444.	256835.	75831.	41725.	6345.	4861.	4180.	2639.	2613.	35976.
78	176030.	179228.	131623.	24546.	5211.	1702.	2569.	1828.	1382.	26483.
79	77747.	48322.	82586.	43682.	8753.	2691.	2378.	3797.	3656.	22807.
80	181555.	138196.	112676.	34813.	10919.	4745.	3159.	2246.	2340.	24568.
81	153659.	308374.	112260.	16763.	12811.	6096.	4418.	4737.	3416.	17651.
82	610048.	255871.	180005.	35080.	6973.	3594.	5132.	8972.	5205.	38888.
83	661161.	183593.	117908.	27771.	11486.	4906.	8530.	6412.	5103.	38832.
84	167350.	593304.	77856.	29822.	19162.	9733.	5548.	6303.	10300.	41385.
85	211218.	329782.	277272.	58541.	14591.	9209.	4330.	3627.	3833.	33306.
86	589053.	279348.	169783.	65035.	12138.	6547.	3553.	2306.	3160.	27540.
87	231377.	403819.	123350.	33317.	13324.	8403.	8448.	4599.	4096.	24101.
88	764519.	194898.	224722.	45555.	12889.	10546.	12087.	6687.	5708.	33569.
89	427685.	374544.	104582.	69006.	39704.	7228.	10436.	7301.	5099.	24004.
90	390979.	318667.	195899.	55194.	38505.	8399.	7470.	10924.	12874.	25255.
91	257208.	399047.	189996.	53999.	40314.	8501.	5384.	6126.	13655.	40469.
92	426527.	496269.	274484.	48134.	16089.	7918.	7096.	7639.	10185.	42593.
93	291913.	761131.	365258.	65159.	26289.	14508.	8127.	5584.	6765.	42839.
94	273175.	505865.	160218.	54239.	37542.	25496.	20047.	18932.	22229.	85868.
95	397190.	298948.	271217.	58546.	37126.	23756.	15577.	11943.	15399.	88172.
96	473520.	660055.	220479.	126894.	38949.	18317.	16240.	14690.	17129.	81033.
97	310602.	476212.	160888.	51831.	43254.	28100.	18335.	24970.	29385.	68633.

TABLE 4.1 SPAWNING STOCK FECUNDITY AND RECRUITMENT OF EAST

year	spawning biomass	recruits from VPA
70	161011.	839440.
71	183815.	1244733.
72	191700.	933262.
73	188799.	1313402.
74	194959.	1931654.
75	183303.	2017543.
76	180586.	1897194.
77	171531.	1402939.
78	161520.	1045263.
79	153023.	1274454.
80	147336.	1888648.

81	136736.	1698843.
82	134187.	2815364.
83	121154.	3976412.
84	118569.	2212986.
85	121347.	1957136.
86	127234.	3211738.
87	129335.	1840207.
88	132886.	2976730.
89	132997.	2644878.
90	130965.	2810752.
91	129841.	2887311.
92	128312.	3129725.
93	135302.	2920158.
94	117549.	1967060.
95	97088.	2472383.
96	74910.	2297416.
97	50100.	1083913.

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TABLE 5.1 FITS TO INDEX DATA EAST

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5.1 ESP BB

Lognormal dist.
average numbers
Ages 2 - 2
log-likelihood = -9.74
deviance = 103.37
Chi-sq. discrepancy= 114.25

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
70	3.584	3.049	0.535	0.224	0.666E-04	36.020	21.086	9.786
71	3.313	3.039	0.274	0.224	0.666E-04	27.470	20.883	1.941
72	3.283	3.662	-0.379	0.224	0.666E-04	26.660	38.933	1.939
73	3.937	3.240	0.696	0.224	0.666E-04	51.240	25.535	19.771
74	3.658	3.582	0.076	0.224	0.666E-04	38.800	35.948	0.123
75	4.401	3.930	0.470	0.224	0.666E-04	81.520	50.925	7.042
76	3.982	3.537	0.446	0.224	0.666E-04	53.640	34.353	6.150
77	4.070	3.990	0.080	0.224	0.666E-04	58.580	54.056	0.137
78	3.496	3.518	-0.022	0.224	0.666E-04	32.990	33.713	0.009
79	2.342	3.315	-0.973	0.224	0.666E-04	10.400	27.526	7.552
80	3.116	3.609	-0.493	0.224	0.666E-04	22.560	36.924	2.952
81	3.522	3.873	-0.351	0.224	0.666E-04	33.850	48.071	1.707
82	3.449	3.794	-0.346	0.224	0.666E-04	31.460	44.452	1.667
83	3.789	4.196	-0.407	0.224	0.666E-04	44.200	66.407	2.182
84	4.942	4.509	0.433	0.224	0.666E-04	140.020	90.826	5.724
85	4.217	4.086	0.132	0.224	0.666E-04	67.860	59.495	0.386
86	3.882	3.917	-0.035	0.224	0.666E-04	48.540	50.245	0.022
87	4.454	4.300	0.155	0.224	0.666E-04	86.000	73.667	0.547
88	4.091	3.875	0.216	0.224	0.666E-04	59.790	48.185	1.132
89	4.146	4.072	0.074	0.224	0.666E-04	63.190	58.677	0.115
90	3.517	4.154	-0.637	0.224	0.666E-04	33.690	63.684	4.328
91	4.157	4.224	-0.068	0.224	0.666E-04	63.850	68.331	0.084
92	4.169	4.297	-0.128	0.224	0.666E-04	64.670	73.486	0.281
93	4.963	4.163	0.799	0.224	0.666E-04	142.970	64.290	29.221
94	3.466	4.287	-0.821	0.224	0.666E-04	32.010	72.752	6.118
95	3.884	3.853	0.031	0.224	0.666E-04	48.620	47.120	0.020
96	4.157	3.819	0.338	0.224	0.666E-04	63.850	45.552	3.148
97	3.669	3.767	-0.098	0.224	0.666E-04	39.200	43.257	0.172

Selectivities by age

Year	2
70	1.000
71	1.000
72	1.000
73	1.000
74	1.000
75	1.000
76	1.000
77	1.000
78	1.000
79	1.000
80	1.000
81	1.000
82	1.000
83	1.000
84	1.000
85	1.000
86	1.000
87	1.000
88	1.000
89	1.000
90	1.000
91	1.000
92	1.000
93	1.000
94	1.000
95	1.000

96	1.000
97	1.000

5.2 FRA PS Early 2

Not used

5.3 FRA PS Late 2

Not used

5.4 FRA PS Early 3

Lognormal dist.
average numbers
Ages 3 - 3
log-likelihood = -1.13
deviance = 3.67
Chi-sq. discrepancy= 3.95

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
70	0.018	0.501	-0.483	1.076	0.790E-05	1.018	1.650	0.067
71	-0.014	0.402	-0.416	1.099	0.790E-05	0.986	1.494	0.049
72	0.107	0.289	-0.182	1.207	0.790E-05	1.113	1.335	0.008
73	1.259	1.043	0.216	1.055	0.790E-05	3.522	2.838	0.028
74	0.947	0.618	0.329	1.395	0.790E-05	2.578	1.856	0.025
75	0.363	0.995	-0.632	0.937	0.790E-05	1.438	2.704	0.156
76	1.698	1.042	0.656	0.558	0.790E-05	5.463	2.834	2.352
77	1.558	0.808	0.750	0.922	0.790E-05	4.749	2.243	0.931
78	1.115	1.286	-0.171	0.911	0.790E-05	3.050	3.620	0.019
79	0.720	0.790	-0.070	0.789	0.790E-05	2.054	2.203	0.005
80	0.227	0.636	-0.409	0.949	0.790E-05	1.255	1.889	0.077
81	0.416	0.910	-0.494	0.713	0.790E-05	1.516	2.484	0.229

Selectivities by age

Year	3
70	1.000
71	1.000
72	1.000
73	1.000
74	1.000
75	1.000
76	1.000
77	1.000
78	1.000
79	1.000
80	1.000
81	1.000

5.5 FRA PS Late 3

Lognormal dist.
average numbers
Ages 3 - 3
log-likelihood = 1.58
deviance = 12.64
Chi-sq. discrepancy= 13.04

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
82	0.999	0.727	0.273	0.534	0.599E-05	2.716	2.068	0.297
83	-0.434	0.757	-1.191	1.699	0.599E-05	0.648	2.132	0.029
84	-0.650	1.365	-2.015	1.217	0.599E-05	0.522	3.915	0.221
85	2.259	1.410	0.850	0.462	0.599E-05	9.574	4.094	7.523
86	1.145	1.044	0.100	0.807	0.599E-05	3.142	2.842	0.012
87	1.209	0.901	0.308	0.655	0.599E-05	3.350	2.462	0.242
88	1.914	1.247	0.667	0.560	0.599E-05	6.780	3.481	2.437
89	0.336	0.940	-0.604	0.634	0.599E-05	1.399	2.559	0.416
90	0.817	0.959	-0.141	0.483	0.599E-05	2.264	2.608	0.066
91	0.724	1.127	-0.403	0.460	0.599E-05	2.063	3.087	0.466
92	1.164	1.084	0.080	0.442	0.599E-05	3.203	2.957	0.032
93	1.003	1.026	-0.024	0.443	0.599E-05	2.726	2.791	0.003
94	0.221	0.863	-0.642	0.522	0.599E-05	1.247	2.369	0.716
95	1.039	1.116	-0.078	0.440	0.599E-05	2.826	3.054	0.026
96	0.892	0.631	0.261	0.472	0.599E-05	2.440	1.880	0.355
97	-0.289	0.273	-0.562	0.815	0.599E-05	0.749	1.314	0.196

Selectivities by age

Year	3
82	1.000
83	1.000
84	1.000
85	1.000

86	1.000
87	1.000
88	1.000
89	1.000
90	1.000
91	1.000
92	1.000
93	1.000
94	1.000
95	1.000
96	1.000
97	1.000

5.6 ESP TRAP 4+

Lognormal dist.
average numbers
Ages 4 - 10
log-likelihood = -3.27
deviance = 55.18
Chi-sq. discrepancy= 168.31

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
81	4.381	4.283	0.098	0.423	0.141E-03	79.918	72.462	0.054
82	4.397	4.258	0.139	0.252	0.141E-03	81.207	70.657	0.339
83	4.501	4.207	0.294	0.252	0.141E-03	90.107	67.150	1.777
84	4.331	4.136	0.195	0.252	0.141E-03	76.020	62.573	0.702
85	4.326	4.086	0.240	0.252	0.141E-03	75.641	59.516	1.116
86	3.669	4.066	-0.397	0.221	0.141E-03	39.213	58.306	2.147
87	3.676	4.091	-0.415	0.229	0.141E-03	39.488	59.827	2.153
88	4.147	4.119	0.028	0.221	0.141E-03	63.244	61.494	0.016
89	4.210	4.168	0.042	0.221	0.141E-03	67.357	64.602	0.036
90	4.193	4.216	-0.023	0.221	0.141E-03	66.221	67.730	0.010
91	4.124	4.252	-0.128	0.221	0.141E-03	61.806	70.231	0.288
92	3.930	4.230	-0.300	0.229	0.141E-03	50.907	68.746	1.251
93	3.741	4.203	-0.462	0.228	0.141E-03	42.140	66.918	2.563
94	3.725	4.082	-0.357	0.229	0.141E-03	41.471	59.254	1.678
95	3.687	3.862	-0.175	0.228	0.141E-03	39.925	47.550	0.481
96	3.649	3.594	0.055	0.221	0.141E-03	38.436	36.380	0.064
97	4.544	3.217	1.327	0.221	0.141E-03	94.066	24.950	153.634

Selectivities by age

Year	4	5	6	7	8	9	10
81	0.003	0.048	0.158	0.256	0.507	0.674	1.000
82	0.003	0.048	0.158	0.256	0.507	0.674	1.000
83	0.003	0.048	0.158	0.256	0.507	0.674	1.000
84	0.003	0.048	0.158	0.256	0.507	0.674	1.000
85	0.003	0.048	0.158	0.256	0.507	0.674	1.000
86	0.003	0.048	0.158	0.256	0.507	0.674	1.000
87	0.003	0.048	0.158	0.256	0.507	0.674	1.000
88	0.003	0.048	0.158	0.256	0.507	0.674	1.000
89	0.003	0.048	0.158	0.256	0.507	0.674	1.000
90	0.003	0.048	0.158	0.256	0.507	0.674	1.000
91	0.003	0.048	0.158	0.256	0.507	0.674	1.000
92	0.003	0.048	0.158	0.256	0.507	0.674	1.000
93	0.003	0.048	0.158	0.256	0.507	0.674	1.000
94	0.003	0.048	0.158	0.256	0.507	0.674	1.000
95	0.003	0.048	0.158	0.256	0.507	0.674	1.000
96	0.003	0.048	0.158	0.256	0.507	0.674	1.000
97	0.003	0.048	0.158	0.256	0.507	0.674	1.000

5.7 JLL East&Med 8+

Lognormal dist.
average numbers
Ages 8 - 10
log-likelihood = 1.46
deviance = 64.17
Chi-sq. discrepancy= 75.96

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
75	-0.456	-0.295	-0.161	0.226	0.136E-05	0.634	0.745	0.420
76	-0.177	-0.398	0.221	0.227	0.136E-05	0.838	0.672	1.156
77	0.232	-0.509	0.741	0.232	0.136E-05	1.261	0.601	21.786
78	-0.498	-0.518	0.020	0.230	0.136E-05	0.608	0.596	0.007
79	-0.708	-0.553	-0.155	0.246	0.136E-05	0.493	0.575	0.331
80	-0.369	-0.540	0.171	0.237	0.136E-05	0.691	0.582	0.605
81	-0.540	-0.542	0.001	0.240	0.136E-05	0.583	0.582	0.000
82	-0.002	-0.594	0.592	0.232	0.136E-05	0.998	0.552	11.806
83	-0.587	-0.575	-0.012	0.228	0.136E-05	0.556	0.563	0.003
84	-0.658	-0.656	-0.002	0.224	0.136E-05	0.518	0.519	0.000
85	-0.555	-0.779	0.224	0.234	0.136E-05	0.574	0.459	1.116
86	-0.647	-0.814	0.167	0.228	0.136E-05	0.524	0.443	0.618
87	-0.086	-0.827	0.741	0.236	0.136E-05	0.918	0.437	21.154
88	-0.653	-0.835	0.181	0.230	0.136E-05	0.520	0.434	0.725

89	-0.996	-0.623	-0.372	0.239	0.136E-05	0.370	0.536	1.640
90	-0.805	-0.490	-0.315	0.230	0.136E-05	0.447	0.612	1.341
91	-0.472	-0.508	0.035	0.231	0.136E-05	0.624	0.602	0.023
92	-1.095	-0.594	-0.501	0.227	0.136E-05	0.334	0.552	2.925
93	-0.919	-0.607	-0.312	0.234	0.136E-05	0.399	0.545	1.275
94	-1.034	-0.734	-0.300	0.242	0.136E-05	0.356	0.480	1.115
95	-0.881	-1.001	0.120	0.227	0.136E-05	0.414	0.367	0.307
96	-2.255	-1.198	-1.057	0.235	0.136E-05	0.105	0.302	7.493
97	-1.671	-1.587	-0.084	0.236	0.136E-05	0.188	0.204	0.113

Selectivities by age

Year	8	9	10
75	0.810	1.000	0.791
76	0.810	1.000	0.791
77	0.810	1.000	0.791
78	0.810	1.000	0.791
79	0.810	1.000	0.791
80	0.810	1.000	0.791
81	0.810	1.000	0.791
82	0.810	1.000	0.791
83	0.810	1.000	0.791
84	0.810	1.000	0.791
85	0.810	1.000	0.791
86	0.810	1.000	0.791
87	0.810	1.000	0.791
88	0.810	1.000	0.791
89	0.810	1.000	0.791
90	0.810	1.000	0.791
91	0.810	1.000	0.791
92	0.810	1.000	0.791
93	0.810	1.000	0.791
94	0.810	1.000	0.791
95	0.810	1.000	0.791
96	0.810	1.000	0.791
97	0.810	1.000	0.791

5.8 JLL Cent 8+

Not used

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TABLE 6.1 FITS TO TAGS RELEASED IN HOME RANGE OF EAST
Multinomial dist.
log-likelihood = -1770.26
deviance = 367.20

Release Year	Age	Recapture Area	Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
77	1	1	obsd	3.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.60	0.36	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	1	1	obsd	23.00	1.00	3.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	7.28	2.18	1.13	0.13	0.04	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	1	1	obsd	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.19	0.49	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	1	1	obsd	13.00	3.00	2.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	8.51	4.04	3.32	0.40	0.21	0.08	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
81	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.31	1.48	0.95	0.19	0.07	0.02	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
82	1	1	obsd	5.00	6.00	3.00	2.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	2.48	2.26	1.27	0.75	0.12	0.07	0.07	0.04	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.00												
83	1	1	obsd	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.33	0.80	0.59	0.11	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	1	1	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.34	0.35	0.41	0.12	0.08	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
86	1	1	obsd	36.00	8.00	5.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	36.96	7.82	11.58	2.77	0.79	0.14	0.09	0.05	0.17	0.11	0.07	0.04																
88	1	1	obsd	28.00	19.00	5.00	0.00	2.00	0.00	1.00	0.00	0.00	0.00																		
			pred	29.20	20.64	11.21	2.40	0.56	0.39	0.43	0.20	0.22	0.12																		
89	1	1	obsd	2.00	1.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00																			
			pred	1.57	1.81	1.13	0.22	0.10	0.07	0.03	0.03	0.04																			
90	1	1	obsd	8.00	20.00	3.00	5.00	3.00	0.00	0.00	0.00																				
			pred	9.68	13.86	10.08	1.86	0.84	0.41	0.22	0.27																				
91	1	1	obsd	4.00	2.00	4.00	2.00	0.00	0.00	0.00																					
			pred	0.76	5.87	4.62	0.53	0.28	0.11	0.08																					
93	1	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.02	0.01	0.00	0.00																							
94	1	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.05	0.35	0.27	0.05																								
95	1	1	obsd	0.00	0.00	0.00																									
			pred	0.01	0.08	0.02																									
96	1	1	obsd	0.00	0.00																										
			pred	0.04	0.05																										
76	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.08	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
77	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.50	0.21	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	2	1	obsd	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	3.66	1.34	0.10	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	2	1	obsd	1.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	2.61	7.13	0.14	0.05	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	2	1	obsd	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	3.75	0.71	0.30	0.08	0.05	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
81	2	1	obsd	4.00	6.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	3.68	6.59	1.44	0.77	0.29	0.09	0.09	0.08	0.04	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00											
82	2	1	obsd	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	1.01	1.36	0.47	0.18	0.06	0.06	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00												
83	2	1	obsd	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	2.37	2.36	2.56	0.41	0.22	0.25	0.12	0.11	0.09	0.05	0.03	0.05	0.03	0.02	0.01													
84	2	1	obsd	8.00	8.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00														
			pred	12.96	7.41	2.68	0.43	0.26	0.20	0.11	0.11	0.07	0.04	0.06	0.04	0.02	0.01														
85	2	1	obsd	12.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	6.44	2.47	1.27	0.38	0.17	0.09	0.06	0.07	0.05	0.06	0.04	0.02	0.01															
86	2	1	obsd	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	1.59	0.21	0.20	0.14	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00																

88	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.59	0.31	0.16	0.09	0.01	0.01	0.02	0.01	0.01	0.00
89	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.20	0.13	0.04	0.01	0.01	0.01	0.00	0.00	0.00
90	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.12	0.09	0.03	0.01	0.01	0.00	0.00	0.00
91	2	1	obsd	0.00	0.00	0.00	1.00	0.00	0.00	0.00
			pred	0.13	0.32	0.08	0.04	0.02	0.01	0.01
92	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.04	0.02	0.00	0.00	0.00	0.00
93	2	1	obsd	0.00	0.00	0.00	0.00	0.00
			pred	0.02	0.02	0.01	0.00	0.00
94	2	1	obsd	0.00	0.00	0.00	0.00
			pred	0.01	0.06	0.03	0.01
96	2	1	obsd	0.00	0.00
			pred	0.05	0.02
97	2	1	obsd	0.00
			pred	0.03
78	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.53	0.12	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.96	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	3	1	obsd	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	1.45	0.66	0.60	0.22	0.07	0.07	0.07	0.03	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00
83	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	3	1	obsd	1.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.93	0.74	0.22	0.12	0.13	0.06	0.06	0.05	0.03	0.02	0.03	0.02	0.01	0.01
85	3	1	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	1.58	0.25	0.13	0.08	0.06	0.03	0.03	0.02	0.01	0.02	0.01	0.01	0.00
86	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.25	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.01	0.01	0.00	0.00	0.00	0.00
93	3	1	obsd	0.00	0.00	0.00	0.00	0.00
			pred	0.06	0.01	0.00	0.00	0.00
97	3	1	obsd	0.00
			pred	0.07
78	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	4	1	obsd	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.36	0.03	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	4	1	obsd	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.20	0.17	0.19	0.06	0.03	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
83	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	4	1	obsd	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.09	0.05	0.03	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	4	1	obsd	0.00	0.00	0.00	0.00	0.00
			pred	0.02	0.01	0.01	0.00	0.00
96	4	1	obsd	0.00	0.00
			pred	0.02	0.02
80	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
84	5	1	obsd	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.08	0.04	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	5	1	obsd	0.00	0.00	0.00
			pred	0.01	0.01	0.01
80	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.07	0.02	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
89	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00

84	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
92	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.00	0.00	0.01	0.01	0.01	0.00																
93	7	1	obsd	0.00	0.00	0.00	0.00	0.00																	
			pred	0.01	0.02	0.01	0.01	0.00																	
95	7	1	obsd	0.00	0.00	0.00																			
			pred	0.01	0.01	0.02																			
91	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.01	0.01	0.01	0.01	0.00	0.00															
92	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.01	0.01	0.01	0.01	0.01	0.00																
93	8	1	obsd	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.02	0.01	0.01	0.00																	
95	8	1	obsd	0.00	0.00	0.00																			
			pred	0.01	0.02	0.02																			
93	9	1	obsd	0.00	0.00	0.00	0.00	0.00																	
			pred	0.01	0.02	0.01	0.01	0.00																	
95	9	1	obsd	0.00	0.00	0.00																			
			pred	0.02	0.02	0.02																			
97	9	1	obsd	0.00																					
			pred	0.04																					
90	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.05	0.05	0.04	0.03	0.04	0.02	0.01	0.01														
91	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.01	0.01	0.01	0.01	0.01	0.00	0.00															
97	10	1	obsd	0.00																					
			pred	0.46																					
77	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
78	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.10	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
79	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
80	1	2	obsd	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.12	0.02	0.01	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
81	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.02	0.02	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
82	1	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.05	0.04	0.05	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
83	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.02	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
84	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
85	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
86	1	2	obsd	0.00	1.00	2.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.53	0.55	0.14	0.06	0.04	0.03	0.03	0.01	0.01	0.00	0.00										
88	1	2	obsd	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.82	1.06	0.14	0.05	0.05	0.05	0.03	0.02	0.01												
89	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.05	0.12	0.01	0.01	0.01	0.00	0.00	0.00													
90	1	2	obsd	0.00	2.00	0.00	1.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.65	0.10	0.14	0.08	0.06	0.06	0.03														
91	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.08	0.07	0.03	0.04	0.01	0.01															
93	1	2	obsd	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00																	
94	1	2	obsd	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00																		
95	1	2	obsd	0.00	0.00	0.00																			
			pred	0.00	0.00	0.00																			
96	1	2	obsd	0.00	0.00																				
			pred	0.00	0.00																				
76	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
78	2	2	obsd	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
79	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.16	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
80	2	2	obsd	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
81	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.03	0.01	0.03	0.04	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
82	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.02	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
83	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.06	0.08	0.02	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00							

84	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.27	0.06	0.06	0.05	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00						
85	2	2	obsd	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.13	0.08	0.05	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00							
86	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
88	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
89	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
90	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00												
91	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
92	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.00	0.00	0.00	0.00														
93	2	2	obsd	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00															
94	2	2	obsd	0.00	0.00	0.00	0.00																
			pred	0.00	0.00	0.00	0.00																
96	2	2	obsd	0.00	0.00																		
			pred	0.00	0.00																		
97	2	2	obsd	0.00																			
			pred	0.00																			
78	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	3	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
80	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
81	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
82	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
83	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
84	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
85	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
86	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
88	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
91	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
93	3	2	obsd	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00															
97	3	2	obsd	0.00																			
			pred	0.00																			
78	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
82	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
83	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
84	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
85	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
86	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
93	4	2	obsd	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00															
96	4	2	obsd	0.00	0.00																		
			pred	0.00	0.00																		
80	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
82	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
83	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
84	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
86	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
95	5	2	obsd	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00																	

80	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
89	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
84	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
92	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.00	0.00	0.00												
93	7	2	obsd	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00													
95	7	2	obsd	0.00	0.00	0.00															
			pred	0.00	0.00	0.00															
91	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
92	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.00	0.00	0.00												
93	8	2	obsd	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00													
95	8	2	obsd	0.00	0.00	0.00															
			pred	0.00	0.00	0.00															
93	9	2	obsd	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00													
95	9	2	obsd	0.00	0.00	0.00															
			pred	0.00	0.00	0.00															
97	9	2	obsd	0.00																	
			pred	0.00																	
90	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
91	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
97	10	2	obsd	0.00																	
			pred	0.00																	

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2222222222222222222222222222222222222222222222222222
WEST
2222222222222222222222222222222222222222222222222222

TABLE 1.2 FISHING MORTALITY RATE FOR WEST

	1	2	3	4	5	6	7	8	9	10
70	0.185	0.603	0.797	0.178	0.071	0.014	0.008	0.002	0.012	0.012
71	0.258	1.078	0.452	0.855	0.008	0.044	0.042	0.078	0.020	0.020
72	0.177	0.891	0.692	0.076	0.162	0.002	0.019	0.014	0.019	0.019
73	0.023	0.556	0.633	0.326	0.061	0.089	0.018	0.066	0.017	0.017
74	0.094	0.124	0.282	0.282	0.252	0.026	0.075	0.022	0.058	0.050
75	0.286	0.434	0.067	0.276	0.055	0.065	0.015	0.072	0.049	0.042
76	0.035	0.204	0.384	0.032	0.107	0.031	0.032	0.072	0.077	0.066
77	0.013	0.184	0.133	0.317	0.075	0.199	0.113	0.104	0.088	0.075
78	0.113	0.137	0.218	0.129	0.175	0.085	0.050	0.074	0.090	0.077
79	0.031	0.288	0.275	0.270	0.103	0.085	0.074	0.059	0.113	0.097
80	0.043	0.230	0.402	0.255	0.081	0.128	0.191	0.132	0.137	0.118
81	0.103	0.138	0.323	0.363	0.297	0.151	0.179	0.161	0.144	0.123
82	0.110	0.062	0.026	0.015	0.038	0.057	0.026	0.044	0.060	0.036
83	0.066	0.048	0.059	0.019	0.035	0.140	0.145	0.096	0.112	0.068
84	0.016	0.087	0.032	0.051	0.060	0.092	0.128	0.108	0.101	0.061
85	0.006	0.086	0.149	0.066	0.154	0.166	0.076	0.187	0.133	0.081
86	0.007	0.071	0.118	0.060	0.036	0.089	0.053	0.050	0.147	0.089
87	0.018	0.155	0.126	0.133	0.109	0.100	0.110	0.094	0.127	0.077
88	0.061	0.120	0.153	0.079	0.151	0.152	0.135	0.159	0.162	0.098
89	0.067	0.166	0.024	0.073	0.048	0.110	0.137	0.156	0.201	0.122
90	0.039	0.112	0.289	0.038	0.073	0.069	0.119	0.173	0.177	0.107
91	0.039	0.209	0.266	0.074	0.043	0.080	0.120	0.202	0.197	0.120
92	0.157	0.063	0.030	0.027	0.050	0.026	0.095	0.132	0.198	0.120
93	0.004	0.028	0.059	0.076	0.108	0.090	0.072	0.169	0.142	0.086
94	0.216	0.007	0.034	0.035	0.080	0.125	0.140	0.148	0.140	0.085
95	0.003	0.041	0.037	0.109	0.095	0.105	0.092	0.171	0.153	0.093
96	0.028	0.026	0.042	0.055	0.095	0.049	0.176	0.140	0.175	0.106
97	0.010	0.031	0.031	0.032	0.032	0.089	0.089	0.186	0.186	0.113

TABLE 2.2 ABUNDANCE AT THE BEGINNING OF THE YEAR [BY AREA] FOR WEST

	1	2	3	4	5	6	7	8	9	10
70	481531.	247120.	250624.	151686.	61515.	72263.	24768.	74514.	46272.	326942.
71	346503.	245093.	110972.	91161.	97049.	43950.	56886.	20121.	61663.	320417.
72	352324.	163966.	68486.	58875.	29643.	73615.	33598.	44659.	15500.	325083.
73	289394.	180911.	59574.	29526.	41765.	19324.	58476.	27006.	36658.	291197.
74	789532.	173338.	87511.	30182.	16337.	30078.	14117.	46840.	21066.	280533.
75	218637.	440489.	133644.	56902.	17538.	9746.	23345.	10721.	38004.	249891.
76	201043.	100579.	238679.	106784.	33054.	12800.	7296.	18778.	8305.	239894.
77	126081.	118976.	77182.	135990.	79168.	22772.	9967.	5790.	14509.	202603.
78	60310.	76254.	97606.	60188.	75735.	56211.	14891.	7331.	4347.	175318.
79	114563.	32988.	65482.	72325.	40545.	48643.	41114.	11586.	5705.	145073.
80	94108.	68060.	27761.	45214.	42357.	28025.	35587.	31202.	9085.	119408.
81	78593.	55209.	55063.	19658.	26862.	29987.	19670.	24015.	22724.	99502.
82	42830.	43451.	57305.	38141.	10527.	15315.	20616.	13466.	16979.	93679.
83	82588.	23517.	51176.	54696.	28854.	7822.	11568.	16475.	10731.	92638.
84	67334.	47371.	44106.	47874.	41144.	21379.	5462.	8206.	12487.	83840.
85	112275.	40578.	73167.	50647.	34921.	29697.	15567.	3960.	6141.	78630.
86	101694.	68343.	54069.	67622.	36596.	22981.	20063.	11813.	2755.	68058.
87	107106.	61864.	71268.	50440.	48957.	27230.	16809.	15561.	9356.	56532.
88	103546.	64444.	70273.	59928.	33929.	33755.	19774.	12347.	11784.	52871.
89	15257.	59686.	63459.	62541.	42515.	22434.	23215.	14234.	8783.	50526.
90	79147.	8738.	62881.	60545.	44697.	31101.	16094.	16626.	10214.	45298.
91	111061.	46655.	31678.	47225.	44756.	31903.	23168.	11740.	11689.	43026.
92	3636.	65465.	55214.	31021.	33702.	32874.	23539.	16811.	8019.	41751.
93	116448.	1904.	80781.	57821.	23341.	24617.	25563.	17540.	12257.	38170.
94	12828.	71084.	35636.	75677.	41132.	16168.	17971.	19450.	12348.	39861.
95	437397.	6330.	89717.	38795.	55963.	29138.	11467.	12799.	13948.	41327.
96	12148.	267158.	25879.	83864.	26765.	38966.	20932.	8615.	8981.	43220.
97	23933.	7240.	230309.	30037.	60844.	18692.	29558.	14355.	6264.	40450.
98		14519.	27907.	182693.	22345.	45096.	13668.	22089.	9908.	36031.

TABLE 3.2 CATCH OF WEST

	1	2	3	4	5	6	7	8	9	10
70	64886.	105064.	127518.	21455.	3677.	914.	176.	162.	514.	3673.
71	62998.	153364.	38360.	46074.	672.	1673.	2109.	1350.	1133.	5958.
72	45402.	98578.	33762.	3730.	3857.	118.	569.	576.	261.	5519.
73	5105.	74311.	30482.	7161.	2132.	1451.	953.	1544.	555.	4445.
74	55958.	20056.	21094.	6506.	3170.	683.	916.	913.	1081.	12507.
75	43556.	148027.	8328.	11963.	821.	547.	317.	671.	1651.	9473.
76	5412.	19781.	72393.	2910.	2899.	344.	206.	1168.	558.	14033.
77	1274.	22419.	9717.	32139.	4946.	3633.	957.	513.	1109.	13532.
78	5133.	10863.	20015.	6315.	10530.	4061.	655.	472.	341.	11982.
79	2745.	10552.	16288.	14916.	3448.	3494.	2612.	599.	557.	12281.
80	3160.	16183.	11068.	8881.	2866.	2982.	5533.	3454.	1061.	12214.
81	6087.	9616.	16541.	5244.	6023.	3721.	2884.	3211.	2764.	10621.
82	3528.	3729.	1654.	498.	342.	751.	477.	519.	896.	3077.
83	4173.	2438.	3268.	894.	866.	911.	1402.	1353.	1039.	5628.
84	868.	7504.	1848.	2072.	2077.	1671.	594.	759.	1091.	4575.
85	568.	5523.	12310.	2814.	4329.	4019.	1024.	612.	696.	5603.
86	563.	5939.	7135.	3442.	1128.	1726.	931.	520.	345.	5335.
87	1513.	13340.	9137.	5491.	4385.	2318.	1566.	1251.	1014.	3856.
88	4850.	9149.	11745.	3933.	4144.	4220.	2258.	1631.	1600.	4554.
89	787.	12877.	1679.	3815.	1713.	2082.	2677.	1864.	1461.	5356.
90	2368.	4238.	17958.	1947.	2747.	1825.	1629.	2388.	1522.	4253.
91	3327.	14533.	10761.	2924.	1650.	2166.	2347.	1946.	1915.	4485.
92	420.	5985.	1997.	711.	1425.	737.	1916.	1870.	1323.	4383.
93	329.	1130.	5215.	3689.	2089.	1883.	1598.	2456.	1479.	2922.
94	1990.	697.	1538.	2283.	2735.	1687.	2107.	2408.	1477.	3013.
95	1036.	1229.	3549.	3476.	4399.	2572.	904.	1810.	1802.	3389.

96	261.	6753.	1449.	3894.	2120.	1643.	3029.	1021.	1311.	4006.
97	185.	990.	6481.	827.	1669.	1403.	2238.	2190.	973.	3973.

TABLE 4.2 SPAWNING STOCK FECUNDITY AND RECRUITMENT OF WEST

year	spawning biomass	recruits from VPA
70	97540.	481531.
71	89370.	346503.
72	91477.	352324.
73	85297.	289394.
74	83064.	789532.
75	69274.	218637.
76	62860.	201043.
77	55108.	126081.
78	50871.	60310.
79	41317.	114563.
80	38265.	94108.
81	34363.	78593.
82	31236.	42830.
83	29556.	82588.
84	25401.	67334.
85	20705.	112275.
86	19874.	101694.
87	18162.	107106.
88	16841.	103546.
89	15384.	15257.
90	14887.	79147.
91	13657.	111061.
92	13174.	3636.
93	13770.	116448.
94	13699.	12828.
95	14352.	437397.
96	13290.	12148.
97	12726.	23933.

TABLE 5.2 FITS TO INDEX DATA WEST

5.1 CAN GSL

Lognormal dist.
average numbers
Ages 10 - 10
log-likelihood = -8.60
deviance = 17.19
Chi-sq. discrepancy= 72.80

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
81	1.804	1.767	0.037	0.283	0.105E-03	6.072	5.853	0.017
82	1.719	1.441	0.278	0.279	0.105E-03	5.578	4.226	1.260
83	2.038	1.351	0.687	0.268	0.105E-03	7.673	3.862	13.069
84	1.485	0.980	0.505	0.284	0.105E-03	4.414	2.664	5.130
85	0.497	0.867	-0.371	0.300	0.105E-03	1.643	2.381	1.019
86	0.604	0.944	-0.340	0.340	0.105E-03	1.829	2.571	0.680
87	-0.038	0.738	-0.775	0.494	0.105E-03	0.963	2.091	1.052
88	0.591	0.606	-0.016	0.392	0.105E-03	1.805	1.833	0.001
89	0.748	0.442	0.305	0.396	0.105E-03	2.112	1.556	0.751
90	0.047	0.404	-0.357	0.382	0.105E-03	1.048	1.498	0.575
91	0.681	0.309	0.372	0.408	0.105E-03	1.975	1.362	1.116
92	1.056	-0.075	1.130	0.346	0.105E-03	2.874	0.928	34.499
93	0.767	0.545	0.222	0.314	0.105E-03	2.153	1.725	0.594
94	-0.464	0.397	-0.860	0.367	0.105E-03	0.629	1.487	2.305
95	1.082	0.692	0.390	0.280	0.105E-03	2.950	1.997	2.785
96	-0.265	0.524	-0.790	0.281	0.105E-03	0.767	1.689	3.619
97	-0.195	0.714	-0.909	0.281	0.105E-03	0.823	2.042	4.326

Selectivities by age

Year	10
81	0.645
82	0.474
83	0.445
84	0.338
85	0.325
86	0.407
87	0.396
88	0.375
89	0.337
90	0.359
91	0.345
92	0.242
93	0.484
94	0.400
95	0.521
96	0.425

97 0.551

5.2 CAN SWNS

Lognormal dist.
average numbers
Ages 7 - 10
log-likelihood = -15.71
deviance = 31.42
Chi-sq. discrepancy= 72.36

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
88	1.081	0.683	0.398	0.323	0.492E-04	2.947	1.979	2.168
89	1.591	0.635	0.956	0.297	0.492E-04	4.907	1.886	27.740
90	1.399	0.618	0.780	0.297	0.492E-04	4.050	1.856	15.129
91	1.162	0.588	0.574	0.297	0.492E-04	3.195	1.800	6.492
92	1.046	0.580	0.466	0.240	0.492E-04	2.845	1.786	5.960
93	0.060	0.670	-0.610	0.233	0.492E-04	1.062	1.954	3.740
94	0.778	0.673	0.105	0.245	0.492E-04	2.177	1.960	0.198
95	0.616	0.584	0.032	0.232	0.492E-04	1.851	1.793	0.019
96	-0.431	0.465	-0.895	0.240	0.492E-04	0.650	1.591	5.877
97	-0.288	0.515	-0.803	0.242	0.492E-04	0.750	1.674	5.037

Selectivities by age

Year	7	8	9	10
88	0.249	0.672	1.000	0.415
89	0.249	0.672	1.000	0.415
90	0.249	0.672	1.000	0.415
91	0.249	0.672	1.000	0.415
92	0.249	0.672	1.000	0.415
93	0.249	0.672	1.000	0.415
94	0.249	0.672	1.000	0.415
95	0.249	0.672	1.000	0.415
96	0.249	0.672	1.000	0.415
97	0.249	0.672	1.000	0.415

5.3 JLL GOM

Lognormal dist.
month 0 numbers
Ages 10 - 10
log-likelihood = -6.02
deviance = 12.05
Chi-sq. discrepancy= 48.51

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
74	-0.033	0.183	-0.216	0.261	0.444E-05	0.968	1.201	0.532
75	-0.627	0.068	-0.695	0.203	0.444E-05	0.534	1.070	5.973
76	-0.406	0.027	-0.433	0.205	0.444E-05	0.666	1.027	2.886
77	-0.091	-0.142	0.051	0.214	0.444E-05	0.913	0.868	0.058
78	-0.132	-0.286	0.154	0.222	0.444E-05	0.876	0.751	0.548
79	0.252	-0.475	0.728	0.278	0.444E-05	1.287	0.622	14.310
80	0.147	-0.670	0.816	0.261	0.444E-05	1.158	0.512	22.677
81	-0.592	-0.851	0.259	0.236	0.444E-05	0.553	0.427	1.531

Selectivities by age

Year	10
74	1.000
75	1.000
76	1.000
77	1.000
78	1.000
79	1.000
80	1.000
81	1.000

5.4 DUMMY

Not used

5.5 JLL NW ATL

Lognormal dist.
month 0 numbers
Ages 2 - 9
log-likelihood = 2.76
deviance = -5.52
Chi-sq. discrepancy= 46.81

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy

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76	-1.313	-0.425	-0.888	0.445	0.278E-05	0.269	0.653	1.581
77	-0.069	-0.446	0.377	0.280	0.278E-05	0.933	0.640	2.563
78	-0.777	-0.487	-0.290	0.339	0.278E-05	0.460	0.615	0.520
79	-1.146	-0.577	-0.569	0.361	0.278E-05	0.318	0.562	1.353
80	-0.596	-0.783	0.187	0.297	0.278E-05	0.551	0.457	0.460
81	-0.268	-0.950	0.682	0.270	0.278E-05	0.765	0.387	12.669
82	-1.448	-1.140	-0.308	0.401	0.278E-05	0.235	0.320	0.403
83	-2.216	-1.101	-1.115	0.609	0.278E-05	0.109	0.332	1.006
84	-1.124	-1.007	-0.117	0.355	0.278E-05	0.325	0.365	0.091
85	-0.828	-0.870	0.042	0.316	0.278E-05	0.437	0.419	0.018
86	-2.718	-0.851	-1.867	1.044	0.278E-05	0.066	0.427	0.362
87	-1.201	-0.772	-0.428	0.402	0.278E-05	0.301	0.462	0.691
88	-0.896	-0.749	-0.148	0.326	0.278E-05	0.408	0.473	0.168
89	-1.100	-0.782	-0.318	0.360	0.278E-05	0.333	0.458	0.536
90	-1.231	-0.765	-0.466	0.379	0.278E-05	0.292	0.465	0.898
91	-1.347	-0.845	-0.502	0.404	0.278E-05	0.260	0.429	0.878
92	-0.594	-0.876	0.282	0.334	0.278E-05	0.552	0.416	0.895
93	-0.511	-0.801	0.290	0.302	0.278E-05	0.600	0.449	1.183
94	-0.707	-0.833	0.126	0.309	0.278E-05	0.493	0.435	0.180
95	-0.911	-0.764	-0.147	0.368	0.278E-05	0.402	0.466	0.129
96	0.162	-0.737	0.899	0.316	0.278E-05	1.176	0.479	20.227
97	-0.483	-0.494	0.011	0.334	0.278E-05	0.617	0.610	0.001

Selectivities by age

Year	2	3	4	5	6	7	8	9
----	-----	-----	-----	-----	-----	-----	-----	-----
76	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
77	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
78	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
79	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
80	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
81	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
82	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
83	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
84	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
85	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
86	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
87	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
88	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
89	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
90	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
91	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
92	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
93	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
94	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
95	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
96	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555
97	0.058	0.398	0.630	0.789	1.000	0.878	0.704	0.555

5.6 LARVAL

Lognormal dist.
average biomass
Ages 8 - 10
log-likelihood = -1.64
deviance = 3.28
Chi-sq. discrepancy= 57.08

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
----	-----------	-----------	-----------	-----------	-----------	-----------	-----------	-----------
77	0.890	0.963	-0.073	0.415	0.475E-07	2.435	2.618	0.026
78	1.762	0.883	0.879	0.268	0.475E-07	5.824	2.417	26.756
81	0.245	0.491	-0.247	0.414	0.475E-07	1.277	1.634	0.256
82	0.415	0.394	0.020	0.304	0.475E-07	1.514	1.483	0.004
83	0.211	0.340	-0.128	0.301	0.475E-07	1.235	1.404	0.153
84	-0.426	0.188	-0.614	0.704	0.475E-07	0.653	1.207	0.328
86	-1.343	-0.057	-1.286	0.559	0.475E-07	0.261	0.944	1.427
87	-0.810	-0.147	-0.662	0.479	0.475E-07	0.445	0.863	0.911
88	0.666	-0.222	0.888	0.318	0.475E-07	1.946	0.801	19.226
89	-0.226	-0.312	0.087	0.420	0.475E-07	0.798	0.732	0.042
90	-0.747	-0.345	-0.401	0.198	0.475E-07	0.474	0.708	2.732
91	-1.008	-0.431	-0.577	0.550	0.475E-07	0.365	0.650	0.544
92	-0.488	-0.467	-0.020	0.369	0.475E-07	0.614	0.627	0.003
93	-0.405	-0.424	0.019	0.566	0.475E-07	0.667	0.655	0.001
94	-0.329	-0.429	0.100	0.390	0.475E-07	0.720	0.651	0.068
95	-0.766	-0.382	-0.384	0.543	0.475E-07	0.465	0.682	0.297
96	0.377	-0.459	0.836	0.578	0.475E-07	1.458	0.632	4.303
97	-0.480	-0.502	0.022	0.428	0.475E-07	0.619	0.605	0.003

Selectivities by age

Year	8	9	10
----	-----	-----	-----
77	1.000	1.000	1.000
78	1.000	1.000	1.000
81	1.000	1.000	1.000
82	1.000	1.000	1.000
83	1.000	1.000	1.000
84	1.000	1.000	1.000
86	1.000	1.000	1.000
87	1.000	1.000	1.000

88	1.000	1.000	1.000
89	1.000	1.000	1.000
90	1.000	1.000	1.000
91	1.000	1.000	1.000
92	1.000	1.000	1.000
93	1.000	1.000	1.000
94	1.000	1.000	1.000
95	1.000	1.000	1.000
96	1.000	1.000	1.000
97	1.000	1.000	1.000

5.7 US LL GOM

Lognormal dist.
month 0 numbers
Ages 8 - 10
log-likelihood = -3.83
deviance = 7.67
Chi-sq. discrepancy= 20.13

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
87	-0.128	-0.448	0.321	0.286	0.874E-05	0.880	0.639	1.679
88	-0.916	-0.503	-0.414	0.431	0.874E-05	0.400	0.605	0.563
89	-0.357	-0.551	0.194	0.304	0.874E-05	0.700	0.577	0.473
90	-0.163	-0.584	0.422	0.302	0.874E-05	0.850	0.558	2.882
91	0.000	-0.656	0.656	0.294	0.874E-05	1.000	0.519	9.512
92	-1.427	-0.666	-0.761	0.497	0.874E-05	0.240	0.514	1.015
93	-1.470	-0.659	-0.810	0.524	0.874E-05	0.230	0.517	0.978
94	-2.303	-0.610	-1.693	0.770	0.874E-05	0.100	0.544	0.822
95	-1.772	-0.644	-1.128	0.619	0.874E-05	0.170	0.525	0.980
96	-1.715	-0.732	-0.982	0.628	0.874E-05	0.180	0.481	0.809
97	-1.171	-0.748	-0.423	0.502	0.874E-05	0.310	0.473	0.414

Selectivities by age

Year	8	9	10
87	0.729	0.820	1.000
88	0.729	0.820	1.000
89	0.729	0.820	1.000
90	0.729	0.820	1.000
91	0.729	0.820	1.000
92	0.729	0.820	1.000
93	0.729	0.820	1.000
94	0.729	0.820	1.000
95	0.729	0.820	1.000
96	0.729	0.820	1.000
97	0.729	0.820	1.000

5.8 US RR 66-114

Lognormal dist.
average numbers
Ages 2 - 3
log-likelihood = 1.77
deviance = -3.53
Chi-sq. discrepancy= 1.90

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
93	-0.916	-0.943	0.026	0.448	0.329E-05	0.400	0.390	0.003
94	-2.408	-0.931	-1.477	1.078	0.329E-05	0.090	0.394	0.271
95	-1.514	-0.940	-0.574	0.568	0.329E-05	0.220	0.391	0.501
96	-0.329	-0.281	-0.047	0.332	0.329E-05	0.720	0.755	0.018
97	0.000	-0.263	0.263	0.280	0.329E-05	1.000	0.769	1.109

Selectivities by age

Year	2	3
93	0.738	1.000
94	0.738	1.000
95	0.738	1.000
96	0.738	1.000
97	0.738	1.000

5.9 US RR 115-144

Lognormal dist.
average numbers
Ages 4 - 5
log-likelihood = -1.90
deviance = 3.81
Chi-sq. discrepancy= 1.92

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy

93	-0.774	-0.877	0.103	0.835	0.623E-05	0.461	0.416	0.012
94	-3.147	-0.503	-2.644	1.772	0.623E-05	0.043	0.605	0.039
95	-1.619	-0.747	-0.872	1.008	0.623E-05	0.198	0.474	0.192
96	0.000	-0.558	0.558	0.543	0.623E-05	1.000	0.572	1.631
97	-1.124	-0.761	-0.363	1.029	0.623E-05	0.325	0.467	0.049

Selectivities by age

Year	4	5
93	1.000	0.952
94	1.000	0.952
95	1.000	0.952
96	1.000	0.952
97	1.000	0.952

5.10 US RR <145

Lognormal dist.
average numbers
Ages 1 - 5
log-likelihood = 4.08
deviance = -8.17
Chi-sq. discrepancy= 21.17

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
80	-0.968	-0.836	-0.132	0.412	0.312E-05	0.380	0.434	0.082
81	-1.661	-0.782	-0.879	0.489	0.312E-05	0.190	0.457	1.264
82	0.000	-0.856	0.856	0.322	0.312E-05	1.000	0.425	16.819
83	-0.635	-0.822	0.187	0.256	0.312E-05	0.530	0.439	0.629
85	-1.204	-0.532	-0.672	0.586	0.312E-05	0.300	0.587	0.584
86	-0.994	-0.533	-0.462	0.412	0.312E-05	0.370	0.587	0.739
87	-0.545	-0.471	-0.074	0.385	0.312E-05	0.580	0.624	0.031
88	-0.755	-0.509	-0.246	0.367	0.312E-05	0.470	0.601	0.329
89	-0.755	-0.722	-0.033	0.412	0.312E-05	0.470	0.486	0.006
90	-0.844	-0.871	0.027	0.331	0.312E-05	0.430	0.419	0.006
91	-0.511	-0.714	0.203	0.340	0.312E-05	0.600	0.490	0.415
92	-0.942	-0.696	-0.246	0.403	0.312E-05	0.390	0.499	0.269

Selectivities by age

Year	1	2	3	4	5
80	0.487	1.000	0.854	0.201	0.075
81	0.487	1.000	0.854	0.201	0.075
82	0.487	1.000	0.854	0.201	0.075
83	0.487	1.000	0.854	0.201	0.075
85	0.487	1.000	0.854	0.201	0.075
86	0.487	1.000	0.854	0.201	0.075
87	0.487	1.000	0.854	0.201	0.075
88	0.487	1.000	0.854	0.201	0.075
89	0.487	1.000	0.854	0.201	0.075
90	0.487	1.000	0.854	0.201	0.075
91	0.487	1.000	0.854	0.201	0.075
92	0.487	1.000	0.854	0.201	0.075

5.11 US RR 145-177

Lognormal dist.
average numbers
Ages 6 - 6
log-likelihood = -0.97
deviance = 1.94
Chi-sq. discrepancy= 0.44

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
93	-0.894	0.044	-0.938	1.320	0.501E-04	0.409	1.045	0.079
94	0.092	-0.387	0.479	0.909	0.501E-04	1.096	0.679	0.294
95	0.427	0.204	0.222	0.887	0.501E-04	1.532	1.227	0.052
96	0.490	0.520	-0.030	0.810	0.501E-04	1.632	1.682	0.001
97	-1.106	-0.230	-0.875	1.777	0.501E-04	0.331	0.794	0.015

Selectivities by age

Year	6
93	1.000
94	1.000
95	1.000
96	1.000
97	1.000

5.12 US RR >178

Not used

5.13 US RR >195

Not used

5.14 TAGGING

Lognormal dist.
average numbers
Ages 1 - 3
log-likelihood = -22.16
deviance = 44.32
Chi-sq. discrepancy= 124.13

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
70	13.879	13.273	0.606	0.198	0.849E+00	1065132.000	581137.415	17.341
71	13.817	12.899	0.918	0.198	0.849E+00	1001624.000	399998.902	56.555
72	12.976	12.776	0.200	0.198	0.849E+00	431955.000	353701.493	1.224
73	12.121	12.756	-0.636	0.198	0.849E+00	183616.000	346760.891	5.534
74	12.741	13.471	-0.729	0.198	0.849E+00	341589.000	708295.890	6.701
75	13.226	13.170	0.056	0.198	0.849E+00	554596.000	524600.989	0.082
76	12.442	12.836	-0.394	0.198	0.849E+00	253265.000	375625.122	2.653
77	12.458	12.427	0.032	0.198	0.849E+00	257385.000	249344.558	0.026
78	11.704	12.122	-0.418	0.198	0.849E+00	121110.000	183883.266	2.913
79	11.501	11.965	-0.464	0.198	0.849E+00	98815.000	157127.131	3.443
80	12.168	11.885	0.283	0.198	0.849E+00	192541.000	145037.130	2.682
81	12.731	11.938	0.793	0.239	0.849E+00	337995.000	152978.877	24.976

Selectivities by age

Year	1	2	3
70	1.000	1.000	1.000
71	1.000	1.000	1.000
72	1.000	1.000	1.000
73	1.000	1.000	1.000
74	1.000	1.000	1.000
75	1.000	1.000	1.000
76	1.000	1.000	1.000
77	1.000	1.000	1.000
78	1.000	1.000	1.000
79	1.000	1.000	1.000
80	1.000	1.000	1.000
81	1.000	1.000	1.000

5.15 US RR >195 C

Lognormal dist.
average numbers
Ages 8 - 10
log-likelihood = 8.66
deviance = -17.33
Chi-sq. discrepancy= 26.54

Year	Observed	Predicted	Residuals (Obs-pred)	Standard Deviation	Q Catchabil.	Untransfrmd Observed	Untransfrmd Predicted	Chi-square Discrepancy
83	0.654	0.428	0.226	0.239	0.155E-04	1.923	1.534	1.096
84	0.128	0.301	-0.173	0.252	0.155E-04	1.136	1.351	0.387
85	-0.337	0.128	-0.465	0.272	0.155E-04	0.714	1.137	1.803
86	-0.340	0.049	-0.388	0.556	0.155E-04	0.712	1.050	0.286
87	-0.341	0.035	-0.376	0.331	0.155E-04	0.711	1.035	0.849
88	-0.189	-0.032	-0.157	0.281	0.155E-04	0.828	0.969	0.256
89	-0.159	-0.091	-0.068	0.290	0.155E-04	0.853	0.913	0.050
90	-0.281	-0.108	-0.173	0.287	0.155E-04	0.755	0.898	0.295
91	-0.040	-0.190	0.150	0.271	0.155E-04	0.961	0.827	0.346
92	-0.092	-0.191	0.099	0.269	0.155E-04	0.912	0.826	0.144
93	-0.384	-0.160	-0.224	0.357	0.155E-04	0.681	0.852	0.296
94	-0.381	-0.107	-0.274	0.371	0.155E-04	0.683	0.899	0.390
95	0.031	-0.155	0.186	0.298	0.155E-04	1.031	0.856	0.447
96	0.572	-0.268	0.841	0.334	0.155E-04	1.772	0.765	14.669
97	0.283	-0.283	0.566	0.324	0.155E-04	1.327	0.754	5.220

Selectivities by age

Year	8	9	10
83	0.887	1.000	0.940
84	0.887	1.000	0.940
85	0.887	1.000	0.940
86	0.887	1.000	0.940
87	0.887	1.000	0.940
88	0.887	1.000	0.940
89	0.887	1.000	0.940
90	0.887	1.000	0.940
91	0.887	1.000	0.940
92	0.887	1.000	0.940
93	0.887	1.000	0.940
94	0.887	1.000	0.940
95	0.887	1.000	0.940
96	0.887	1.000	0.940

```
     97   0.887  1.000  0.940

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TABLE 6.2 FITS TO TAGS RELEASED IN HOME RANGE OF WEST

Multinomial dist.

log-likelihood = -8775.84

deviance = 1692.07

Recaptures by year following release

Release Year	Age	Recapture Area	Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
70	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.12	0.16	0.16	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
75	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
76	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.06	0.05	0.10	0.03	0.02	0.02	0.02	0.04	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
77	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.02	0.01	0.03	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	1	1	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.03	0.09	0.05	0.03	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
81	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.00	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
82	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
86	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
87	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
88	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
89	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
90	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.01	0.01	0.02	0.02	0.01	0.01	0.02																				
91	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.03	0.04	0.06	0.07	0.04	0.05																					
92	1	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.00	0.00	0.00	0.00	0.00																						
93	1	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.00	0.00	0.01	0.01																							
94	1	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.00	0.00	0.00																								
95	1	1	obsd	0.00	0.00	0.00																									
			pred	0.00	0.08	0.06																									
96	1	1	obsd	0.00	0.00																										
			pred	0.00	0.01																										
97	1	1	obsd	0.00																											
			pred	0.00																											
70	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.01	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.01	0.07	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

75	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
76	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.06	0.21	0.11	0.07	0.07	0.13	0.07	0.06	0.04	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
77	2	1	obsd	0.00	1.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.13	0.33	0.12	0.07	0.06	0.08	0.12	0.07	0.05	0.03	0.03	0.02	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00							
78	2	1	obsd	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.05	0.13	0.07	0.02	0.05	0.04	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.16	0.46	0.25	0.26	0.12	0.07	0.12	0.13	0.07	0.04	0.04	0.02	0.02	0.03	0.02	0.01	0.01										
81	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
82	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
86	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
87	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
88	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00																		
89	2	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00																			
90	2	1	obsd	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01																				
91	2	1	obsd	0.00	0.00	1.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.03	0.10	0.10	0.08	0.06	0.11																					
92	2	1	obsd	0.00	0.00	1.00	0.00	0.00	0.00																						
			pred	0.00	0.06	0.14	0.16	0.11	0.12																						
93	2	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.01	0.04	0.05	0.04																							
94	2	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.00	0.02	0.01																								
95	2	1	obsd	0.00	0.00	0.00																									
			pred	0.00	0.01	0.03																									
96	2	1	obsd	0.00	0.00																										
			pred	0.00	0.02																										
97	2	1	obsd	0.00																											
			pred	0.00																											
70	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.04	0.07	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
75	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
76	3	1	obsd	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.29	0.06	0.03	0.04	0.06	0.06	0.05	0.04	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
77	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	3	1	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.06	0.03	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.05	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
81	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
82	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															

86	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
87	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
88	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
89	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00																			
90	3	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.03	0.01	0.02	0.02	0.01	0.02	0.02																				
91	3	1	obsd	0.00	1.00	2.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.08	0.07	0.08	0.06	0.06	0.12																					
92	3	1	obsd	0.00	1.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.20	0.19	0.16	0.12	0.21																						
93	3	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.16	0.19	0.12	0.14																							
94	3	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.03	0.03	0.03																								
95	3	1	obsd	0.00	0.00	0.00																									
			pred	0.00	0.03	0.02																									
96	3	1	obsd	0.00	0.00																										
			pred	0.00	0.01																										
97	3	1	obsd	0.00																											
			pred	0.00																											
70	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
73	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
75	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
77	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
82	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
86	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
87	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
89	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00																			
90	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.04	0.01	0.02	0.05	0.04	0.03	0.02																				
91	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.01	0.01	0.01	0.01	0.01	0.01																					
92	4	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.01	0.01	0.01	0.01	0.02																						
93	4	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.04	0.04	0.04	0.07																							
94	4	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.03	0.02	0.03																								
95	4	1	obsd	0.00	0.00	0.00																									
			pred	0.00	0.01	0.02																									
96	4	1	obsd	0.00	0.00																										
			pred	0.00	0.03																										
97	4	1	obsd	0.00																											
			pred	0.00																											
70	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

72	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
75	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
77	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.01	0.02	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
82	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
84	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
87	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
88	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
89	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
90	5	1	obsd	0.00	0.00	0.00	0.00	0.00	2.00	0.00	1.00																				
			pred	0.00	0.01	0.01	0.01	0.03	0.02	0.02	0.01																				
91	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.00	0.01	0.02	0.02	0.01	0.01																					
92	5	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.00	0.01	0.01	0.01	0.01																						
93	5	1	obsd	0.00	0.00	0.00	0.00	1.00																							
			pred	0.00	0.01	0.01	0.01	0.03																							
94	5	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.01	0.02	0.03																								
95	5	1	obsd	0.00	0.00	0.00																									
			pred	0.00	0.00	0.01																									
96	5	1	obsd	0.00	0.00																										
			pred	0.00	0.06																										
97	5	1	obsd	0.00																											
			pred	0.00																											
70	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
75	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
78	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.02	0.06	0.07	0.07	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00									
84	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
87	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
88	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
89	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
90	6	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01																				
91	6	1	obsd	0.00	0.00	0.00	0.00	0.00	1.00	0.00																					
			pred	0.00	0.00	0.00	0.02	0.01	0.01	0.01																					
92	6	1	obsd	0.00	0.00	0.00	1.00	0.00	0.00																						
			pred	0.00	0.01	0.03	0.03	0.03	0.02																						
93	6	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.01	0.01	0.01	0.01																							
94	6	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.01	0.02	0.04																								
95	6	1	obsd	0.00	0.00	0.00																									
			pred	0.00	0.01	0.04																									
96	6	1	obsd	0.00	0.00																										
			pred	0.00	0.27																										
97	6	1	obsd	0.00																											
			pred	0.00																											
75	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					

77	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
79	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
82	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
85	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
88	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
89	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
90	7	1	obsd	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00																				
			pred	0.00	0.01	0.02	0.02	0.04	0.03	0.03	0.02																				
91	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.01	0.01	0.02	0.01	0.01	0.01																					
92	7	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.00	0.02	0.02	0.02	0.01																						
93	7	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.01	0.01	0.01	0.01																							
94	7	1	obsd	0.00	0.00	1.00	0.00																								
			pred	0.00	0.02	0.04	0.04																								
95	7	1	obsd	0.00	0.00	0.00																									
			pred	0.00	0.03	0.12																									
96	7	1	obsd	0.00	0.00																										
			pred	0.00	0.78																										
97	7	1	obsd	0.00																											
			pred	0.00																											
70	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
75	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
77	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
82	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
88	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
90	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00																				
91	8	1	obsd	0.00	0.00	0.00	0.00	1.00	0.00	0.00																					
			pred	0.00	0.01	0.01	0.02	0.02	0.02	0.01																					
92	8	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.00	0.01	0.01	0.01	0.00																						
93	8	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.00	0.00	0.00	0.00																							
94	8	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.03	0.05	0.05																								
95	8	1	obsd	0.00	1.00	0.00																									
			pred	0.00	0.12	0.16																									
96	8	1	obsd	0.00	0.00																										
			pred	0.00	0.60																										
97	8	1	obsd	0.00																											
			pred	0.00																											
70	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
75	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
76	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
78	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								

79	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
82	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
85	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
86	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
87	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
89	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
90	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
91	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.01	0.01	0.02	0.02	0.02	0.01																					
92	9	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.00	0.01	0.01	0.01	0.00																						
93	9	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.00	0.00	0.00	0.00																							
94	9	1	obsd	0.00	0.00	0.00	0.00																								
			pred	0.00	0.05	0.07	0.08																								
95	9	1	obsd	0.00	0.00	1.00																									
			pred	0.00	0.22	0.31																									
96	9	1	obsd	0.00	0.00																										
			pred	0.00	0.32																										
97	9	1	obsd	0.00																											
			pred	0.00																											
70	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.05	0.05	0.06	0.10	0.10	0.07	0.05	0.03	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.01	0.02	0.04	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	10	1	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.01	0.04	0.05	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	10	1	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.00	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
75	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
76	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
77	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.00	0.05	0.07	0.07	0.05	0.09	0.07	0.06	0.04	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.00	0.06	0.08	0.06	0.12	0.10	0.09	0.05	0.04	0.03	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00								
79	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.00	0.17	0.17	0.37	0.34	0.32	0.20	0.13	0.10	0.10	0.06	0.03	0.03	0.02	0.01	0.02	0.01	0.01	0.01									
80	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
81	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
82	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.00	0.03	0.05	0.04	0.03	0.02	0.03	0.02	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00												
83	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.00	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
86	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
87	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00																	
88	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
89	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
90	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
91	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.00	0.01	0.01	0.03	0.02	0.02	0.02																					
92	10	1	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.00	0.00	0.01	0.01	0.01	0.01																						
93	10	1	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.00	0.01	0.01	0.01	0.01																							

94	10	1	obsd	0.00	0.00	1.00	0.00
			pred	0.00	0.07	0.11	0.11
95	10	1	obsd	0.00	0.00	0.00
			pred	0.00	0.39	0.55
96	10	1	obsd	0.00	0.00
			pred	0.00	0.34
97	10	1	obsd	0.00
			pred	0.00
70	1	2	obsd	4.00	12.00	5.00	3.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	8.18	26.74	4.01	0.68	0.24	0.03	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	1	2	obsd	2.00	28.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	8.16	17.57	3.37	0.57	0.06	0.02	0.04	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	1	2	obsd	7.00	27.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	3.57	9.42	1.85	0.84	0.16	0.16	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	1	2	obsd	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.24	1.13	0.33	0.09	0.13	0.08	0.04	0.05	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	1	2	obsd	55.00	79.00	32.00	10.00	6.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	29.34	90.87	31.93	11.39	3.00	0.80	1.02	0.47	0.11	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	1	2	obsd	8.00	12.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	8.68	9.69	0.88	0.46	0.20	0.14	0.11	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	1	2	obsd	23.00	33.00	41.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	7.00	18.69	15.03	8.99	1.38	1.44	0.15	0.33	0.22	0.11	0.08	0.04	0.04	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
77	1	2	obsd	4.00	12.00	12.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.30	8.49	3.98	1.74	0.95	0.09	0.14	0.06	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	1	2	obsd	10.00	58.00	16.00	1.00	3.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
			pred	9.22	73.68	18.87	7.14	0.37	0.79	0.41	0.33	0.15	0.05	0.04	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
79	1	2	obsd	1.00	7.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.45	4.02	2.91	0.07	0.10	0.15	0.07	0.03	0.05	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
80	1	2	obsd	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.43	0.86	0.11	0.05	0.09	0.14	0.03	0.03	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81	1	2	obsd	16.00	2.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	4.18	1.30	0.84	0.43	0.72	0.23	0.17	0.14	0.10	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00
82	1	2	obsd	1.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	3.86	0.60	0.28	0.34	0.11	0.18	0.14	0.09	0.05	0.02	0.01	0.01	0.00	0.00	0.00	0.00
83	1	2	obsd	1.00	2.00	2.00	3.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	1.27	1.24	1.40	0.31	0.32	0.25	0.12	0.07	0.05	0.02	0.01	0.00	0.00	0.00	0.00
84	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.10	0.21	0.19	0.11	0.07	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
85	1	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.07	0.52	0.62	0.21	0.07	0.05	0.05	0.03	0.02	0.01	0.01	0.00	0.00
86	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.10	0.06	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
87	1	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.11	0.33	0.05	0.03	0.02	0.01	0.01	0.02	0.01	0.00	0.00
88	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.60	0.99	0.81	0.11	0.04	0.04	0.04	0.03	0.02	0.01
89	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.24	0.22	0.19	0.01	0.02	0.01	0.01	0.01	0.00
90	1	2	obsd	2.00	4.00	1.00	0.00	0.00	0.00	0.00	0.00
			pred	0.68	4.79	0.25	0.37	0.22	0.16	0.16	0.09
91	1	2	obsd	6.00	4.00	1.00	0.00	0.00	2.00	1.00
			pred	1.90	4.78	1.77	0.62	0.96	0.29	0.32
92	1	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.78	0.15	0.08	0.14	0.07	0.04
93	1	2	obsd	0.00	1.00	0.00	0.00	0.00
			pred	0.02	0.05	0.10	0.09	0.03
94	1	2	obsd	0.00	1.00	0.00	0.00
			pred	0.65	0.15	0.06	0.03
95	1	2	obsd	7.00	5.00	2.00
			pred	0.30	3.72	1.86
96	1	2	obsd	0.00	0.00
			pred	0.38	0.48
97	1	2	obsd	1.00
			pred	0.24
70	2	2	obsd	1.00	4.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	2.71	1.31	0.10	0.04	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	2	2	obsd	14.00	12.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	28.95	9.11	1.46	0.52	0.07	0.02	0.04	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	2	2	obsd	2.00	6.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	9.15	5.46	0.88	0.09	0.03	0.07	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	2	2	obsd	25.00	7.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	21.47	6.64	2.89	0.56	0.56	0.08	0.06	0.08	0.05	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
74	2	2	obsd	6.00	5.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	5.43	2.57	0.69	0.95	0.63	0.32	0.34	0.22	0.04	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	2	2	obsd	9.00	7.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	7.79	8.15	0.60	0.16	0.04	0.05	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

76	2	2	obsd	61.00	4.00	20.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	51.54	16.64	11.32	4.96	3.44	2.67	0.38	0.62	0.21	0.18	0.13	0.07	0.06	0.05	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00						
77	2	2	obsd	39.00	154.00	60.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	2.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00							
			pred	39.02	120.65	30.79	4.73	4.92	0.50	1.14	0.74	0.37	0.27	0.15	0.12	0.10	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00							
78	2	2	obsd	7.00	36.00	4.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	7.55	48.95	8.80	4.79	0.48	0.71	0.31	0.23	0.09	0.05	0.04	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00								
79	2	2	obsd	1.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	2.11	3.19	1.30	0.07	0.14	0.07	0.06	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	2	2	obsd	130.00	88.00	5.00	2.00	4.00	2.00	1.00	2.00	4.00	1.00	2.00	1.00	0.00	2.00	0.00	0.00	0.00	0.00										
			pred	112.58	80.89	2.30	3.20	4.96	2.43	0.99	1.55	0.74	0.58	0.25	0.18	0.11	0.05	0.03	0.02	0.02	0.01										
81	2	2	obsd	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	1.75	0.16	0.08	0.15	0.23	0.04	0.05	0.05	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00											
82	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.89	0.32	0.19	0.32	0.10	0.07	0.06	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00												
83	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.13	0.06	0.09	0.03	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	2	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	1.57	1.08	0.28	0.29	0.22	0.11	0.06	0.04	0.01	0.01	0.00	0.00	0.00	0.00														
85	2	2	obsd	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.56	0.45	0.33	0.20	0.08	0.04	0.04	0.02	0.01	0.00	0.00	0.00	0.00															
86	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.15	0.13	0.05	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00																
87	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.27	0.11	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00																	
88	2	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.86	0.11	0.10	0.07	0.02	0.04	0.05	0.03	0.01	0.01																		
89	2	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	1.67	1.76	0.14	0.06	0.06	0.05	0.04	0.02	0.01																			
90	2	2	obsd	2.00	3.00	0.00	0.00	0.00	1.00	0.00	0.00																				
			pred	1.13	3.56	0.12	0.28	0.18	0.08	0.07	0.05																				
91	2	2	obsd	4.00	2.00	6.00	1.00	1.00	3.00	0.00																					
			pred	8.24	2.40	2.39	1.42	1.07	1.02	0.59																					
92	2	2	obsd	3.00	6.00	3.00	0.00	2.00	1.00																						
			pred	3.90	6.52	1.53	2.37	0.71	0.78																						
93	2	2	obsd	1.00	3.00	0.00	2.00	2.00																							
			pred	0.45	1.10	1.33	0.65	0.34																							
94	2	2	obsd	0.00	1.00	1.00	0.00																								
			pred	0.03	0.25	0.15	0.05																								
95	2	2	obsd	1.00	1.00	0.00																									
			pred	0.44	0.79	0.24																									
96	2	2	obsd	0.00	0.00																										
			pred	0.83	1.10																										
97	2	2	obsd	0.00																											
			pred	1.08																											
70	3	2	obsd	9.00	2.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	9.58	5.55	0.35	0.10	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	3	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.94	0.13	0.06	0.02	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	3	2	obsd	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.88	0.34	0.11	0.02	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	3	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	2.72	0.86	0.08	0.03	0.06	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	3	2	obsd	3.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	8.10	6.13	1.14	1.14	0.17	0.12	0.17	0.09	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
75	3	2	obsd	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.26	0.28	0.12	0.08	0.04	0.04	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
76	3	2	obsd	25.00	19.00	5.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	56.11	18.99	6.66	1.77	2.26	1.05	0.24	0.17	0.10	0.09	0.06	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00						
77	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.24	0.66	0.13	0.09	0.07	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	3	2	obsd	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.29	0.82	0.05	0.05	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	3	2	obsd	1.00	4.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	3.35	4.09	2.38	0.24	0.35	0.15	0.11	0.05	0.03	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00									
80	3	2	obsd	3.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	19.06	7.92	0.49	1.03	0.54	0.44	0.20	0.06	0.05	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00										
81	3	2	obsd	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	1.38	0.02	0.03	0.05	0.02	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
82	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.03	0.03	0.06	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.12	0.13	0.05	0.08	0.06	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00														
85	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00															
			pred	1.55	0.33	0.39	0.30	0.15	0.09	0.05	0.02	0.01	0.01	0.00	0.00	0.00															
86	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.27	0.15	0.10	0.04	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00																

87	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.23	0.08	0.03	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00																	
88	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.06	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
89	3	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.12	0.15	0.08	0.03	0.05	0.06	0.04	0.02	0.01																			
90	3	2	obsd	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	2.39	0.91	0.28	0.30	0.27	0.18	0.11	0.04																				
91	3	2	obsd	1.00	3.00	0.00	0.00	0.00	0.00	0.00																					
			pred	8.03	1.33	2.47	1.59	0.68	0.61	0.47																					
92	3	2	obsd	0.00	5.00	4.00	2.00	1.00	1.00																						
			pred	1.46	5.90	2.77	2.09	1.98	1.15																						
93	3	2	obsd	4.00	3.00	0.00	3.00	0.00																							
			pred	2.52	2.29	2.82	0.84	0.93																							
94	3	2	obsd	1.00	1.00	0.00	0.00																								
			pred	0.25	1.07	0.41	0.22																								
95	3	2	obsd	1.00	0.00	0.00																									
			pred	0.27	0.37	0.10																									
96	3	2	obsd	0.00	1.00																										
			pred	0.19	0.12																										
97	3	2	obsd	1.00																											
			pred	1.38																											
70	4	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	4	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.74	0.09	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
73	4	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.06	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.57	0.10	0.03	0.07	0.03	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
75	4	2	obsd	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	2.25	1.87	0.55	0.08	0.06	0.08	0.05	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
77	4	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.43	0.63	0.07	0.09	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
78	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.02	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	0.53	0.19	0.21	0.02	0.05	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
80	4	2	obsd	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	4.22	2.55	0.30	0.45	0.19	0.14	0.06	0.03	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00										
82	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	4	2	obsd	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.03	0.08	0.15	0.03	0.03	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
84	4	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.05	0.11	0.04	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.34	0.09	0.18	0.14	0.09	0.05	0.02	0.01	0.01	0.00	0.00	0.00	0.00															
86	4	2	obsd	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.14	0.13	0.12	0.06	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00																
87	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.16	0.10	0.05	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00																	
89	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.46	0.32	0.16	0.11	0.12	0.06	0.02	0.02	0.01																			
90	4	2	obsd	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00																				
			pred	0.23	0.73	0.21	0.36	0.44	0.26	0.11	0.07																				
91	4	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.16	0.28	0.23	0.21	0.14	0.08	0.03																					
92	4	2	obsd	0.00	1.00	1.00	0.00	0.00	1.00																						
			pred	0.09	0.69	0.35	0.15	0.13	0.10																						
93	4	2	obsd	0.00	2.00	0.00	1.00	0.00																							
			pred	0.50	1.28	0.76	0.72	0.42																							
94	4	2	obsd	1.00	1.00	0.00	1.00																								
			pred	0.12	0.84	0.20	0.22																								
95	4	2	obsd	0.00	0.00	0.00																									
			pred	0.29	0.44	0.18																									
96	4	2	obsd	1.00	1.00																										
			pred	0.50	0.30																										
97	4	2	obsd	0.00																											
			pred	0.51																											
70	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	5	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	5	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

75	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.08	0.14	0.10	0.04	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
77	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.01	0.04	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
78	5	2	obsd	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	0.53	1.41	0.83	0.39	0.09	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
79	5	2	obsd	2.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	1.01	1.85	1.53	0.22	0.35	0.12	0.10	0.07	0.04	0.03	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00								
82	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.07	0.18	0.11	0.09	0.04	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
84	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.08	0.11	0.02	0.03	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.11	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
87	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.14	0.10	0.06	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00																	
88	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.14	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00																		
89	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.09	0.14	0.11	0.07	0.05	0.02	0.01	0.01	0.01																			
90	5	2	obsd	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00																				
			pred	0.27	0.75	0.42	0.43	0.21	0.08	0.06	0.04																				
91	5	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00																					
			pred	0.08	0.13	0.18	0.22	0.13	0.06	0.04																					
92	5	2	obsd	0.00	0.00	0.00	2.00	0.00	0.00																						
			pred	0.10	0.28	0.20	0.14	0.08	0.03																						
93	5	2	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.38	0.80	0.27	0.24	0.18																							
94	5	2	obsd	0.00	0.00	0.00	1.00																								
			pred	0.24	0.64	0.48	0.28																								
95	5	2	obsd	0.00	0.00	0.00																									
			pred	0.12	0.11	0.09																									
96	5	2	obsd	0.00	2.00																										
			pred	1.63	1.60																										
97	5	2	obsd	2.00																											
			pred	1.43																											
70	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	6	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	6	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
75	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.04	0.06	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
78	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	0.02	0.06	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
79	6	2	obsd	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	2.15	5.99	2.98	0.67	0.49	0.29	0.25	0.18	0.10	0.08	0.06	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00									
84	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
87	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.07	0.05	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00																	
88	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.14	0.07	0.04	0.03	0.01	0.00	0.00	0.00	0.00	0.00																		
89	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.17	0.17	0.13	0.07	0.02	0.01	0.01	0.01	0.00																			
90	6	2	obsd	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00																				
			pred	0.10	0.50	0.25	0.16	0.06	0.04	0.03	0.02																				
91	6	2	obsd	0.00	1.00	0.00	1.00	0.00	0.00	0.00																					
			pred	0.17	0.39	0.32	0.15	0.06	0.05	0.03																					
92	6	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.12	0.50	0.48	0.29	0.12	0.08																						
93	6	2	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.19	0.35	0.19	0.11	0.04																							
94	6	2	obsd	0.00	0.00	1.00	0.00																								
			pred	0.53	0.51	0.36	0.28																								
95	6	2	obsd	0.00	0.00	0.00																									
			pred	0.41	0.93	0.42																									
96	6	2	obsd	3.00	6.00																										
			pred	3.78	6.92																										
97	6	2	obsd	9.00																											
			pred	5.21																											
75	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
77	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						

79	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.02	0.04	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.04	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.04	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
89	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.02	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00
90	7	2	obsd	0.00	5.00	2.00	0.00	0.00	0.00	0.00	0.00
			pred	0.52	2.32	0.97	0.25	0.16	0.11	0.08	0.05
91	7	2	obsd	1.00	1.00	0.00	0.00	0.00	0.00	0.00
			pred	0.19	0.49	0.25	0.09	0.06	0.05	0.03
92	7	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.20	0.67	0.25	0.10	0.07	0.05
93	7	2	obsd	0.00	0.00	1.00	0.00	0.00
			pred	0.06	0.24	0.11	0.05	0.03
94	7	2	obsd	2.00	0.00	0.00	0.00
			pred	0.48	0.45	0.48	0.18
95	7	2	obsd	1.00	3.00	1.00
			pred	1.18	0.86	1.18
96	7	2	obsd	10.00	9.00
			pred	18.17	8.97
97	7	2	obsd	20.00
			pred	10.74
70	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77	8	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.05	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.43	0.46	0.43	0.28	0.05	0.07	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.11	0.42	0.32	0.06	0.08	0.05	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.04	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	8	2	obsd	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.07	0.09	0.04	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.08	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
90	8	2	obsd	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
			pred	0.16	0.44	0.12	0.06	0.04	0.02	0.02	0.01
91	8	2	obsd	0.00	2.00	0.00	1.00	0.00	0.00	0.00
			pred	0.52	1.04	0.21	0.13	0.09	0.07	0.05
92	8	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.08	0.17	0.05	0.04	0.03	0.02
93	8	2	obsd	0.00	0.00	0.00	0.00	0.00
			pred	0.03	0.02	0.01	0.01	0.00
94	8	2	obsd	0.00	0.00	1.00	0.00
			pred	0.65	0.53	0.40	0.27
95	8	2	obsd	0.00	1.00	0.00
			pred	2.16	1.61	1.13
96	8	2	obsd	11.00	4.00
			pred	6.48	6.89
97	8	2	obsd	7.00
			pred	9.11
70	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.13	0.11	0.05	0.03	0.06	0.04	0.04	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.06	0.03	0.01	0.03	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.03	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.06	0.06	0.03	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.03	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.23	0.09	0.09	0.06	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
79	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

82	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.16	0.09	0.07	0.06	0.05	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
83	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.04	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
85	9	2	obsd	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.15	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
86	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	0.09	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
87	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.09	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
89	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.12	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00																			
90	9	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.01	0.03	0.01	0.01	0.00	0.00	0.00	0.00																				
91	9	2	obsd	0.00	1.00	1.00	1.00	0.00	0.00	0.00																					
			pred	0.40	0.62	0.22	0.14	0.10	0.07	0.05																					
92	9	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00																						
			pred	0.11	0.11	0.06	0.04	0.03	0.02																						
93	9	2	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.04	0.03	0.02	0.01	0.01																							
94	9	2	obsd	1.00	0.00	0.00	0.00																								
			pred	0.83	0.48	0.62	0.41																								
95	9	2	obsd	1.00	2.00	0.00																									
			pred	3.26	1.91	2.29																									
96	9	2	obsd	6.00	2.00																										
			pred	4.79	2.31																										
97	9	2	obsd	0.00																											
			pred	4.19																											
70	10	2	obsd	2.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			pred	1.40	1.32	0.63	0.39	0.79	0.45	0.46	0.35	0.23	0.19	0.14	0.09	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
71	10	2	obsd	0.00	0.00	3.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
			pred	0.78	0.42	0.20	0.40	0.23	0.24	0.18	0.12	0.10	0.07	0.05	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
72	10	2	obsd	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
			pred	0.68	0.42	0.64	0.36	0.38	0.28	0.19	0.15	0.12	0.08	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
73	10	2	obsd	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
			pred	0.41	0.62	0.27	0.28	0.21	0.14	0.11	0.09	0.06	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
74	10	2	obsd	2.00	2.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
			pred	0.80	0.37	0.29	0.22	0.15	0.12	0.09	0.06	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
75	10	2	obsd	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
			pred	0.56	0.56	0.32	0.21	0.17	0.13	0.08	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
76	10	2	obsd	0.00	1.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
			pred	0.84	0.40	0.38	0.30	0.23	0.15	0.03	0.04	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
77	10	2	obsd	13.00	5.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
			pred	7.68	2.37	2.69	2.07	1.35	0.26	0.32	0.19	0.16	0.12	0.06	0.05	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00							
78	10	2	obsd	7.00	4.00	5.00	2.00	3.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
			pred	8.21	3.39	3.69	2.40	0.46	0.57	0.34	0.29	0.21	0.12	0.10	0.07	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00								
79	10	2	obsd	3.00	8.00	2.00	1.00	3.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
			pred	3.11	11.21	10.35	1.97	2.47	1.45	1.25	0.89	0.50	0.41	0.32	0.14	0.10	0.06	0.03	0.02	0.01	0.01	0.01									
80	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
			pred	0.35	0.08	0.02	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
81	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
			pred	0.25	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
82	10	2	obsd	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00												
			pred	0.89	0.72	0.59	0.51	0.36	0.20	0.17	0.13	0.06	0.04	0.03	0.01	0.01	0.01	0.00	0.00												
83	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
			pred	0.61	0.27	0.33	0.23	0.13	0.11	0.08	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00													
84	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
			pred	0.10	0.04	0.04	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
85	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00															
			pred	0.69	0.14	0.11	0.09	0.07	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00															
86	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																
			pred	1.08	0.16	0.19	0.15	0.06	0.04	0.03	0.01	0.01	0.01	0.00	0.00																
87	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																	
			pred	0.93	0.21	0.24	0.10	0.07	0.05	0.02	0.01	0.01	0.01	0.00																	
88	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																		
			pred	0.58	0.11	0.07	0.05	0.03	0.01	0.01	0.01	0.00	0.00																		
89	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																			
			pred	0.14	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00																			
90	10	2	obsd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00																				
			pred	0.03	0.05	0.02	0.01	0.01	0.00	0.00	0.00																				
91	10	2	obsd	0.00	2.00	1.00	0.00	0.00	0.00	0.00																					
			pred	0.32	0.67	0.24	0.15	0.11	0.08	0.05																					
92	10	2	obsd	0.00	0.00	1.00	0.00	0.00	0.00																						
			pred	0.10	0.13	0.06	0.05	0.03	0.02																						
93	10	2	obsd	0.00	0.00	0.00	0.00	0.00																							
			pred	0.05	0.14	0.08	0.05	0.04																							
94	10	2	obsd	0.00	3.00	3.00	0.00																								
			pred	0.69	0.71	0.92	0.62																								

95	10	2	obsd	9.00	4.00	3.00
			pred	3.48	3.34	4.00
96	10	2	obsd	2.00	2.00	
			pred	2.57	2.40	
97	10	2	obsd	1.00		
			pred	1.53		

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TOTAL NUMBER OF FUNCTION EVALUATIONS = 28145

APPENDIX 4. SOURCE CODE

A copy of the entire source code has been filed with the ICCAT Secretariat and the full source code is available from the author (Clay.Porch@noaa.gov) on request.