



Sea turtle populations are overestimated worldwide from remigration intervals: correction for bias

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ABSTRACT: Estimating population abundance is key for species of conservation concern. This is particularly challenging for marine animals, like sea turtles, with ocean-scale distribution and migratory nature. However, sea turtles lay clutches on land where they can be easily counted; thus, clutch number has always been the most common index of population abundance. A female typically lays >1 clutch per year and does not reproduce every year. Therefore, 2 conversion factors are needed to convert the number of egg clutches to the number of adult females: the number of clutches laid by a female in a nesting season and the fraction of adult females reproducing in a season, which is linked to the breeding periodicity. The effects of breeding periodicity, probability of detection and annual survival probability on the derived adult female abundance were investigated by simulating a virtual population of adult females over a 15 yr beach monitoring period. The results indicate that current methods may greatly overestimate the abundance of sea turtle populations, especially in situations with a low detection probability, including temporary emigration. The factors involved and ways to minimize biases and errors are discussed, including a method which is easy to implement using existing datasets. A careful reassessment of current estimates of sea turtle abundance derived from nest counts and capture-mark-recapture data would be appropriate, and the potential error associated with such estimates should be considered when they are used in conservation status assessments.

KEY WORDS: Sea turtle · Remigration interval · Abundance · Breeding proportion · Mortality · Detection · Simulation

1. INTRODUCTION

Abundance is one of the most fundamental attributes that describe an animal population. It characterizes the ecological role of the population and possible metapopulation dynamics and helps contextualize other features, such as behavioral traits. Moreover, abundance is particularly crucial to define for species of conservation concern because a low abundance represents an inherent vulnerability to anthropogenic threats and because trends of abundance may

highlight conservation problems or conservation successes. For instance, the IUCN Red List categorizes species and populations according to a risk of extinction assessed through several criteria, most of which are based on population abundance (IUCN 2017).

Sea turtles represent one of the taxa subjected to high attention by conservationists because their abundance has been diminished by anthropogenic activities to levels at which they may no longer fulfill their past ecological role (Jackson et al. 2001, Bjørndal & Jackson 2003). Although direct exploitation for

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turtle meat and eggs has been greatly reduced, several other anthropogenic threats are cause for increasing concern, such as incidental capture in fisheries (e.g. Wallace et al. 2013a), habitat destruction (e.g. Brock et al. 2009, Mazaris et al. 2009, Fuentes et al. 2016), pollution (e.g. D'Ilio et al. 2011, Casale et al. 2016, Lauritsen et al. 2017, Wallace et al. 2017) and climate change (e.g. Fuentes et al. 2011).

Estimating population abundance for marine animals is in general challenging, especially for migratory species, like sea turtles, with dispersed ocean-scale distribution. Individuals belonging to the same population may frequent very distant foraging areas (e.g. Luschi et al. 2003, Benson et al. 2007, Ceriani et al. 2017), and a complete knowledge of the range of a population is difficult per se, making it difficult to estimate the abundance of a specific population at sea. However, sea turtles lay egg clutches on land and tend to return to the same breeding area over their lifetime. Therefore, breeding areas of a specific population are much easier to identify. On land, annual clutch counts represent the most common index of sea turtle population trends (e.g. National Marine Fisheries Service & U.S. Fish Wildlife Service 2008, Witherington et al. 2009, Wallace et al. 2013b, Casale & Tucker 2015, Mazaris et al. 2017). However, clutches are only indirectly linked to population abundance because the iteroparous females lay >1 clutch per breeding year, they do not reproduce every year (Miller 1997), adult females represent only a part of the adults, and adults are only a small part of the population. Therefore, conversion factors are needed to convert number of egg clutches to number of turtles. Although 3 conversion factors (clutch frequency, breeding proportion and sex ratio) are needed to estimate the number of adults, this is rarely attempted, for instance for specific criteria of the IUCN Red List Assessments (Wallace et al. 2013b, Casale & Tucker 2015). It is more common to use 1 or 2 conversion factors to estimate the number of adult females nesting annually and the total number of adult females, respectively.

The first conversion factor to estimate the number of females reproducing in 1 season (annual nesting females [ANF]) is the number of clutches laid by a female in a nesting season (also known as clutch frequency). Although apparently easy to obtain, the partial fidelity of females to a nesting site and technical limitations of capture-mark-recapture (CMR) through flipper tagging often underestimated this factor, until satellite tracking (Tucker 2010, Weber et al. 2013, Esteban et al. 2017) and more recently gene-

tic fingerprinting (Shamblin et al. 2017) studies were introduced.

The second conversion factor, required to convert ANF to total females (TF), is the breeding proportion (BP), i.e. the fraction ANF/TF of adult females that reproduce in a season. This parameter is much more problematic to estimate because TF is both what would be needed to calculate BP and the unknown target parameter. The BP is the consequence of iteroparous turtles that do not breed annually, with a longer average remigration interval (RI, the number of years between consecutive breeding seasons) causing a lower BP. Many studies have used observed RI as the reciprocal of BP to estimate adult female abundance (e.g. Spotila et al. 1996, Richardson et al. 1999, Beggs et al. 2007, Richards et al. 2011, Marco et al. 2012, Bellini et al. 2013, Casale & Heppell 2016, Gallaway et al. 2016, Warden et al. 2017) or to model population dynamics (e.g. Chaloupka 2002, 2003, Heppell et al. 2005, Tröng & Chaloupka 2007, Piacenza et al. 2016, 2017). Other studies derived RI and/or BP from transition probabilities between breeding and non-breeding states estimated, among other parameters, through CMR models (e.g. Phillips et al. 2014, García-Cruz et al. 2015, Piacenza et al. 2016), although the conversion equations were not consistent among these studies. Both the direct (observed RI) and modeling approaches need the same CMR data.

Obtaining adequate CMR data is challenging because it requires identifying individual females across nesting seasons, which is commonly attained by flipper tagging (e.g. Broderick et al. 2003, Ehrhart et al. 2014, Hamilton et al. 2015, Garner et al. 2017) with great limitations. For instance, low detection capacity by the monitoring teams can produce longer observed remigration intervals caused by missing encounters. Tracking individual females for several years (e.g. through satellite telemetry) is still technically unfeasible, and the rare positive cases (e.g. Zbinden et al. 2008, Marcovaldi et al. 2010, Hawkes et al. 2011, Ceriani et al. 2012, Mingozi et al. 2016) are too few to be helpful. CMR based on genetic fingerprinting (Shamblin et al. 2017) could theoretically provide data on RI, but such an approach is feasible only for small populations or at small geographic scales. Mortality is another parameter that can affect the observed RI, and ways to correct such biases have seldom been attempted (e.g. Richards et al. 2011). This study aims to assess how the different parameters involved can affect the estimation of adult female abundance from remigration intervals and to provide indications of how to minimize potential errors.

2. MATERIALS AND METHODS

2.1. Proportion of annual breeding females

Adult female turtles do not breed every year. The relationship between the total number of adult females in a population (TF) and the number of females nesting in a given year (annual nesting females [ANF]) is given by their ratio, or breeding proportion (BP):

$$BP = \frac{ANF}{TF} \quad (1)$$

Therefore, if BP is known, it can be used to convert ANF (observed) to TF (unknown), assuming a stable population:

$$TF = \frac{ANF}{BP} \quad (2)$$

BP can be estimated from capture-mark-recapture histories of females nesting in different years, with the interval between 2 consecutive nesting seasons called the remigration interval (RI). All the following simulations and analyses were performed in R v.3.5.1 (R Development Core Team 2018).

2.2. Simulated breeding female assemblage

To test different ways of estimating BP, we created a virtual assemblage of TF individuals (total adult females) with a given mean remigration interval (M), through the following procedure. We assumed a Poisson distribution of RIs with mean M and calculated the number of cases with RI values ranging from 1 to 10 yr out of a total of 1000 cases. From this sample of 1000 values, a maximum of 25 random values of RI were extracted and used to create the reproductive history of an individual adult female along 25 yr, i.e. in which year she nested. This process was repeated for each of the TF individual turtles of the virtual assemblage. Then the first 10 yr were discarded to remove possible effects of the starting year, and the remaining 15 yr represented the observation window of a virtual capture-mark-recapture program. From this simulation, the 'true' ANF was calculated as the average number of turtles breeding per year. Then, the effects of probability of detection and of annual survival probability on the 'observed' results of a virtual CMR program were simulated as follows.

A probability of detection p was applied to all the breeding events, and each breeding turtle was assigned to an observed/not observed status through

a random binomial function. From these simulated breeding observations, the average number of nesting females observed per year (ANF_{obs}) was calculated. Assuming a stable population, the observed probability of detection was calculated as:

$$p_{obs} = \frac{ANF_{obs}}{ANF} \quad (3)$$

A survival probability S^t was calculated for each time a turtle was re-encountered after being observed (and tagged) the first time (where S is the annual survival probability and t is the interval since the first tagging) and converted into a dead/alive status through a random binomial function. If a turtle was marked as dead in 1 yr, it remained in that status for the rest of the years. In other words, although all turtles are subjected to mortality, in a stable population dead turtles are replaced while tagged turtles are not (they are specific individuals that are monitored along the years). For this reason, S is applied only to tagged animals.

In this way, for each turtle, we obtained a simulated CMR history resulting from a combination of M , p and S . In such a formulation, S can be considered to include also tag loss, and p can include temporary emigration (temporary unavailability). Simulations were run with a range of values of M (13 values ranging from 1.6 to 4 yr with interval 0.2), S (7 values ranging from 0.70 to 1.00 with interval 0.05), p (10 values ranging from 0.1 to 1.0 with interval 0.1) and TF (7 values: 25, 50, 100, 150, 200, 250, 1000 turtles).

2.3. BP estimation

BP was estimated through 4 different methods.

The first method ('REM', based on the mean remigration interval) is the most common one and estimates BP as the reciprocal of the average RI:

$$BP = \frac{1}{RI} \quad (4)$$

Remigration intervals were obtained from the individual CMR histories, potentially including multiple remigration intervals for each turtle. The average RI was calculated from all RIs (including multiple RIs from the same individual turtle).

The second method ('MSLR') was based on a MultiState Live Recapture model, implemented by the Rmark package for R (R Development Core Team 2018). The model included 2 possible states for any given year: an observable state (breeding) and an unobservable state (not breeding). The model esti-

mates 4 direct parameters: adult female survival rate (S), probability of detection (p), probability of moving from breeding to non-breeding state ($\psi^{B \rightarrow NB}$) and probability of moving from non-breeding to breeding state ($\psi^{NB \rightarrow B}$). All parameters were set as constant across years. Since in a stable population:

$$ANF = ANF \times (1 - \psi^{B \rightarrow NB}) + NBF \times \psi^{NB \rightarrow B} \quad (5)$$

and

$$TF = ANF + NBF \quad (6)$$

where NBF is the number of non-breeding females per year, then:

$$\begin{aligned} BP &= \frac{ANF}{TF} \\ &= \frac{ANF(1 - \psi^{B \rightarrow NB}) + (TF - ANF)\psi^{NB \rightarrow B}}{TF} \quad (7) \\ &= \frac{\psi^{NB \rightarrow B}}{\psi^{B \rightarrow NB} + \psi^{NB \rightarrow B}} \end{aligned}$$

The third method ('MSLR p -corr') was a variant of MSLR in which p was fixed to a value equal to p_{obs} . This represents the case when the probability of detection can be estimated from additional data. For instance, an approximate estimation of p (p_{est}) can be obtained as:

$$p_{est} = 1 - (1 - e)^C \quad (8)$$

where C is the number of clutches a female lays in a nesting season (also known as clutch frequency), and e is the probability of observing a nesting event. In other words, the probability of encountering an individual turtle at least 1 time during a nesting season increases with the number of times the turtle comes ashore to lay eggs. In turn, e can be estimated from the total number of clutches laid in a nesting season (C_{tot}) and the number of clutches where the turtle was encountered (C_{obs}):

$$e = \frac{C_{obs}}{C_{tot}} \quad (9)$$

The fourth method ('REM-t', based on the mean remigration interval calculated from a conditionally truncated distribution) assumes that long remigration intervals are an artifact caused by low detection probability and implements the simple approach of removing the presumed artifacts from the dataset. This method is a variant of REM, where a correction was applied in case of a highly right-skewed distribution, which can be an indication of overestimated (artifact) RI values. What to consider a highly right-skewed distribution and where to truncate the distribution are 2 key parameters that were empirically investigated through a series of trials, and we pro-

pose the following method. The first (lowest) mode of the frequency distribution of RIs is identified and the number of values of 2 parts of the dataset is calculated: (A) the number of RIs $\leq$ mode+2 and (B) the number of RIs $>$ mode+2 (B). If $B/A \geq 0.1$ (denoting a right-skewed distribution), then the mean RI is calculated only on the A values; otherwise, the mean RI is calculated on the entire dataset.

2.4. Correction for mortality

We simulated the case when an estimated S is available and correction for mortality can be implemented. Two scenarios were simulated, with a correct and with a wrong estimation of S . For the methods MSLR and MSLR p -corr, S was given as a fixed parameter in the model. For the methods REM and REM-t, the observed frequency distribution of remigration intervals (Rlobs) was converted into an S -corrected frequency distribution by reconstructing the number of RIs (RIcorr) that would have been observed if the turtle had not died, for each remigration interval i :

$$RIcorr_i = \frac{RIobs_i}{S^i} \quad (10)$$

3. RESULTS

A total of 910 simulations of a virtual assemblage of 1000 adult females were performed, with M ranging from 1.6 to 4.0 ($n = 13$ values), S ranging from 0.70 to 1.00 ($n = 7$ values) and p ranging from 0.1 to 1.0 ($n = 10$ values) (see Table S1 in the Supplement at www.int-res.com/articles/suppl/n041p141_supp.pdf). The effects of S and p on the observed remigration intervals (RI) are shown in Fig. 1 with the example of $M = 2.6$. Low S values reduced the number of long RIs, with the result of underestimating the observed mean RI. On the contrary, low p values increased the number of long RIs, with the result of overestimating the observed mean RI.

When the 4 combinations of realistic low and high values of S (0.70 and 0.95; see a review by Casale et al. 2015) and p (0.1 and 1) are used in simulations with the 13 different values of M considered, the results indicate a stronger effect of p than S on the estimation of the adult female assemblage size by the 2 methods currently used (the reciprocal of RI and CMR models, here represented by REM and MSLR, respectively) and that a low S can only partially compensate for a low p (Fig. 2). In the range of M considered, with $S = 0.95$ and $p = 0.1$ the error ranged from

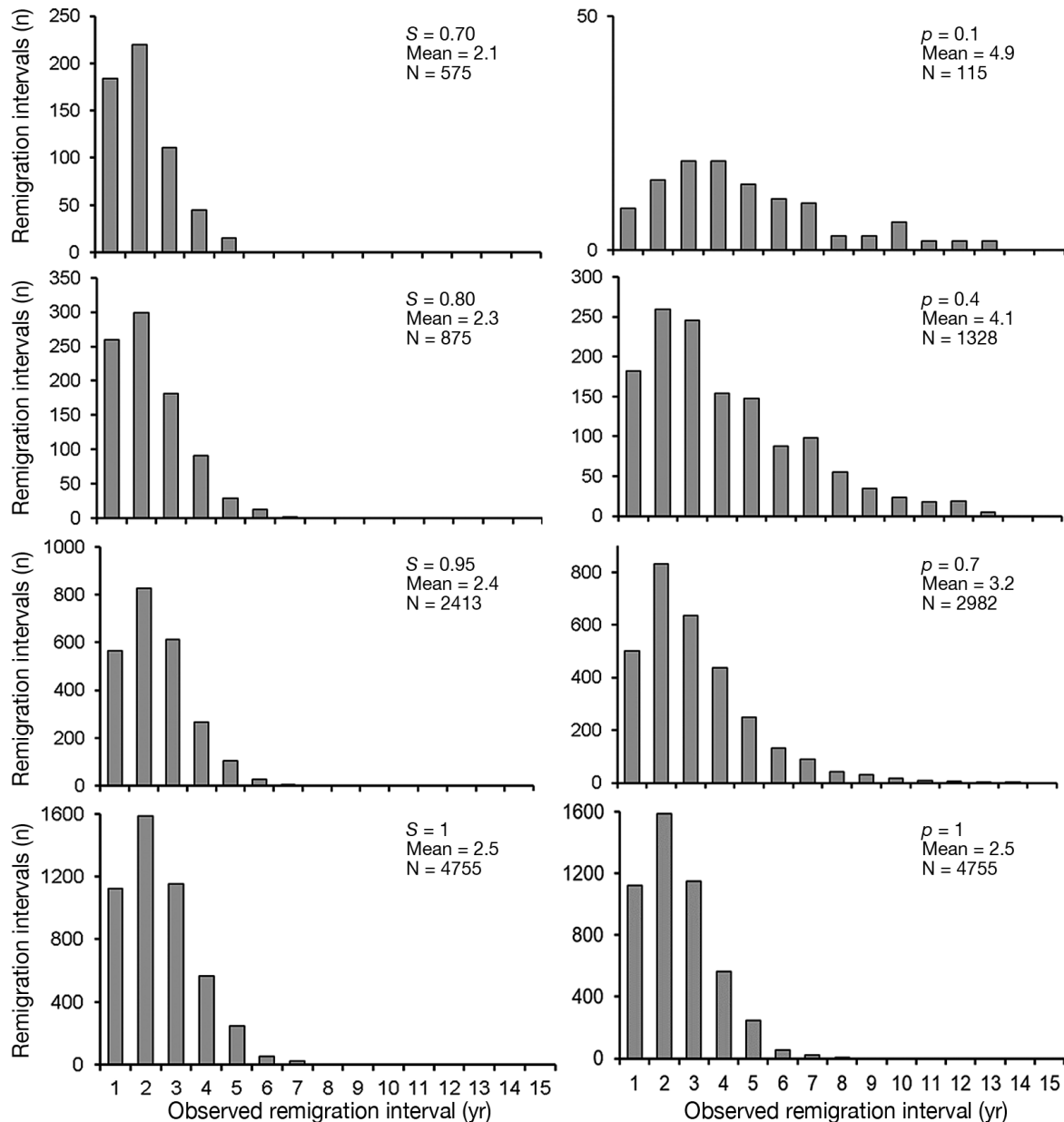


Fig. 1. Frequency distribution of turtle female remigration intervals (RI) observed from different simulations of a virtual turtle assemblage of 1000 adult females and mean RI = 2.6 yr as an example. Different scenarios are shown with (left panels) fixed detection probability (p) = 1 and annual survival probability (S) ranging from 0.70 to 1 and (right panels) fixed survival (S) = 1 with p ranging from 0.1 to 1. Resulting mean RI and number of observed RIs (N) are shown

28 to 188% (median = 71%; IQ range: 47–120) for method REM and from –27 to 1133% (median = 812%; IQ range: 13–858%) for method MSLR. The 2 methods with corrections (respectively REM-t and MSLR p -corr) greatly reduced the error (Fig. 2). Over a range of S and p values, the overall effect was an overestimation of adult female assemblage size, with increasing errors at lower and higher mean RI for the REM and MSLR methods, respectively (Fig. 3). Also

in this case, the 2 methods with corrections (respectively REM-t and MSLR p -corr) greatly reduced and balanced the errors at different M values (Fig. 3).

Of the 4 methods to calculate BP to estimate the adult female assemblage size, REM-t showed the best performance over a variety of M , S , and p (median: –10.8%; IQ range: –18.2–2.4%; range: –48.8–48.9%; n = 768), followed by REM, MSLR p -corr and MSLR (Fig. 4). Thanks to the inclusion of additional informa-

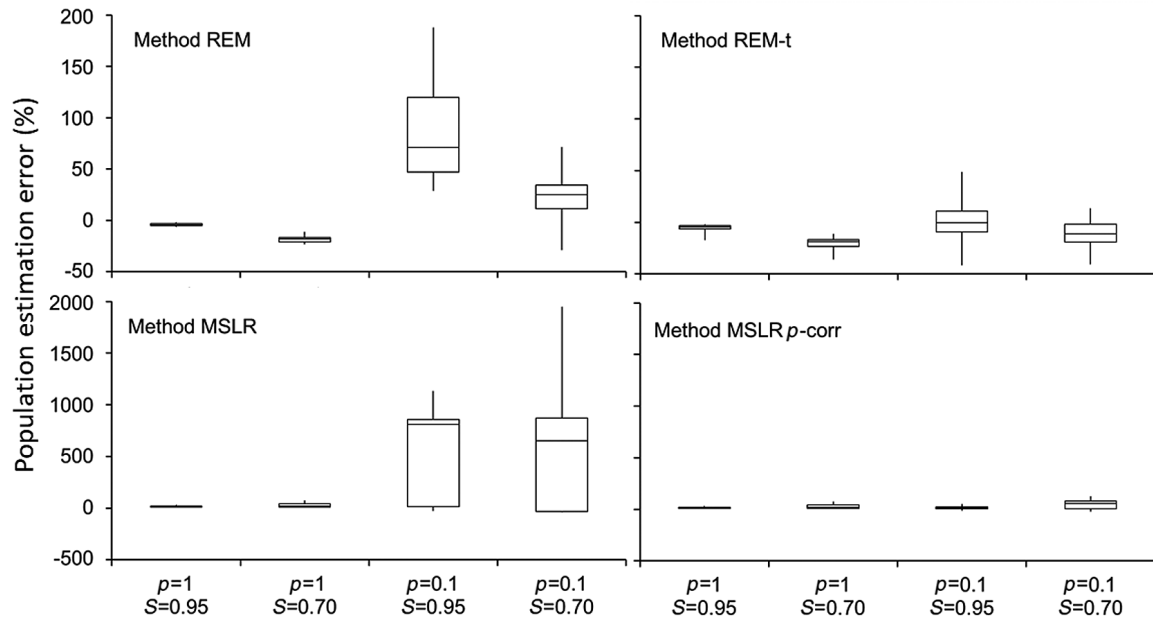


Fig. 2. Errors (%) of sea turtle adult female assemblage size estimated ($[\text{estimated} - \text{real}]/\text{real}$) from a virtual assemblage of 1000 adult females with mean remigration interval ranging from 1.6 to 4 yr (interval 0.2; $n = 13$). Distributions of the resulting 13 error values are shown as a box-plot (median, quartiles 1 and 3, and min-max) for each of the 4 combinations of 2 values of S and 2 values of p . Four methods to derive the breeding proportion are compared: mean remigration interval (REM), mean remigration interval calculated from a conditionally truncated distribution (REM-t, see Section 2.3), multistate live recapture model (MSLR), and MSLR corrected with fixed p estimated from simulation results (MSLR p -corr; see Section 2.3)

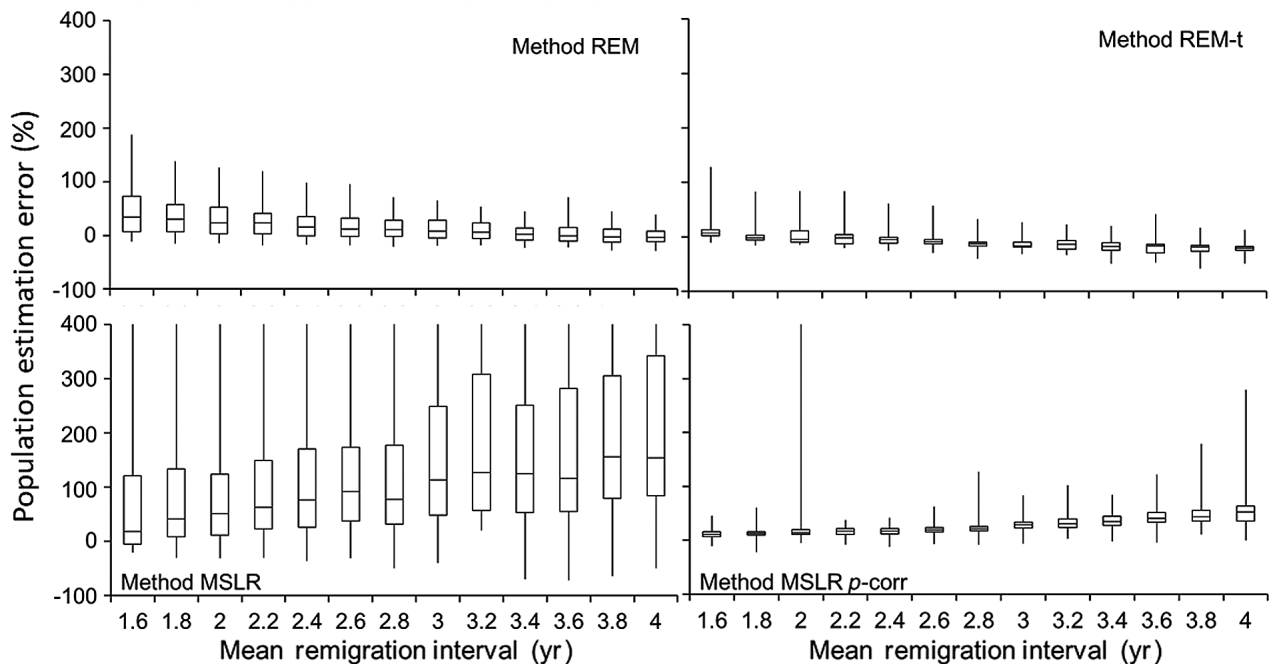


Fig. 3. Errors (%) of sea turtle adult female assemblage size estimated from a virtual assemblage of 1000 adult females with S ranging from 0.7 to 0.95 (interval 0.5; $n = 6$) and p ranging from 0.1 to 1 (interval 0.1; $n = 10$). Distributions of the resulting 60 error values are shown as a box-plot for each of 13 values of given mean remigration interval. See Fig. 2 for details. Upper whiskers of MSLR and one of MSLR p -corr are truncated for display purposes

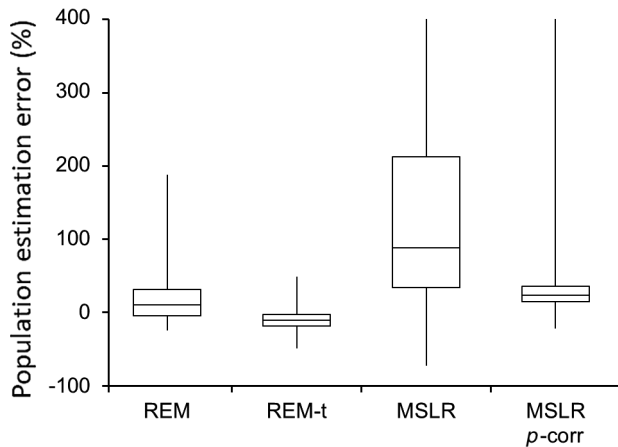


Fig. 4. Errors (%) of sea turtle adult female assemblage size estimated from a virtual assemblage of 1000 adult females with mean remigration interval ranging from 1.6 to 4 yr (interval 0.2; $n = 13$), S ranging from 0.7 to 0.95 (interval 0.5; $n = 6$) and p ranging from 0.1 to 1 (interval 0.1; $n = 10$). Of the resulting 780 error values, only those derived from a minimum of 20 remigration intervals were considered ($n = 768$), and their distribution is shown as a box-plot. See Fig. 2 for details. The latter 2 cases had a few very high values, and the upper whiskers are truncated for display purposes

tion (p ; virtually obtained from other sources, see Section 2), MSLR p -corr greatly improved the performance of MSLR in terms of IQ range, but very high values were still produced. The correction approach undertaken by REM-t removed the bias and narrowed both IQ and total ranges of errors in comparison to REM.

Simulations with a range of virtual assemblage sizes from 25 to 1000 adult females show that errors increase at low assemblage sizes, with the possible exception of MSLR (see Figs. S1 & S2). However, this was because a low number of RIs are observed from smaller assemblages. When this effect was removed by calculating BP only from data sets with at least 20 RIs, the performance was similar at any assemblage size (Fig. S3), indicating that assemblage size has no effect per se and that a sample size of 20 RI is enough to estimate BP, at least with the REM-t method.

Correction of low S with the real S value worsened the performance of all methods except MSLR p -corr. The latter had a good performance, similar to REM-t, although moderately high-biased (Fig. 5). When S was corrected with an erroneous lower S value, all

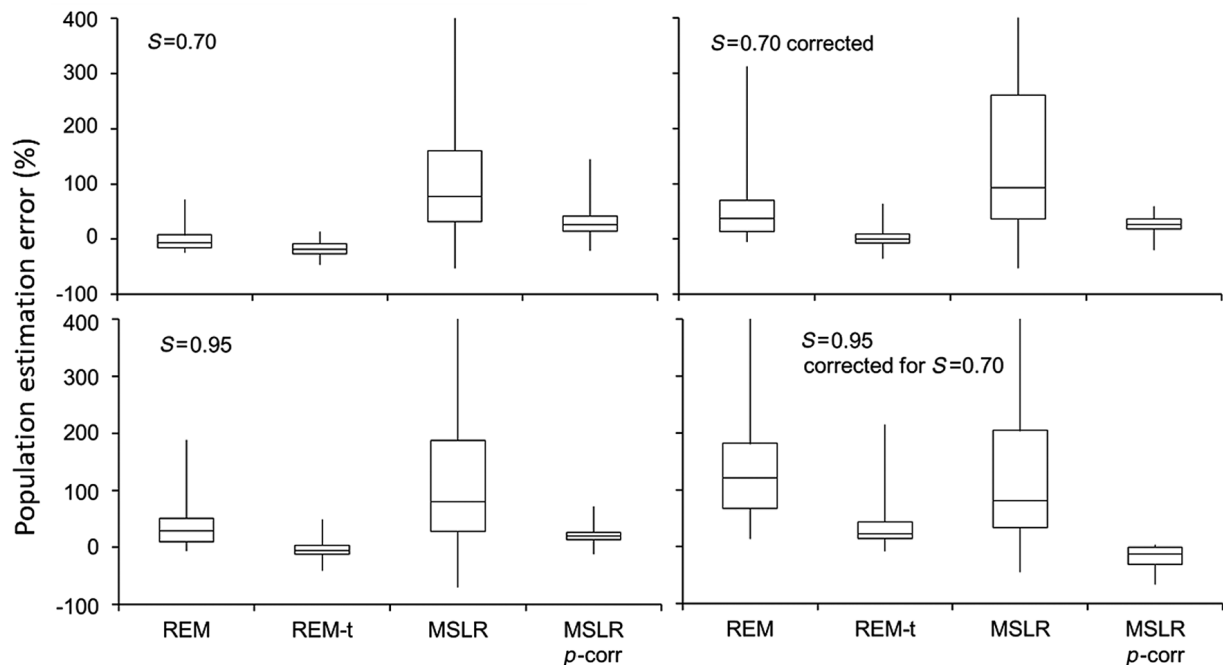


Fig. 5. Errors (%) of sea turtle adult female assemblage size estimated from a virtual assemblage of 1000 adult females with mean remigration interval ranging from 1.6 to 4 yr (interval 0.2; $n = 13$), p ranging from 0.1 to 1 (interval 0.1; $n = 10$) and S ranging from 0.7 to 0.95 (interval 0.5; $n = 6$). Results for S of 0.70 and 0.95 (on the left) are compared with the same S values with a correction for $S = 0.70$ (on the right), which represents a case of correction with a correct estimate of S in the top-right panel and a case of correction with an erroneous estimate of S in the bottom-right panel. Of the resulting 130 error values, only those derived from minimum 20 remigration intervals were considered. This condition was met in all 130 cases of the simulations ' $S = 0.95$ ' and ' $S = 0.95$ corrected for $S = 0.70$ ', while 124 and 129 values were considered for the simulations ' $S = 0.70$ ' and ' $S = 0.70$ corrected', respectively. See Fig. 2 for details

methods (and especially REM) provided worse results (Fig. 5). It should be noted that the correction approach for methods REM and REM-t (Eq. 10) successfully provided the true mean RI when $p = 1$ (simulations with $S = 0.70$ and M ranging from 1.6 to 4 yr; mean error = 0.008; $n = 13$).

4. DISCUSSION

This study provides information and methods that can contribute to future assessments of abundance and conservation status of sea turtle populations as well as to the re-assessment of previous estimates. Sea turtle population abundance (at least that of adult females) is currently derived from nest counts, which are converted into number of individuals through capture-mark-recapture data (i.e. clutch frequency and 'remigration intervals' or through more complex modeling). The present study strongly indicates that this conversion bears the risk of producing estimates very different from the real abundance. Although this risk may vary with the method, it cannot be totally eliminated, and this should be carefully considered when using population abundance estimations to derive the conservation status of populations.

The results show that mortality and detection probability may have important effects in estimating abundance. A low apparent survival probability may be caused both by a real low survivorship or by tag loss (see Pfaller et al. 2019 for a review of tag loss estimates worldwide). In both cases, the turtle cannot be detected anymore. A method to reduce missed identification due to tag loss is the subcutaneous application of passive integrated transponders (PIT) tags (Balazs 1999). However, PIT tags are expensive (compared to regular external flipper tags) and require the use of a PIT tag scanner, limiting their systematic use in many locations worldwide.

Detection probability is a particularly problematic parameter because it showed the greatest effect on population abundance estimate. With lower detection, fewer nesting events are observed, leading to incomplete individual nesting history and longer observed remigration intervals. A low detection probability may be caused by 2 different factors. A limited spatial or temporal capacity of the monitoring program would not detect all the turtles on the nesting beach (e.g. Pfaller et al. 2013). Another factor might be a limited site fidelity of turtles to the monitored beach across years. Turtles may not be detected in their breeding year because they laid clutches somewhere else; in another year, if they

return to the original nesting beach where they were tagged and are encountered again, their remigration interval would appear longer than the reality. Naturally, long remigration intervals can only be reported by long-term monitoring projects. Therefore, although long-term projects are the most valuable ones in many respects, they also bear the highest risk of observing biased (long) remigration intervals (e.g. Ehrhart et al. 2014) and of producing biased (high) population abundance estimates. A good detection probability can be achieved only with a complete and regular monitoring of a nesting site with low–moderate nesting activity. For instance, we estimated (Eq. 8) that a p close to 1 was achieved, at least in certain years, at sites with intensive monitoring effort and just tens or a few hundreds of nesting events per year (e.g. Broderick et al. 2002, Bellini et al. 2013). In such cases, basically all turtles nesting in a certain season were encountered at least 1 time. Where, on the contrary, only partial monitoring is possible and/or a high number of clutches is laid annually, making it impossible to observe a good proportion of nesting activity, the detection probability can be very low. For instance, we estimated (Eq. 8) $p = 0.06$ at the Archie Carr National Wildlife Refuge (central east coast of Florida, USA) in the period 1982 to 2012, where an average of 11556 clutches were laid annually (Ehrhart et al. 2014).

Given that complete monitoring is rare and population abundance at regional management unit (Wallace et al. 2010) or species is driven by major nesting sites with high numbers of clutches per year, it is likely that population abundance assessments are based on datasets affected by imperfect detection. Therefore, the present results suggest that current estimates of turtle populations, mostly derived through method REM, may be overestimated, even by a factor of 2. Moreover, studies that adjusted data (remigration intervals) for mortality but not for detection (e.g. Richards et al. 2011) probably produced even greater overestimations. Since estimating S is difficult and estimates can be wrong, the small benefits of a good correction of S are not worth the great errors caused by a wrong correction. It is worth noting that even greater errors may be produced by more sophisticated CMR models (here represented by the MSLR method), which need to estimate at least 4 unknown parameters simultaneously. Results show incorrect estimates of all 4 parameters by MSLR in most simulations. As expected, fixing 1 parameter (p) with values close to real ones greatly improved the estimates of the other 3 parameters and fixing a second parameter (S) produced a further im-

provement, although slight. The decreased performance of CMR models in simulations with low detection probability was also reported by Troëng & Chaloupka (2007). In principle, robust design models using captures in secondary periods (i.e. within the same nesting season) should better estimate detection probability. However, such analyses may not be effective in some cases (e.g. Hamilton et al. 2015), require substantial increases in the number of parameters of the model and, obviously, cannot be applied if data about intra-season re-encounters are not available.

With the understanding that the population abundance of marine animals like sea turtles is inherently elusive and that any method bears a risk of error, we propose a method (method REM-t, mean remigration interval calculated from a conditionally truncated distribution; see Section 2) to correct the biases potentially produced by the most common method currently used (method REM). In the simulations, REM-t performed better than the methods except in some cases where the result was similar to that of the CMR *p*-corr method. REM-t is a simple and practical method, easy to implement in future studies as well as on existing datasets that are available at least in the form of frequency distribution of remigration intervals. It basically consists of right-censoring the dataset if there is evidence of a high right-skewness, which suggests the presence of artifact values due to a low detection probability. This method was robust in a variety of simulations with wide ranges of values of the main parameters involved, such as mean remigration interval (*M*), detection probability (*p*) and annual survival probability (*S*). It performed well also in case of correction for *S* and even minimized the error due to correction with a wrong *S* value.

It is important to remember that converting annual nesting females to total females by means of a conversion factor in the form of a breeding proportion (independently of how breeding proportion is estimated) assumes that the population is stable. One single breeding proportion value is estimated from the entire CMR study period and is commonly applied to an average number of annual nesting females. The simulations presented here were based on the same assumption. Naturally, even higher risks of errors may occur when estimating the abundance of a non-stable population, making corrections more difficult.

There is growing evidence, from the present and other studies (e.g. Tucker 2010, Pfaller et al. 2013, Weber et al. 2013, Esteban et al. 2017, Ceriani et al. 2019), of the risks associated with deriving sea turtle

demographic parameters from nesting activity. Demographic parameters such as population abundance (at least of adult females) and annual survival probability are needed for proper management of sea turtles and deserve a careful understanding and a proper analysis of data. Obtaining suitable data is not a simple task. A complete seasonal and spatial coverage of the nesting activity in a site can increase the detection of clutches and of individual females. A high and constant effort across years can increase detection probability and minimize temporal biases. Researchers should restrain from estimating demographic parameters if the quality of data is questionable.

In summary, we recommend: (1) using only datasets with at least 20 remigration intervals (including multiple values from the same turtle), no matter the population size, (2) avoiding correction for *S*, (3) interpreting with caution the results of CMR models, since very large errors are possible, and in these models (4) fixing the detection probability parameter with values obtained by other sources whenever possible, (5) applying the correction method described here (REM-t; see Section 2) in place of the commonly used REM and in addition to CMR models, enhancing the value of nesting monitoring programs for abundance studies by (6) estimating the detection probability (see Eq. 8) and attempting to increase it if it is low, (7) always double tagging (and possibly applying PIT tags) and (8) having a consistent and complete spatio-temporal coverage of the nesting activity in a nesting area.

A recent re-evaluation of clutch frequency estimates (the other conversion factor relating clutches to females, see Section 1) found that the traditional method based on CMR could overestimate turtle abundance by a factor of 2 in cases of low detection probability (Tucker 2010, Weber et al. 2013, Esteban et al. 2017). Therefore, the combination of the 2 conversion factors (clutch frequency and remigration interval) obtained by traditional methods could have produced estimates of adult female abundance much higher than the reality. Thus, a general reassessment for populations should be deemed urgent to understand their real conservation status. The availability of new or improved methods to estimate clutch frequency and breeding proportion should encourage undertaking the ambitious task of estimating adult female abundance of as many sea turtle populations as possible. Reliable data on these 2 parameters, which are important for several other aspects, are still very limited, and their variation in time and among different populations should be assessed to improve our knowledge of the populations and to quantify the associated uncertainty.

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Sea turtle populations are overestimated worldwide from remigration intervals: correction for bias

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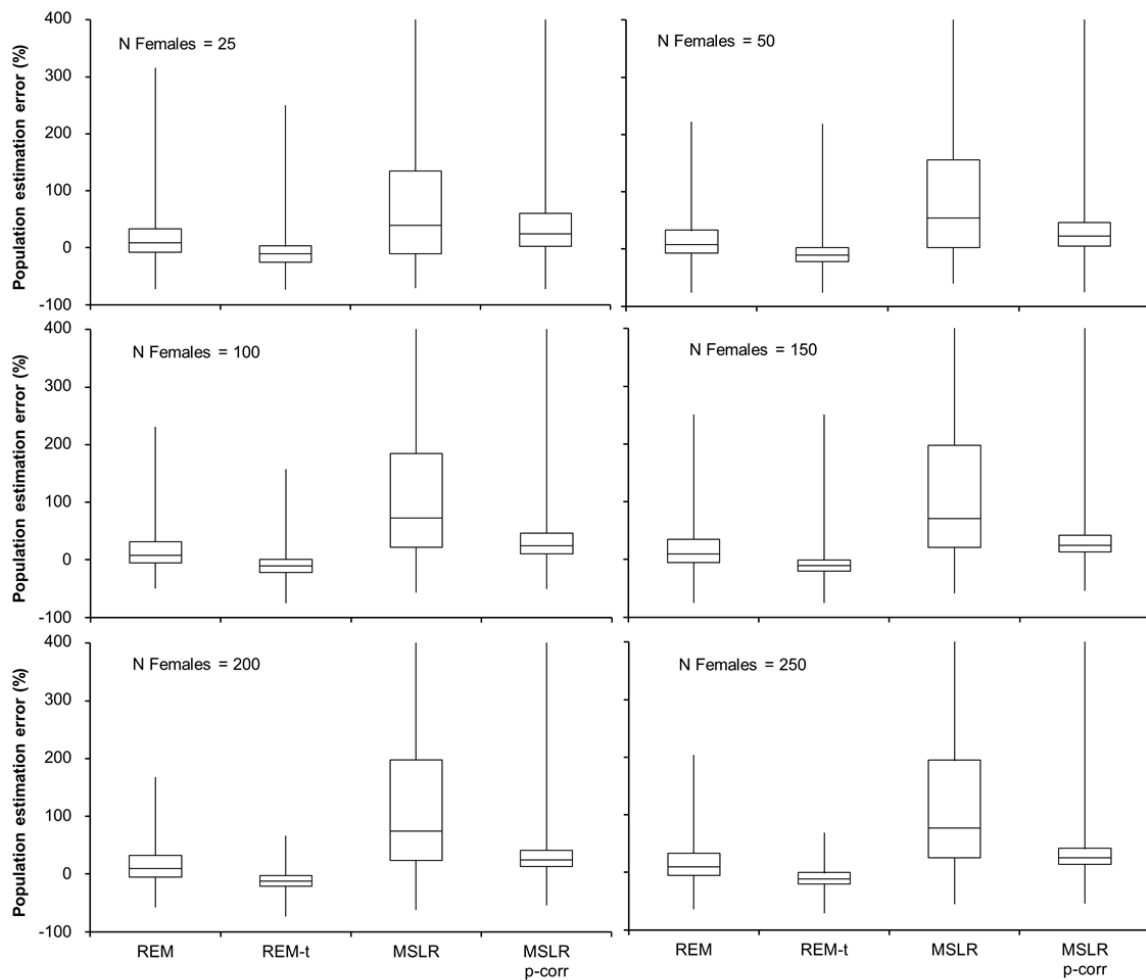


Figure S1. Errors (%) of sea turtle adult female assemblage size estimated ((estimated –real)/real) from virtual assemblages ranging from 25 to 250 adult females with mean remigration interval ranging from 1.6 to 4 years (interval 0.2; n=13), annual survival probability (S) ranging from 0.7 to 0.95 (interval 0.5; n=6) and probability of detection (p) ranging from 0.1 to 1 (interval 0.1; n=10). Distributions of the resulting 780 error values are shown as a box-plot (median, quartiles 1 and 3, and min-max) for each of four methods to derive the Breeding

Proportion: mean remigration interval (REM), mean remigration interval calculated from a conditionally truncated distribution (REM-t, see text for details), multistate live recapture model (MSLR), MSLR corrected with fixed probability of detection (p) estimated from simulation results (MSLR p-corr; see text for details). The latter two cases had a few very high values and the upper whiskers are truncated for display purposes. Of the 780 simulations some resulted in no remigration intervals for assemblages smaller than 250 females. Specifically, the number of values included in each box plot was 744, 771, 775, 779, 779 for virtual assemblages of 25, 50, 100, 150, 200 females respectively.

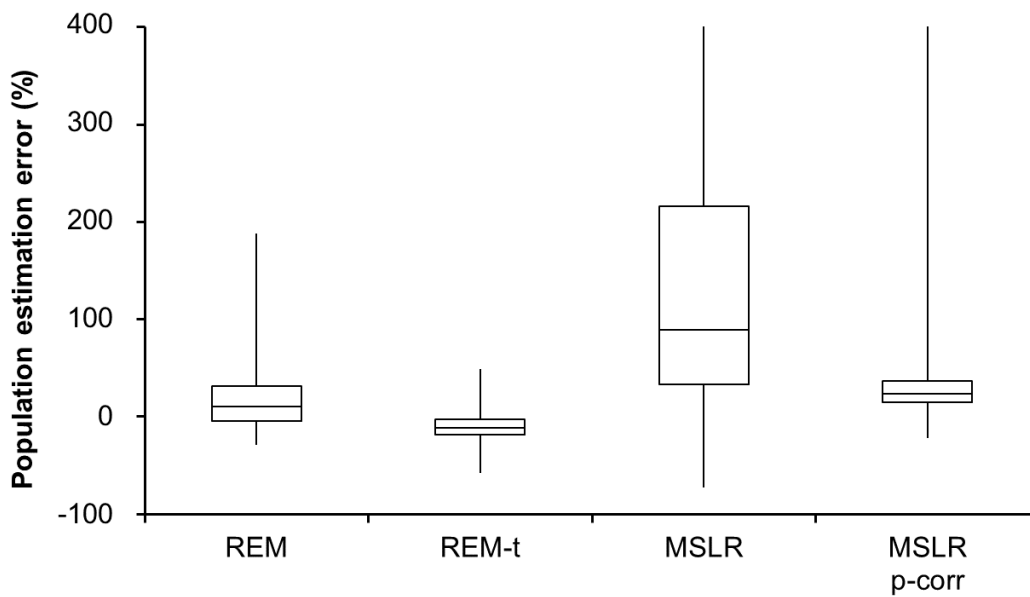


Figure S2. Errors (%) of sea turtle adult female assemblage size estimated ((estimated – real)/real) from a virtual assemblage of 1000 adult females. See Fig. S1 for details.

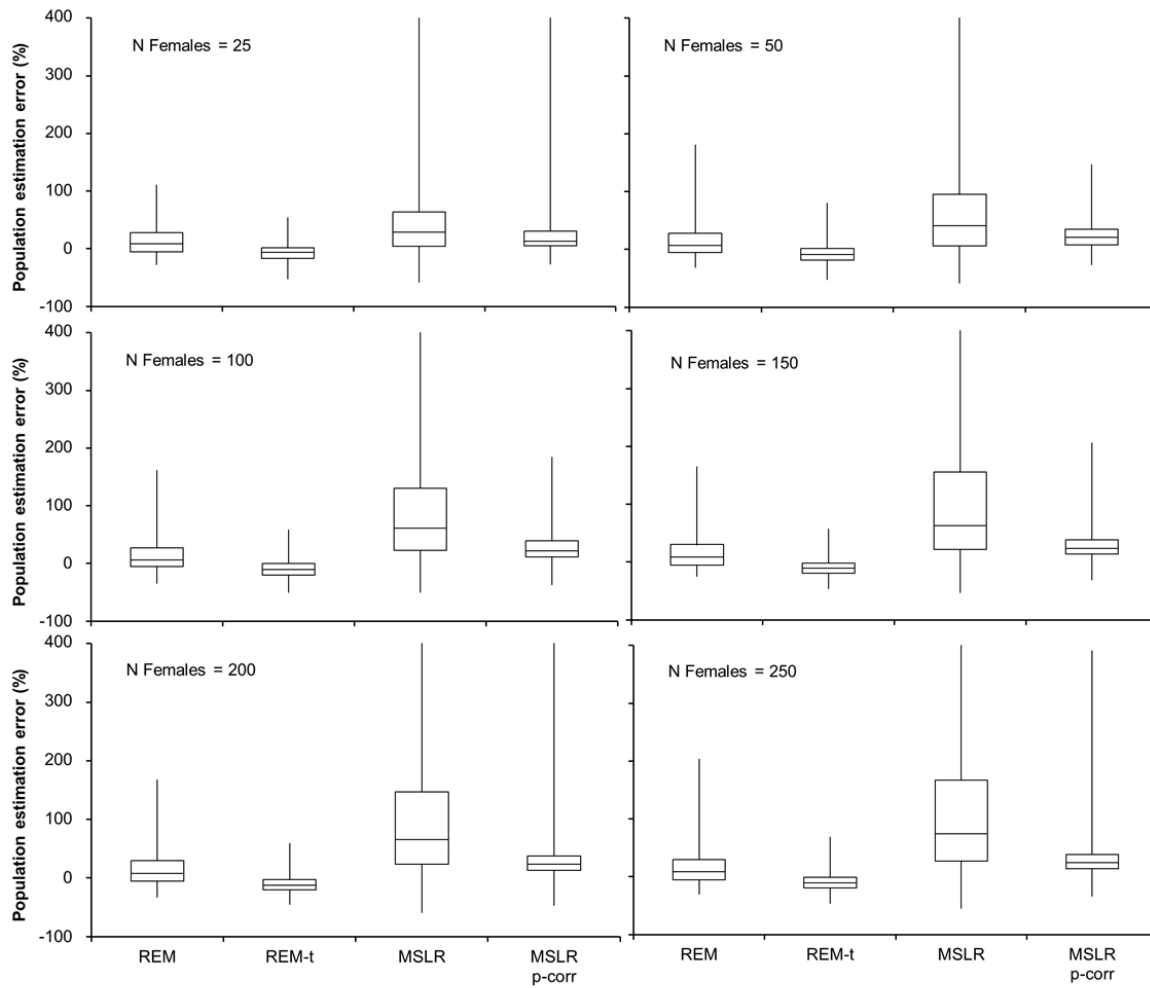


Figure S3. Errors (%) of sea turtle adult female assemblage size estimated ((estimated – real)/real) from virtual assemblages ranging from 25 to 250 adult females. See Fig. 4 for details. Only estimates derived from a minimum of 20 remigration intervals have been considered and consequently the number of values included in each box plot was lower than 780 and specifically they were 239, 456, 605, 655, 682, 700 for virtual assemblages of 25, 50, 100, 150, 200, 250 females respectively.

Table S1. Results of 910 simulations of a virtual assemblage of 1000 adult females, with mean remigration interval (M) ranging from 1.6 to 4 years (interval 0.2; n=13), annual survival probability (S) ranging from 0.70 to 1.00 (interval 0.05; n=6) and detection probability (p) ranging from 0.1 to 1 (interval 0.1; n=10). RI: remigration intervals 1-14; N RIs: number of observed remigration intervals; Skewness: see text; ANF: “true” annual nesting females; T obs: individual turtles observed; MSLR S, MSLR p, MSLR psiAB, MSLR psiBA: the four parameters of the MSLR model (see text); pobs: observed probability of detection (see text); MSLR p-corr S, MSLR p-corr p, MSLR p-corr psiAB, MSLR p-corr psiBA: the three parameters of the MSLR p-corr model (see text); REM, REM-t, MSLR, MSLR p-corr: Errors (%) of adult female abundance estimates ((estimated –real)/real) obtained from the four methods, respectively.

	M	S	p	RI=1	RI=2	RI=3	RI=4	RI=5	RI=6	RI=7	RI=8	RI=9	RI=10	RI=11	RI=12	RI=13	RI=14	N RIs	Mean RI	Skewness	ANF	T obs	MSLR_S	MSLR_p	MSLR_PsiB-NB	MSLR_PsiNB-B	pobs	MSLR p-corr S	MSLR p-corr PsiB-NB	MSLR p-corr PsiNB-B	REM	REM-t	MSLR	MSLR p-corr
1	1.6	0.7	0.1	20	19	10	10	8	4	1	0	0	0	0	0	0	0	72	2.76	0.47	622	68	0.69	1.00	0.96	0.07	0.10	0.69	0.59	0.81	71.6	11.7	813.6	7.0
2	1.6	0.7	0.2	67	44	28	11	11	7	4	1	0	0	1	0	0	0	174	2.45	0.25	622	163	0.69	0.98	0.90	0.11	0.20	0.69	0.53	0.54	52.3	6.9	492.6	23.0
3	1.6	0.7	0.3	122	75	45	32	12	11	2	4	2	1	0	0	1	0	307	2.44	0.27	622	269	0.71	0.92	0.85	0.15	0.29	0.71	0.53	0.49	51.7	4.6	307.0	29.8
4	1.6	0.7	0.4	185	131	51	25	15	5	5	2	0	1	0	0	0	0	420	2.06	0.14	622	344	0.66	0.33	0.40	1.00	0.40	0.66	0.50	0.78	28.1	1.7	12.7	1.8
5	1.6	0.7	0.5	234	136	65	34	10	3	8	1	1	2	0	0	0	0	494	2.02	0.14	622	400	0.67	0.32	0.27	1.00	0.49	0.67	0.53	0.56	25.6	0.2	20.9	20.3
6	1.6	0.7	0.6	319	186	69	34	18	5	1	0	0	0	0	0	0	0	632	1.84	0.10	622	473	0.66	0.48	0.38	0.92	0.59	0.66	0.50	0.69	14.4	2.7	11.8	7.6
7	1.6	0.7	0.7	351	203	84	21	5	5	1	1	0	0	0	0	0	0	671	1.73	0.05	622	494	0.64	1.00	0.67	0.45	0.71	0.64	0.53	0.67	7.6	7.6	54.5	11.4
8	1.6	0.7	0.8	447	233	73	18	5	1	2	0	0	0	0	0	0	0	779	1.6	0.03	622	542	0.64	1.00	0.61	0.54	0.79	0.64	0.50	0.71	0.5	0.5	32.1	6.1
9	1.6	0.7	0.9	500	236	65	8	3	2	0	0	0	0	0	0	0	0	814	1.51	0.02	622	563	0.62	1.00	0.56	0.62	0.90	0.62	0.51	0.70	6.1	6.1	18.2	6.9
10	1.6	0.7	1	563	247	51	6	1	0	0	0	0	0	0	0	0	0	868	1.43	0.01	622	598	0.61	1.00	0.51	0.71	1.00	0.61	0.51	0.71	11.1	11.1	6.6	6.6
11	1.6	0.7	0.1	22	22	6	15	4	8	1	0	0	1	1	0	0	0	80	3	0.23	628	77	0.74	0.10	0.64	1.00	0.10	0.74	0.64	1.00	88.4	39.1	3.3	3.2
12	1.6	0.7	0.2	87	58	40	28	10	15	4	1	0	1	0	1	0	0	245	2.58	0.32	628	209	0.73	1.00	0.89	0.13	0.21	0.73	0.47	0.65	62.0	9.6	409.8	7.9
13	1.6	0.7	0.3	152	97	63	39	20	14	10	3	1	0	0	0	0	0	399	2.45	0.28	628	338	0.73	1.00	0.84	0.17	0.30	0.73	0.47	0.62	53.8	7.7	267.2	10.3
14	1.6	0.7	0.4	203	145	73	43	22	18	4	0	2	3	0	0	0	0	513	2.3	0.22	628	411	0.72	0.29	0.36	1.00	0.39	0.72	0.52	0.66	44.4	6.2	14.9	12.6
15	1.6	0.7	0.5	263	183	78	36	16	5	6	1	0	0	1	0	0	0	589	2	0.12	628	434	0.68	0.53	0.54	0.69	0.50	0.68	0.51	0.75	25.6	3.4	12.0	5.4
16	1.6	0.7	0.6	341	225	96	27	14	12	4	3	0	1	1	0	0	0	724	1.94	0.09	628	516	0.69	0.54	0.48	0.76	0.60	0.69	0.52	0.67	21.8	21.8	2.5	11.8
17	1.6	0.7	0.7	383	228	117	35	16	4	5	0	0	0	0	0	0	0	788	1.86	0.08	628	535	0.69	1.00	0.69	0.41	0.70	0.69	0.56	0.61	16.8	16.8	68.6	20.3
18	1.6	0.7	0.8	483	258	74	37	11	2	0	2	0	0	0	0	0	0	867	1.67	0.06	628	592	0.67	0.59	0.35	1.00	0.80	0.67	0.52	0.64	4.9	4.9	15.3	14.1
19	1.6	0.7	0.9	571	278	83	26	10	1	0	0	1	0	0	0	0	0	970	1.59	0.04	628	632	0.67	0.84	0.49	0.68	0.91	0.67	0.52	0.61	0.2	0.2	8.0	16.5
20	1.6	0.7	1	678	255	70	17	3	0	0	0	0	0	0	0	0	0	1023	1.45	0.02	628	655	0.65	1.00	0.49	0.62	1.00	0.65	0.49	0.62	9.0	9.0	11.9	11.9

21	1.6	0.8	0.1	29	22	23	14	6	2	3	4	0	1	2	0	0	0	106	3.07	0.43	621	100	0.77	1.00	0.95	0.07	0.10	0.77	0.43	0.77	90.7	19.2	796.2	-	3.5	
22	1.6	0.8	0.2	81	80	44	21	25	15	7	4	3	3	1	1	1	0	286	2.96	0.40	621	245	0.79	0.17	0.47	0.89	0.20	0.79	0.55	0.72	83.9	13.0	-	4.8	10.2	
23	1.6	0.8	0.3	141	124	78	46	49	19	10	5	5	1	3	0	0	0	481	2.84	0.40	621	384	0.79	1.00	0.87	0.17	0.30	0.79	0.57	0.63	76.4	12.8	287.6		18.5	
24	1.6	0.8	0.4	237	181	107	54	28	17	12	8	0	1	2	0	1	0	648	2.42	0.23	621	482	0.76	0.62	0.69	0.40	0.40	0.76	0.53	0.65	50.4	8.9	69.6		12.2	
25	1.6	0.8	0.5	337	226	134	74	26	15	9	3	2	1	1	0	0	0	828	2.21	0.19	621	574	0.76	1.00	0.75	0.30	0.50	0.76	0.50	0.66	37.3	6.2	116.8		9.6	
26	1.6	0.8	0.6	380	278	111	64	33	17	6	1	2	0	0	0	0	0	892	2.09	0.16	621	595	0.75	0.45	0.40	1.00	0.61	0.75	0.56	0.64	29.8	2.5	-	13.2	16.5	
27	1.6	0.8	0.7	494	285	119	46	14	9	4	1	0	1	1	0	0	0	974	1.83	0.08	621	615	0.72	0.77	0.55	0.58	0.70	0.72	0.50	0.65	13.7	13.7	20.9		10.6	
28	1.6	0.8	0.8	557	342	116	37	12	4	4	0	0	0	0	0	0	0	1072	1.72	0.06	621	639	0.71	0.93	0.59	0.57	0.80	0.71	0.53	0.69	6.9	6.9	27.1		9.2	
29	1.6	0.8	0.9	643	381	120	22	7	2	0	0	0	0	0	0	0	0	1175	1.62	0.03	621	679	0.70	1.00	0.58	0.62	0.90	0.70	0.53	0.70	0.7	0.7	20.1		9.2	
30	1.6	0.8	1	776	413	104	10	2	0	0	0	0	0	0	0	0	0	1305	1.5	0.01	621	721	0.70	1.00	0.52	0.72	1.00	0.70	0.52	0.72	6.8	6.8	7.1		7.1	
31	1.6	0.8	0.5	1	32	23	22	16	16	6	3	7	5	1	2	0	0	133	3.59	0.73	632	118	0.85	1.00	0.95	0.06	0.10	0.85	0.50	0.56	126.7	18.1	1,044.3		19.8	
32	1.6	0.8	0.2	97	75	46	25	33	25	12	14	9	7	3	0	1	0	347	3.44	0.59	632	283	0.87	0.12	0.19	0.39	0.20	0.87	0.51	0.39	117.3	11.5	-	6.0	46.1	
33	1.6	0.8	0.3	164	144	87	63	49	22	18	11	6	4	5	4	0	0	577	3.04	0.46	632	433	0.84	0.20	0.36	1.00	0.29	0.84	0.56	0.60	92.0	14.0	-	14.0	21.9	
34	1.6	0.8	0.4	291	228	114	87	58	23	15	12	3	2	1	0	1	0	835	2.56	0.32	632	560	0.81	0.31	0.36	1.00	0.40	0.81	0.51	0.68	61.7	8.7	-	14.1	10.3	
35	1.6	0.8	0.5	393	286	177	85	50	35	15	8	7	2	1	0	0	0	1059	2.42	0.24	632	653	0.81	1.00	0.76	0.28	0.50	0.81	0.53	0.60	52.9	10.4	134.1		18.6	
36	1.6	0.8	0.6	503	291	192	79	41	16	13	5	1	0	1	0	1	0	1143	2.14	0.16	632	668	0.79	1.00	0.70	0.34	0.60	0.79	0.50	0.58	35.2	6.4	94.7		18.2	
37	1.6	0.8	0.7	643	476	160	83	40	15	9	4	0	0	0	0	0	0	1430	1.95	0.12	632	750	0.79	0.56	0.40	1.00	0.71	0.79	0.53	0.71	23.2	2.5	-	11.3	10.6	
38	1.6	0.8	0.8	734	475	158	61	17	6	3	2	0	0	0	0	0	0	1456	1.76	0.07	632	740	0.76	0.84	0.53	0.68	0.80	0.76	0.51	0.73	11.2	11.2	12.8		7.2	
39	1.6	0.8	0.9	849	490	136	43	7	3	1	0	0	0	0	0	0	0	1529	1.61	0.04	632	755	0.75	1.00	0.55	0.63	0.91	0.75	0.50	0.72	1.7	1.7	18.5		7.8	
40	1.6	0.8	0.5	1	998	472	120	13	4	0	0	0	0	0	0	0	0	1607	1.48	0.01	632	772	0.73	1.00	0.48	0.72	1.00	0.73	0.48	0.72	-	-	5.2		5.2	
41	1.6	0.9	0.1	46	42	30	20	14	16	8	4	4	6	1	2	0	0	193	3.55	0.64	627	166	0.87	0.10	0.32	1.00	0.10	0.87	0.37	0.89	122.6	16.9	-	17.1	-	10.9
42	1.6	0.9	0.2	129	107	84	59	47	46	22	23	8	7	3	3	2	1	541	3.57	0.69	627	396	0.90	1.00	0.89	0.12	0.20	0.90	0.47	0.63	123.8	16.6	440.3		9.9	
43	1.6	0.9	0.3	258	183	136	86	59	39	31	18	8	7	2	0	2	0	829	2.96	0.44	627	520	0.87	1.00	0.83	0.18	0.31	0.87	0.45	0.60	85.6	12.1	252.8		9.5	
44	1.6	0.9	0.4	310	264	178	112	81	43	28	21	11	8	7	1	0	0	1064	2.93	0.41	627	645	0.87	0.94	0.81	0.23	0.40	0.87	0.56	0.58	83.7	14.4	189.3		23.5	
45	1.6	0.9	0.5	444	398	204	110	77	45	28	12	9	3	6	1	1	0	1338	2.57	0.28	627	717	0.86	0.38	0.41	0.95	0.49	0.86	0.55	0.65	61.1	11.0	-	10.3	15.5	
46	1.6	0.9	0.6	615	439	249	138	73	28	14	15	4	4	3	0	0	0	1582	2.31	0.21	627	780	0.85	1.00	0.72	0.34	0.60	0.85	0.52	0.61	44.8	7.8	95.6		17.0	
47	1.6	0.9	0.7	721	475	258	114	69	21	11	4	2	0	0	0	0	0	1675	2.09	0.15	627	786	0.83	1.00	0.67	0.40	0.69	0.83	0.53	0.61	31.0	5.4	67.3		16.8	
48	1.6	0.9	0.8	961	615	227	110	38	17	5	3	0	0	0	0	0	0	1976	1.85	0.10	627	822	0.82	0.65	0.39	0.89	0.80	0.82	0.51	0.66	16.0	16.0	-	9.4	10.6	
49	1.6	0.9	0.9	1146	617	216	64	17	6	0	0	0	0	0	0	0	0	2066	1.65	0.04	627	818	0.80	1.00	0.53	0.60	0.90	0.80	0.48	0.68	3.4	3.4	18.1		6.7	
50	1.6	0.9	1	1283	672	203	31	7	0	0	0	0	0	0	0	0	0	2196	1.55	0.02	627	859	0.80	1.00	0.49	0.70	1.00	0.80	0.49	0.70	-	-	7.2		7.2	

51	1.6	0.95	0.1	37	40	36	26	25	15	11	14	13	6	5	5	4	1	238	4.58	0.71	629	193	0.98	0.10	0.52	0.64	0.10	0.98	0.53	0.63	188.1	48.9	13.3	15.9
52	1.6	0.95	0.2	174	129	116	85	80	37	36	33	19	10	7	6	1	2	735	3.7	0.75	629	469	0.95	0.99	0.88	0.12	0.20	0.95	0.39	0.63	132.7	17.1	406.9	1.9
53	1.6	0.95	0.3	318	246	202	145	98	63	43	27	25	18	13	8	3	1	1210	3.37	0.58	629	669	0.94	1.00	0.84	0.17	0.31	0.94	0.48	0.58	112.0	16.3	270.8	14.9
54	1.6	0.95	0.4	487	356	260	182	104	78	58	35	18	16	9	3	1	0	1607	3.02	0.46	629	768	0.93	0.99	0.79	0.22	0.40	0.93	0.47	0.56	90.0	12.9	191.4	16.0
55	1.6	0.95	0.5	667	553	330	221	116	81	49	27	11	4	5	4	1	0	2069	2.67	0.33	629	846	0.93	0.40	0.40	0.87	0.50	0.93	0.52	0.63	67.9	12.1	-	14.8
56	1.6	0.95	0.6	916	692	345	209	114	62	35	25	7	4	3	0	0	0	2412	2.36	0.24	629	877	0.91	0.44	0.32	1.00	0.60	0.91	0.50	0.62	48.4	7.4	-	13.7
57	1.6	0.95	0.7	1139	819	402	206	80	45	25	8	2	2	2	0	0	0	2730	2.12	0.16	629	898	0.90	0.93	0.63	0.47	0.71	0.90	0.51	0.65	33.4	6.2	47.6	12.4
58	1.6	0.95	0.8	1418	982	385	168	56	10	7	3	1	0	0	0	0	0	3030	1.86	0.09	629	920	0.88	1.00	0.60	0.54	0.81	0.88	0.50	0.71	17.0	17.0	31.9	7.5
59	1.6	0.95	0.9	1719	1002	323	118	32	9	2	0	0	0	0	0	0	0	3203	1.68	0.05	629	913	0.87	1.00	0.53	0.62	0.90	0.87	0.47	0.70	5.7	5.7	16.7	5.3
60	1.6	0.95	1	1949	1109	295	55	12	0	0	0	0	0	0	0	0	0	3416	1.56	0.02	629	917	0.86	1.00	0.49	0.72	1.00	0.86	0.49	0.72	-	-	5.2	5.2
61	1.6	1	0.1	54	48	51	44	38	26	18	19	14	8	5	5	8	2	340	4.58	1.22	618	266	0.99	1.00	0.94	0.07	0.11	0.99	0.00	1.00	183.1	22.4	801.5	- 38.2
62	1.6	1	0.2	193	182	140	110	110	72	53	32	40	34	19	10	6	2	1003	4.15	0.95	618	580	1.00	0.18	0.37	0.85	0.20	1.00	0.45	0.70	156.5	17.3	-	1.5
63	1.6	1	0.3	446	431	317	236	163	117	92	53	42	20	17	14	10	0	1958	3.5	0.64	618	830	1.00	1.00	0.84	0.21	0.31	1.00	0.47	0.79	116.3	16.9	212.5	- 1.1
64	1.6	1	0.4	751	629	411	297	180	160	87	67	53	24	6	4	6	2	2677	3.13	0.49	618	913	1.00	0.35	0.37	0.85	0.40	1.00	0.45	0.71	93.5	11.9	-	0.9
65	1.6	1	0.5	925	603	330	249	125	87	41	35	11	9	6	5	1	0	3540	2.74	0.34	618	973	1.00	1.00	0.74	0.32	0.49	1.00	0.46	0.75	69.4	11.7	102.6	- 0.5
66	1.6	1	0.6	1641	1268	748	394	244	110	53	24	11	10	8	3	0	0	4514	2.38	0.23	618	997	1.00	1.00	0.68	0.40	0.59	1.00	0.46	0.75	47.1	8.5	67.1	- 0.2
67	1.6	1	0.7	2338	1630	807	377	198	80	39	17	11	2	1	0	0	0	5500	2.1	0.15	618	999	1.00	1.00	0.61	0.47	0.70	1.00	0.45	0.73	29.8	3.8	41.9	- 0.3
68	1.6	1	0.8	3012	1975	893	318	136	58	22	5	1	0	0	1	0	0	6421	1.89	0.09	618	1000	1.00	1.00	0.57	0.56	0.80	1.00	0.45	0.73	16.8	16.8	24.8	0.1
69	1.6	1	0.9	3820	2328	840	252	80	19	8	3	0	0	0	0	0	0	7350	1.71	0.05	618	1000	1.00	1.00	0.51	0.64	0.90	1.00	0.45	0.74	5.7	5.7	10.9	0.0
70	1.6	1	1	4670	2673	780	134	14	0	0	0	0	0	0	0	0	0	8271	1.57	0.02	618	1000	1.00	1.00	0.46	0.75	1.00	1.00	0.46	0.75	-	-	-	- 0.1
71	1.8	0.7	1	25	24	11	4	3	1	1	2	0	1	0	0	0	0	72	2.44	0.20	550	71	0.66	0.13	0.54	0.89	0.10	0.66	0.43	1.00	34.2	2.9	-	- 21.5
72	1.8	0.7	2	55	33	23	18	6	8	2	1	2	0	0	0	0	0	148	2.57	0.33	550	136	0.72	0.08	0.02	0.00	0.20	0.72	0.59	0.44	41.3	-	789,242.5	29.3
73	1.8	0.7	3	115	75	41	24	11	7	5	3	3	0	0	0	0	0	284	2.35	0.23	550	251	0.69	0.18	0.26	1.00	0.31	0.69	0.56	0.51	29.2	-	-	- 15.2
74	1.8	0.7	4	136	108	49	25	13	12	10	1	1	1	0	0	1	0	357	2.37	0.22	550	306	0.70	0.24	0.40	1.00	0.40	0.70	0.63	0.50	30.3	-	-	- 24.6
75	1.8	0.7	5	198	135	80	27	19	9	1	3	0	0	0	0	1	0	473	2.13	0.15	550	389	0.68	1.00	0.80	0.26	0.50	0.68	0.60	0.56	17.1	-	-	- 13.5
76	1.8	0.7	6	242	175	87	31	21	3	1	1	0	0	0	0	0	0	561	1.99	0.11	550	445	0.66	1.00	0.77	0.35	0.60	0.66	0.61	0.62	9.4	-	-	- 9.4
77	1.8	0.7	7	292	193	87	31	12	4	1	0	0	0	0	0	0	0	620	1.86	0.08	550	471	0.65	1.00	0.72	0.41	0.71	0.65	0.61	0.60	2.3	2.3	52.9	10.6
78	1.8	0.7	8	298	208	74	18	11	1	0	0	0	2	0	0	0	0	612	1.78	0.06	550	468	0.63	0.90	0.68	0.51	0.79	0.63	0.63	0.60	-	-	27.2	12.4
79	1.8	0.7	9	378	210	74	22	4	2	1	0	0	0	0	0	0	0	691	1.66	0.04	550	536	0.63	1.00	0.64	0.50	0.90	0.63	0.60	0.57	-	-	-	- 13.4
80	1.8	0.7	1	429	242	61	12	0	0	0	0	0	0	0	0	0	0	744	1.54	0.02	550	539	0.61	1.00	0.59	0.65	1.00	0.61	0.59	0.65	-	-	5.3	5.3

81	1.8	0.75	0.1	25	14	13	8	4	1	1	3	0	1	0	0	0	0	70	2.73	0.35	557	67	0.74	1.00	0.95	0.05	0.10	0.74	0.47	0.49	52.1	1.5	980.1	8.8
82	1.8	0.75	0.2	63	53	40	21	14	8	10	5	1	1	0	0	0	0	216	2.87	0.38	557	196	0.75	1.00	0.92	0.11	0.20	0.75	0.59	0.59	59.9	3.2	425.1	11.7
83	1.8	0.75	0.3	96	74	55	44	26	19	5	5	5	2	0	0	0	0	331	2.93	0.47	557	295	0.78	1.00	0.90	0.13	0.29	0.78	0.66	0.45	63.2	1.3	355.8	37.2
84	1.8	0.75	0.4	181	123	79	36	22	11	9	5	0	0	0	1	0	0	467	2.35	0.22	557	374	0.72	1.00	0.83	0.21	0.41	0.72	0.57	0.55	30.9	3.4	175.4	13.6
85	1.8	0.75	0.5	211	151	100	46	24	6	6	5	1	2	0	0	0	0	552	2.29	0.19	557	429	0.72	1.00	0.81	0.25	0.50	0.72	0.62	0.53	27.6	2.0	134.4	19.9
86	1.8	0.75	0.6	265	208	100	49	29	13	4	2	2	1	0	1	0	0	674	2.2	0.18	557	513	0.72	0.58	0.62	0.57	0.60	0.72	0.64	0.53	22.5	4.6	16.8	22.2
87	1.8	0.75	0.7	337	209	119	38	13	7	3	0	0	0	0	0	0	0	726	1.92	0.09	557	527	0.69	1.00	0.72	0.39	0.69	0.69	0.59	0.58	6.9	6.9	58.0	11.9
88	1.8	0.75	0.8	425	236	103	25	14	5	4	0	1	0	0	0	0	0	813	1.77	0.06	557	584	0.68	1.00	0.66	0.43	0.80	0.68	0.57	0.56	1.4	1.4	39.9	12.8
89	1.8	0.75	0.9	468	262	110	30	6	1	1	1	0	0	0	0	0	0	879	1.7	0.05	557	572	0.67	1.00	0.63	0.51	0.91	0.67	0.59	0.57	5.3	5.3	24.7	13.6
90	1.8	0.75	1	546	288	92	13	2	0	0	0	0	0	0	0	0	0	941	1.55	0.02	557	612	0.65	1.00	0.57	0.63	1.00	0.65	0.57	0.63	13.7	13.7	5.7	5.7
91	1.8	0.8	0.1	25	10	13	10	11	9	6	6	2	0	1	1	0	0	94	3.87	0.96	555	85	0.89	1.00	0.96	0.03	0.10	0.89	0.59	0.31	114.7	2.9	1,539.2	60.4
92	1.8	0.8	0.2	65	59	33	31	16	12	6	3	3	4	2	1	0	0	235	3.09	0.50	555	208	0.79	0.13	0.42	1.00	0.20	0.79	0.61	0.54	71.5	0.3	21.1	18.4
93	1.8	0.8	0.3	131	112	62	52	30	13	12	6	3	3	2	1	0	0	427	2.81	0.40	555	336	0.78	0.21	0.40	1.00	0.31	0.78	0.59	0.57	55.9	1.6	22.3	12.9
94	1.8	0.8	0.4	188	141	92	64	29	26	12	7	3	2	0	0	1	0	565	2.66	0.34	555	439	0.78	1.00	0.84	0.19	0.40	0.78	0.61	0.50	47.6	1.7	202.3	23.1
95	1.8	0.8	0.5	258	200	123	52	28	17	15	5	4	0	3	1	0	0	706	2.41	0.22	555	521	0.77	0.67	0.70	0.39	0.50	0.77	0.60	0.54	33.7	1.9	55.4	16.9
96	1.8	0.8	0.6	331	229	118	54	32	19	10	4	4	0	1	0	0	0	802	2.22	0.18	555	556	0.75	0.43	0.44	0.76	0.60	0.75	0.59	0.51	23.2	6.5	12.6	19.1
97	1.8	0.8	0.7	402	266	141	61	18	8	6	2	3	0	0	0	0	0	907	2.01	0.12	555	598	0.73	1.00	0.71	0.38	0.71	0.73	0.60	0.55	11.5	6.9	60.0	15.6
98	1.8	0.8	0.8	463	309	143	51	21	10	2	0	2	0	0	0	0	0	1001	1.91	0.09	555	617	0.73	1.00	0.68	0.44	0.80	0.73	0.60	0.56	6.0	6.0	42.4	15.1
99	1.8	0.8	0.9	542	362	127	45	12	2	2	0	0	0	0	0	0	0	1092	1.75	0.06	555	673	0.72	1.00	0.64	0.54	0.90	0.72	0.60	0.61	2.9	2.9	21.3	9.8
100	1.8	0.8	1	608	400	137	36	3	0	0	0	0	0	0	0	0	0	1184	1.67	0.03	555	683	0.71	1.00	0.61	0.62	1.00	0.71	0.61	0.62	7.3	7.3	10.5	10.5
101	1.8	0.8	0.1	24	16	18	14	8	6	5	2	1	1	0	1	1	0	97	3.47	0.67	563	88	0.92	0.05	0.08	0.00	0.09	0.92	0.50	0.57	95.2	6.7	72,111,357.6	6.2
102	1.8	0.8	0.2	65	70	44	33	27	15	13	5	7	5	3	2	1	0	290	3.48	0.37	563	246	0.85	0.14	0.48	0.91	0.19	0.85	0.63	0.58	95.8	24.5	14.3	17.4
103	1.8	0.8	0.3	165	132	92	77	44	26	19	15	5	3	4	1	0	0	583	3.04	0.50	563	422	0.84	1.00	0.87	0.16	0.30	0.84	0.56	0.55	71.0	2.0	271.0	13.5
104	1.8	0.8	0.4	222	190	128	77	43	32	20	10	9	2	1	0	0	0	734	2.77	0.36	563	518	0.82	1.00	0.84	0.21	0.39	0.82	0.59	0.58	55.8	2.7	183.5	13.3
105	1.8	0.8	0.5	283	251	163	89	49	21	11	6	1	4	2	0	0	0	880	2.5	0.26	563	573	0.80	1.00	0.81	0.28	0.49	0.80	0.60	0.62	40.7	2.8	118.6	10.8
106	1.8	0.8	0.6	392	314	192	73	31	23	22	8	3	2	0	0	0	0	1060	2.31	0.18	563	654	0.79	1.00	0.76	0.32	0.60	0.79	0.60	0.57	30.0	0.0	88.1	15.0
107	1.8	0.8	0.7	494	386	195	73	40	21	7	5	2	0	0	0	0	0	1223	2.11	0.14	563	696	0.79	1.00	0.72	0.40	0.70	0.79	0.60	0.60	18.7	3.1	57.5	12.3
108	1.8	0.8	0.8	586	416	185	74	26	11	5	1	3	0	0	0	0	0	1307	1.94	0.10	563	708	0.77	1.00	0.67	0.46	0.80	0.77	0.59	0.59	9.1	6.5	38.8	12.1
109	1.8	0.8	0.9	702	452	184	52	15	2	3	0	0	0	0	0	0	0	1410	1.75	0.05	563	743	0.76	1.00	0.61	0.55	0.90	0.76	0.57	0.63	1.5	1.5	18.6	7.4
110	1.8	0.8	1	809	461	164	32	0	0	0	0	0	0	0	0	0	0	1466	1.6	0.02	563	738	0.74	1.00	0.56	0.65	1.00	0.74	0.56	0.65	10.0	10.0	4.4	4.4

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14	1	2	0.7	0.1	10	12	7	6	1	2	1	1	0	0	0	0	0	0	40	2.77	0.14	504	39	0.67	1.00	0.97	0.05	0.10	0.67	0.73	0.62	39.6	13.8	872.6	9.9
14	2	2	0.7	0.2	43	26	28	12	11	1	1	1	0	1	0	0	0	0	124	2.52	0.28	504	116	0.68	1.00	0.93	0.09	0.20	0.68	0.64	0.47	27.0	7.0	457.6	18.4
14	3	2	0.7	0.3	98	64	41	19	17	7	7	2	0	1	0	0	0	0	256	2.45	0.26	504	224	0.70	1.00	0.88	0.13	0.31	0.70	0.61	0.45	23.5	13.3	283.0	18.8
14	4	2	0.7	0.4	112	104	66	27	14	7	2	3	2	0	1	0	0	0	338	2.38	0.20	504	291	0.68	1.00	0.87	0.21	0.41	0.68	0.68	0.56	20.0	7.4	158.6	12.3
14	5	2	0.7	0.5	155	106	63	37	14	7	1	1	3	0	0	0	0	0	387	2.22	0.19	504	327	0.67	1.00	0.83	0.22	0.50	0.67	0.66	0.46	11.9	13.5	140.0	23.6
14	6	2	0.7	0.6	202	157	73	35	15	5	2	1	0	0	0	0	0	0	490	2.04	0.13	504	401	0.65	1.00	0.79	0.32	0.60	0.65	0.66	0.56	2.8	14.2	75.0	9.1
14	7	2	0.7	0.7	248	180	85	21	12	9	0	2	0	0	0	0	0	0	557	1.93	0.09	504	453	0.65	1.00	0.75	0.37	0.70	0.65	0.65	0.55	2.7	2.7	53.3	9.5
14	8	2	0.7	0.8	306	184	92	28	16	2	3	0	0	0	0	0	0	0	631	1.86	0.08	504	482	0.66	1.00	0.71	0.38	0.80	0.66	0.64	0.49	6.2	6.2	44.0	16.4
14	9	2	0.7	0.9	313	218	95	24	5	0	3	0	0	0	0	0	0	0	658	1.79	0.05	504	510	0.64	1.00	0.71	0.48	0.90	0.64	0.67	0.53	9.8	9.8	24.8	14.1
15	0	2	0.7	1	362	240	95	16	5	0	0	0	0	0	0	0	0	0	718	1.69	0.03	504	526	0.63	1.00	0.67	0.55	1.00	0.63	0.67	0.55	14.8	14.8	11.6	11.6
15	1	2	0.7	0.1	7	10	5	6	6	2	2	1	0	1	0	0	0	0	40	3.5	0.43	505	39	0.79	0.06	0.72	0.69	0.09	0.79	0.83	0.39	76.8	19.1	3.4	58.1
15	2	2	0.7	0.2	53	51	25	16	13	8	3	2	1	0	1	1	0	0	174	2.74	0.35	505	159	0.74	0.15	0.48	0.98	0.19	0.74	0.60	0.69	38.4	9.9	24.7	5.6
15	3	2	0.7	0.3	101	97	49	27	24	11	6	3	5	0	0	1	0	1	325	2.69	0.32	505	279	0.75	0.22	0.50	0.88	0.31	0.75	0.65	0.57	35.9	9.6	20.7	7.6
15	4	2	0.7	0.4	110	114	80	40	23	6	7	4	6	1	2	1	0	0	394	2.71	0.15	505	335	0.74	1.00	0.89	0.18	0.40	0.74	0.72	0.49	36.9	8.4	201.2	24.5
15	5	2	0.7	0.5	185	161	71	44	26	10	7	2	1	2	1	0	0	0	510	2.34	0.22	505	403	0.72	0.33	0.48	0.94	0.50	0.72	0.66	0.54	18.2	12.8	23.8	11.5
15	6	2	0.7	0.6	215	182	105	51	24	10	8	0	0	1	1	0	0	0	597	2.27	0.19	505	477	0.72	1.00	0.81	0.29	0.60	0.72	0.68	0.51	14.7	10.0	91.9	18.6
15	7	2	0.7	0.7	252	212	108	53	23	7	8	0	0	0	0	0	0	0	663	2.15	0.16	505	488	0.71	1.00	0.79	0.34	0.69	0.71	0.69	0.51	8.6	11.7	67.7	18.8
15	8	2	0.7	0.8	318	220	113	59	12	2	4	1	1	0	0	0	0	0	730	1.99	0.12	505	541	0.70	1.00	0.74	0.38	0.80	0.70	0.67	0.48	0.6	14.9	48.1	20.6
15	9	2	0.7	0.9	383	289	107	52	10	1	0	0	0	0	0	0	0	0	842	1.84	0.08	505	572	0.69	1.00	0.70	0.49	0.90	0.69	0.66	0.56	7.0	7.0	22.1	10.5
16	0	2	0.7	0.1	406	297	96	39	3	1	0	0	0	0	0	0	0	0	842	1.74	0.05	505	591	0.67	1.00	0.67	0.55	1.00	0.67	0.67	0.55	12.1	12.1	12.0	12.0
16	1	2	0.8	0.1	7	9	13	7	5	2	4	2	1	2	0	0	1	0	53	4.06	0.29	500	51	0.84	1.00	0.98	0.03	0.10	0.84	0.83	0.35	103.0	42.7	1,460.9	68.6
16	2	2	0.8	0.2	48	50	22	29	18	9	11	4	3	2	2	0	0	0	198	3.29	0.33	500	179	0.81	0.12	0.51	1.00	0.19	0.81	0.68	0.51	64.5	10.7	24.4	17.7
16	3	2	0.8	0.3	78	88	76	41	29	19	18	9	1	1	3	0	0	0	363	3.18	0.28	500	304	0.80	1.00	0.92	0.13	0.29	0.80	0.73	0.49	59.0	14.1	294.4	23.8
16	4	2	0.8	0.4	136	145	95	49	41	20	8	5	1	1	1	1	0	0	503	2.72	0.18	500	416	0.77	1.00	0.88	0.20	0.39	0.77	0.69	0.57	36.0	6.7	164.9	10.4
16	5	2	0.8	0.5	210	181	112	59	30	17	10	3	2	2	2	0	0	0	628	2.47	0.25	500	463	0.75	1.00	0.83	0.25	0.51	0.75	0.66	0.52	23.5	9.8	117.9	13.2
16	6	2	0.8	0.6	223	233	120	71	27	15	8	2	3	3	0	0	1	0	706	2.41	0.09	500	510	0.75	0.86	0.80	0.35	0.60	0.75	0.71	0.53	20.5	20.5	63.6	16.7
16	7	2	0.8	0.7	305	262	146	68	34	12	4	4	0	1	0	0	0	0	836	2.21	0.17	500	579	0.75	1.00	0.78	0.35	0.70	0.75	0.68	0.52	10.5	11.2	61.6	14.8
16	8	2	0.8	0.8	344	307	149	49	23	7	2	3	0	0	0	0	0	0	884	2.03	0.11	500	602	0.72	1.00	0.75	0.43	0.80	0.72	0.68	0.56	1.5	12.2	36.5	10.9
16	9	2	0.8	0.9	428	382	159	44	13	4	0	2	0	0	0	0	0	0	1032	1.89	0.07	500	646	0.72	1.00	0.71	0.53	0.90	0.72	0.68	0.59	5.5	5.5	17.4	7.0
17	0	2	0.8	1	478	373	160	39	9	1	0	0	0	0	0	0	0	0	1060	1.8	0.05	500	645	0.72	1.00	0.68	0.56	1.00	0.72	0.68	0.56	10.0	10.0	10.6	10.6

17	1	2	0.8 5	0.		15	20	10	13	4	10	6	2	1	1	1	1	0	0	84	3.77	0.45	500	77	0.85	0.07	0.64	1.00	0.10	0.85	0.72	0.67	88.5	18.1	-	17.8	3.5
17	2	2	0.8 5	0. 2		57	51	47	34	27	18	13	6	9	6	2	0	1	1	272	3.71	0.75	500	231	0.87	1.00	0.94	0.08	0.20	0.87	0.69	0.42	85.5	3.2	-	541.4	32.8
17	3	2	0.8 5	0. 3		122	115	55	45	40	29	19	14	12	4	4	1	0	0	460	3.3	0.58	500	363	0.85	0.16	0.38	1.00	0.30	0.85	0.65	0.41	65.0	11.5	-	31.1	29.8
17	4	2	0.8 5	0. 4		163	190	111	67	39	32	17	13	5	4	1	1	1	0	644	2.91	0.21	500	466	0.82	0.39	0.68	0.60	0.40	0.82	0.69	0.57	45.5	7.7	-	6.7	10.5
17	5	2	0.8 5	0. 5		230	222	154	78	63	37	25	13	6	5	0	2	1	0	836	2.88	0.38	500	570	0.83	1.00	0.85	0.21	0.50	0.83	0.69	0.46	44.0	6.3	-	148.1	25.7
17	6	2	0.8 5	0. 6		270	268	170	94	54	31	20	7	7	5	1	2	0	0	929	2.68	0.31	500	593	0.82	1.00	0.83	0.26	0.59	0.82	0.71	0.46	34.0	7.1	-	111.0	27.1
17	7	2	0.8 5	0. 7		353	355	206	84	41	22	9	1	1	1	0	2	0	0	1075	2.3	0.08	500	647	0.79	1.00	0.78	0.37	0.70	0.79	0.69	0.56	15.0	15.0	-	55.7	11.8
17	8	2	0.8 5	0. 8		432	403	213	86	40	19	8	1	1	1	0	0	0	0	1204	2.17	0.15	500	685	0.79	1.00	0.75	0.41	0.80	0.79	0.69	0.53	8.5	10.5	-	41.4	14.8
17	9	2	0.8 5	0. 9		481	462	192	68	22	8	5	3	1	0	0	0	0	0	1242	2	0.09	500	694	0.77	1.00	0.72	0.49	0.90	0.77	0.69	0.56	0.0	0.0	-	23.0	11.8
18	0	2	0.8 5	0. 1		563	482	201	74	11	1	2	0	0	0	0	0	0	0	1334	1.87	0.07	500	727	0.76	1.00	0.68	0.55	1.00	0.76	0.68	0.55	6.5	6.5	-	11.9	11.9
18	1	2	0.9 1	0. 1		16	17	13	16	10	14	2	7	5	2	1	1	0	1	105	4.37	0.69	502	96	0.91	1.00	0.97	0.04	0.10	0.91	0.70	0.46	119.4	23.9	1,162.0		27.5
18	2	2	0.9 2	0. 2		77	81	58	52	34	24	16	8	9	4	4	2	4	0	373	3.62	0.39	502	289	0.88	1.00	0.92	0.11	0.20	0.88	0.05	0.00	81.8	16.3	376.0	#####	
18	3	2	0.9 3	0. 3		128	129	117	59	62	44	23	23	14	9	10	8	2	0	628	3.73	0.45	502	462	0.91	1.00	0.91	0.12	0.29	0.91	0.68	0.44	87.3	12.8	328.3		27.4
18	4	2	0.9 4	0. 4		219	240	153	94	63	52	24	24	12	2	8	2	3	1	897	3.14	0.27	502	560	0.88	0.35	0.61	0.64	0.41	0.88	0.67	0.53	57.7	9.1	-	1.3	13.2
18	5	2	0.9 5	0. 5		265	306	198	115	84	45	40	21	10	5	3	2	1	0	1095	2.99	0.24	502	644	0.87	0.68	0.78	0.35	0.50	0.87	0.70	0.51	50.1	9.7	61.3		19.4
18	6	2	0.9 6	0. 6		354	386	220	148	76	47	27	14	14	2	0	1	0	0	1289	2.71	0.16	502	698	0.86	0.82	0.78	0.35	0.60	0.86	0.70	0.51	36.1	7.8	60.4		18.3
18	7	2	0.9 7	0. 7		487	472	253	143	88	33	18	8	5	2	0	0	1	0	1510	2.43	0.25	502	758	0.85	1.00	0.77	0.35	0.70	0.85	0.67	0.52	22.0	9.3	61.6		14.7
18	8	2	0.9 8	0. 8		634	553	300	120	48	29	9	5	3	2	0	0	0	0	1703	2.16	0.15	502	792	0.84	1.00	0.72	0.43	0.80	0.84	0.64	0.56	8.5	10.9	34.6		8.3
18	9	2	0.9 9	0. 9		655	603	310	101	41	18	2	2	1	0	0	0	0	0	1733	2.05	0.11	502	773	0.82	1.00	0.71	0.49	0.90	0.82	0.67	0.56	2.9	10.6	22.3		11.0
19	0	2	0.9 1	0. 1		779	691	311	87	12	6	1	0	0	0	0	0	0	0	1887	1.88	0.06	502	808	0.81	1.00	0.67	0.58	1.00	0.81	0.67	0.58	5.6	5.6	7.5		7.5
19	1	2	0.9 5	0. 1		23	26	25	16	14	17	11	5	7	5	5	2	2	0	158	4.56	0.76	495	138	0.96	1.00	0.96	0.05	0.10	0.96	0.63	0.54	125.6	17.7	925.5		7.0
19	2	2	0.9 5	0. 2		68	86	73	47	58	39	31	24	16	17	16	9	3	1	488	4.57	0.78	495	364	0.98	0.25	0.77	0.34	0.20	0.98	0.72	0.44	126.1	16.8	60.5		30.8
19	3	2	0.9 5	0. 3		162	190	134	102	87	59	44	41	25	16	13	7	1	3	884	3.9	0.50	495	572	0.96	0.22	0.56	0.74	0.31	0.96	0.69	0.48	93.0	13.8	-	13.3	21.1
19	4	2	0.9 5	0. 4		250	287	196	143	112	60	64	32	21	19	12	6	1	1	1204	3.5	0.37	495	688	0.95	0.34	0.63	0.61	0.39	0.95	0.68	0.50	73.2	12.1	0.6		16.8
19	5	2	0.9 5	0. 5		399	440	259	198	126	81	58	31	16	9	5	4	1	1	1628	3.06	0.26	495	789	0.93	0.38	0.56	0.78	0.50	0.93	0.66	0.54	51.4	8.7	-	15.1	10.8
19	6	2	0.9 5	0. 6		530	575	380	235	136	79	43	27	13	7	9	2	1	0	2037	2.82	0.18	495	843	0.93	1.00	0.81	0.29	0.60	0.93	0.68	0.53	39.5	8.2	85.6		12.8
19	7	2	0.9 5	0. 7		627	666	409	221	109	81	29	22	9	5	1	1	0	1	2181	2.59	0.13	495	876	0.91	1.00	0.78	0.34	0.70	0.91	0.69	0.52	28.2	4.7	62.2		15.2
19	8	2	0.9 5	0. 8		792	819	460	216	98	51	29	6	2	2	1	0	0	0	2476	2.33	0.08	495	880	0.90	1.00	0.74	0.42	0.80	0.90	0.68	0.54	15.3	15.3	37.9		11.3
19	9	2	0.9 5	0. 9		929	932	506	207	70	30	6	5	1	0	1	0	0	0	2687	2.15	0.04	495	890	0.89	1.00	0.71	0.49	0.90	0.89	0.68	0.55	6.4	6.4	22.0		10.4
20	0	2	0.9 5	0. 1		110	110	2	4	496	173	34	11	0	0	0	0	0	0	2920	1.96	0.02	495	898	0.88	1.00	0.68	0.58	1.00	0.88	0.68	0.58	-	-	3.0	3.0	7.3

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50	1	3	0.7	0.		1	8	4	2	0	4	1	2	1	0	0	0	0	0	23	4.04	0.53	336	23	0.84	0.05	0.93	0.72	0.10	0.84	0.97	0.33	35.9	-	-	22.8	31.4
50	2	3	0.7	0.		12	23	22	13	6	5	6	1	2	2	1	1	0	0	94	3.69	0.34	336	88	0.80	1.00	0.98	0.06	0.20	0.80	0.90	0.30	24.1	-	-	509.7	35.7
50	3	3	0.7	0.		27	31	47	10	10	14	4	5	3	2	1	1	1	0	156	3.56	0.25	336	147	0.80	1.00	0.96	0.07	0.30	0.80	0.88	0.24	19.7	-	-	399.5	58.3
50	4	3	0.7	0.		38	47	48	31	18	7	5	4	2	2	0	0	0	0	202	3.15	0.11	336	187	0.75	1.00	0.95	0.11	0.39	0.75	0.88	0.28	5.9	-	-	236.1	40.3
50	5	3	0.7	0.		59	84	58	46	20	11	3	6	1	1	0	0	0	0	289	2.9	0.17	336	250	0.73	1.00	0.93	0.16	0.50	0.73	0.87	0.32	-	-	20.3	135.5	24.2
50	6	3	0.7	0.		78	108	78	52	18	19	7	2	2	4	1	0	0	0	369	2.91	0.17	336	308	0.75	1.00	0.92	0.17	0.60	0.75	0.87	0.30	-	-	-	112.7	31.3
50	7	3	0.7	0.		90	114	105	56	28	12	7	4	3	2	0	0	0	0	421	2.84	0.15	336	358	0.74	1.00	0.91	0.20	0.71	0.74	0.88	0.28	-	-	-	89.2	38.3
50	8	3	0.7	0.		100	159	110	63	21	13	4	2	3	1	0	0	0	0	476	2.66	0.10	336	393	0.72	1.00	0.91	0.26	0.80	0.72	0.88	0.32	-	-	-	52.5	25.6
50	9	3	0.7	0.		125	160	137	70	21	13	1	2	1	1	0	0	0	0	531	2.56	0.08	336	422	0.72	1.00	0.89	0.28	0.90	0.72	0.87	0.31	-	-	-	40.4	28.4
51	0	3	0.7	0.		1	146	181	138	64	19	10	2	0	0	0	0	0	0	560	2.41	0.06	336	445	0.71	1.00	0.87	0.32	1.00	0.71	0.87	0.32	-	-	-	24.3	24.3
51	1	3	0.8	0.		1	3	3	4	3	4	1	2	1	0	0	0	0	0	21	3.86	0.24	335	21	0.83	1.00	0.99	0.02	0.10	0.83	0.90	0.20	29.2	-	-	1,648.8	84.0
51	2	3	0.8	0.		16	18	27	20	8	9	3	2	4	0	1	0	0	0	108	3.62	0.21	335	101	0.81	1.00	0.97	0.06	0.20	0.81	0.86	0.30	21.1	-	-	465.5	28.4
51	3	3	0.8	0.		33	43	47	26	24	16	9	5	2	0	0	1	0	1	207	3.51	0.20	335	186	0.81	1.00	0.96	0.09	0.30	0.81	0.86	0.31	17.4	-	-	288.5	24.5
51	4	3	0.8	0.		49	74	67	57	30	23	15	9	6	2	1	0	0	0	333	3.53	0.35	335	293	0.83	1.00	0.95	0.12	0.41	0.83	0.88	0.29	18.1	-	-	209.9	33.2
51	5	3	0.8	0.		62	86	78	58	30	28	18	10	4	1	0	2	0	0	377	3.43	0.33	335	308	0.81	1.00	0.94	0.13	0.50	0.81	0.88	0.26	14.8	-	-	183.1	45.7
51	6	3	0.8	0.		71	105	106	66	39	19	9	7	4	2	0	0	0	0	428	3.15	0.11	335	355	0.78	1.00	0.93	0.17	0.60	0.78	0.89	0.29	5.4	-	-	116.8	36.6
51	7	3	0.8	0.		94	150	144	81	38	18	10	4	1	3	3	2	0	0	548	3	0.17	335	435	0.78	1.00	0.92	0.21	0.70	0.78	0.89	0.31	0.4	-	-	77.9	30.1
51	8	3	0.8	0.		101	175	141	94	46	12	9	8	3	1	0	0	0	0	590	2.91	0.15	335	455	0.77	1.00	0.92	0.24	0.80	0.77	0.89	0.31	-	-	-	60.6	31.3
51	9	3	0.8	0.		133	225	181	91	37	9	7	0	2	0	0	0	0	0	685	2.62	0.09	335	501	0.75	1.00	0.90	0.32	0.90	0.75	0.88	0.35	-	-	-	27.8	16.9
52	0	3	0.8	0.		140	218	177	120	46	7	6	0	0	0	0	0	0	0	714	2.66	0.09	335	518	0.76	1.00	0.89	0.31	1.00	0.76	0.89	0.31	-	-	-	30.0	30.0
52	1	3	0.8	0.		7	3	8	6	6	1	2	2	0	0	1	0	0	0	36	3.83	1.00	335	36	0.85	1.00	0.98	0.03	0.10	0.85	0.81	0.25	28.4	-	-	1,224.8	43.0
52	2	3	0.8	0.		22	31	27	14	12	13	13	2	6	1	2	0	0	0	143	3.86	0.52	335	129	0.86	1.00	0.97	0.06	0.20	0.86	0.83	0.35	29.4	-	-	443.4	12.4
52	3	3	0.8	0.		33	46	46	30	18	15	14	7	7	4	2	2	3	2	229	4.07	0.32	335	205	0.88	1.00	0.96	0.07	0.30	0.88	0.87	0.24	36.4	-	-	415.7	56.1
52	4	3	0.8	0.		52	89	75	59	41	27	19	12	6	4	2	1	1	0	388	3.68	0.41	335	327	0.85	1.00	0.95	0.12	0.40	0.85	0.88	0.32	23.4	-	-	202.4	26.6
52	5	3	0.8	0.		78	122	132	90	44	36	22	17	11	4	1	0	1	0	558	3.53	0.20	335	447	0.86	1.00	0.94	0.15	0.50	0.86	0.87	0.32	18.3	-	-	138.0	25.8
52	6	3	0.8	0.		88	154	135	106	68	37	25	12	8	4	2	1	0	0	640	3.44	0.33	335	483	0.85	1.00	0.94	0.17	0.60	0.85	0.89	0.30	15.3	-	-	113.9	33.7
52	7	3	0.8	0.		97	196	168	103	74	35	16	9	6	2	2	0	1	0	709	3.21	0.26	335	523	0.83	1.00	0.93	0.22	0.70	0.83	0.90	0.32	7.6	-	-	77.5	28.8
52	8	3	0.8	0.		129	229	186	116	56	26	19	10	3	3	0	0	0	0	777	2.98	0.18	335	552	0.81	1.00	0.91	0.25	0.80	0.81	0.89	0.32	-	-	-	54.0	25.7
52	9	3	0.8	0.		166	243	226	129	59	29	11	4	0	0	1	0	0	0	868	2.81	0.14	335	591	0.81	1.00	0.89	0.29	0.90	0.81	0.88	0.32	-	-	-	37.1	24.6
53	0	3	0.8	0.		184	297	261	151	51	24	8	1	0	0	0	0	0	0	977	2.69	0.09	335	641	0.80	1.00	0.88	0.33	1.00	0.80	0.88	0.33	-	-	-	22.3	22.3

53	1	3	0.9	0.1	4	13	10	10	8	6	5	3	1	0	1	0	1	0	62	4.32	0.68	332	56	0.88	1.00	0.99	0.05	0.10	0.88	0.89	0.49	43.4	-	10.3	659.7	-	6.3
53	2	3	0.9	0.2	9	26	36	13	9	15	18	7	6	6	2	1	0	0	148	4.64	0.59	332	133	0.92	1.00	0.99	0.05	0.20	0.92	0.93	0.27	54.0	-	5.1	573.3	-	46.5
53	3	3	0.9	0.3	34	67	67	34	35	32	22	15	8	7	6	2	2	0	331	4.24	0.40	332	276	0.91	1.00	0.97	0.08	0.30	0.91	0.88	0.30	40.7	-	4.8	314.4	-	30.0
53	4	3	0.9	0.4	65	99	94	73	50	30	26	15	16	8	4	3	3	0	486	3.93	0.47	332	394	0.90	1.00	0.95	0.11	0.39	0.90	0.86	0.31	30.5	-	16.1	211.9	-	26.8
53	5	3	0.9	0.5	103	185	161	122	84	46	26	25	19	4	7	4	6	0	792	3.71	0.39	332	544	0.91	1.00	0.93	0.16	0.50	0.91	0.86	0.35	23.2	-	16.1	124.1	-	15.7
53	6	3	0.9	0.6	105	189	179	115	100	51	35	23	14	9	5	2	2	1	830	3.67	0.41	332	565	0.90	1.00	0.93	0.17	0.60	0.90	0.89	0.29	21.8	-	16.5	120.5	-	36.6
53	7	3	0.9	0.7	128	246	243	156	104	53	25	20	14	4	6	1	0	0	1000	3.39	0.29	332	620	0.88	1.00	0.93	0.22	0.69	0.88	0.89	0.32	12.5	-	15.3	75.7	-	25.8
53	8	3	0.9	0.8	157	284	310	180	109	50	26	14	9	4	1	4	1	0	1149	3.23	0.10	332	675	0.88	1.00	0.92	0.25	0.79	0.88	0.89	0.32	7.2	-	6.8	55.8	-	26.8
53	9	3	0.9	0.9	181	359	369	191	106	52	18	13	5	5	0	0	0	0	1299	3.03	0.08	332	744	0.87	1.00	0.91	0.29	0.90	0.87	0.90	0.33	0.6	-	0.6	36.3	-	24.7
54	0	3	0.9	1	217	407	402	203	106	36	5	1	1	0	0	0	0	0	1378	2.79	0.12	332	731	0.86	1.00	0.89	0.35	1.00	0.86	0.89	0.35	7.4	-	17.7	17.7	-	17.7
54	1	3	0.9	0.1	6	12	14	8	11	10	6	7	4	5	0	0	0	0	83	4.86	0.63	336	71	0.96	1.00	0.99	0.04	0.11	0.96	0.87	0.36	63.5	-	4.9	835.6	-	15.2
54	2	3	0.9	0.2	26	44	43	22	32	17	21	17	15	13	7	2	1	2	262	4.9	0.94	336	223	0.98	1.00	0.97	0.06	0.20	0.98	0.84	0.33	64.8	-	17.5	482.5	-	20.7
54	3	3	0.9	0.3	51	81	77	72	54	33	28	32	17	16	11	9	3	2	486	4.65	0.73	336	378	0.97	1.00	0.96	0.08	0.30	0.97	0.85	0.30	56.4	-	12.4	319.6	-	28.5
54	4	3	0.9	0.4	82	141	158	117	70	53	51	33	22	19	16	3	6	0	771	4.25	0.36	336	523	0.96	1.00	0.95	0.12	0.40	0.96	0.86	0.33	43.0	-	1.9	190.1	-	21.9
54	5	3	0.9	0.5	109	212	225	175	107	60	56	40	29	12	10	5	0	0	1040	3.91	0.26	336	631	0.95	1.00	0.94	0.17	0.51	0.95	0.88	0.35	31.5	-	0.8	121.2	-	18.3
54	6	3	0.9	0.6	156	288	233	217	116	90	59	51	25	16	11	6	4	1	1273	3.84	0.42	336	726	0.96	1.00	0.93	0.17	0.61	0.96	0.88	0.30	29.2	-	13.5	112.2	-	31.2
54	7	3	0.9	0.7	208	388	390	238	138	84	53	28	19	11	5	2	3	0	1567	3.38	0.15	336	792	0.94	1.00	0.91	0.24	0.70	0.94	0.87	0.36	13.7	-	6.2	58.7	-	14.7
54	8	3	0.9	0.8	257	442	387	267	160	69	43	39	19	10	3	0	0	0	1696	3.24	0.25	336	804	0.93	1.00	0.89	0.26	0.80	0.93	0.87	0.34	9.0	-	16.2	48.3	-	20.5
54	9	3	0.9	0.9	310	573	470	327	179	74	25	27	5	1	1	0	0	0	1992	3	0.19	336	852	0.93	1.00	0.89	0.32	0.89	0.93	0.87	0.36	0.9	-	16.4	27.6	-	15.1
55	0	3	0.9	0.5	1	339	639	555	356	166	56	14	4	1	0	0	0	0	2130	2.82	0.13	336	861	0.92	1.00	0.88	0.36	1.00	0.92	0.88	0.36	5.1	-	16.2	15.8	-	15.8
55	1	3	1	0.1	5	15	11	12	5	11	8	9	4	7	1	3	2	1	94	5.62	1.19	334	89	1.00	0.13	0.92	0.31	0.10	1.00	0.89	0.44	87.7	-	9.9	32.8	-	0.0
55	2	3	1	0.2	18	65	52	39	43	39	30	18	19	15	10	8	6	0	362	5.16	1.08	334	277	1.00	1.00	0.98	0.07	0.21	1.00	0.90	0.43	72.3	-	11.7	377.8	-	3.7
55	3	3	1	0.3	44	107	111	98	80	58	58	37	24	17	16	15	5	2	672	4.86	0.53	334	447	1.00	1.00	0.97	0.10	0.30	1.00	0.88	0.40	62.3	-	5.0	246.6	-	6.6
55	4	3	1	0.4	102	174	219	167	107	97	63	47	31	30	15	16	3	3	1074	4.4	0.40	334	625	1.00	1.00	0.94	0.14	0.39	1.00	0.84	0.41	47.0	-	0.3	154.4	-	2.5
55	5	3	1	0.5	138	315	306	246	158	127	81	48	41	31	23	10	10	4	1538	4.17	0.53	334	774	1.00	1.00	0.94	0.18	0.50	1.00	0.87	0.42	39.3	-	11.3	103.5	-	3.3
55	6	3	1	0.6	228	428	421	327	213	145	79	68	38	27	16	11	7	2	2010	3.84	0.43	334	893	1.00	1.00	0.92	0.22	0.60	1.00	0.85	0.41	28.3	-	13.1	70.6	-	3.6
55	7	3	1	0.7	320	560	586	414	264	162	84	52	32	30	16	5	4	1	2530	3.57	0.18	334	958	1.00	1.00	0.90	0.27	0.70	1.00	0.85	0.40	19.2	-	3.8	45.5	-	3.8
55	8	3	1	0.8	397	726	691	528	277	148	93	43	33	20	8	5	3	0	2972	3.36	0.27	334	981	1.00	1.00	0.89	0.31	0.79	1.00	0.86	0.41	12.2	-	14.0	29.5	-	3.8
55	9	3	1	0.9	497	920	901	607	300	147	71	28	6	11	6	1	1	0	3496	3.1	0.20	334	996	1.00	1.00	0.88	0.36	0.90	1.00	0.86	0.41	3.5	-	14.7	14.4	-	3.4
56	0	3	1	1	633	1137	1079	716	291	117	31	5	1	0	0	0	0	0	4010	2.85	0.12	334	1000	1.00	1.00	0.86	0.42	1.00	1.00	0.86	0.42	4.8	-	15.6	2.3	-	2.3

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1	3	0.8	0.	1	1	4	8	6	0	1	0	2	1	0	2	0	0	0	25	4.4	0.32	260	25	0.85	1.00	1.00	0.03	0.10	0.85	0.95	0.29	14.5	21.9	813.3	11.3
80	2	3	0.8	0.	4	12	12	14	9	8	2	1	4	4	0	0	0	0	70	4.44	0.19	260	65	0.93	0.02	0.01	0.00	0.21	0.93	0.96	0.18	15.5	6.1	255,665.1	66.0
80	3	3	0.8	0.	12	41	31	32	23	13	11	9	2	3	4	1	1	0	183	4.23	0.58	260	168	0.87	1.00	0.98	0.07	0.31	0.87	0.95	0.25	10.1	29.3	279.3	24.2
80	4	3	0.8	0.	15	41	48	48	32	25	16	6	8	3	3	4	0	0	249	4.36	0.19	260	227	0.88	1.00	0.98	0.07	0.40	0.88	0.96	0.19	13.5	7.5	273.7	58.7
80	5	3	0.8	0.	24	61	63	62	57	26	21	9	3	4	0	1	0	0	331	3.99	0.24	260	286	0.86	1.00	0.98	0.10	0.49	0.86	0.95	0.22	3.8	15.4	170.6	39.9
80	6	3	0.8	0.	35	68	97	90	50	29	24	15	12	10	5	3	0	0	438	4.18	0.29	260	367	0.89	1.00	0.97	0.10	0.60	0.89	0.95	0.17	8.8	18.0	174.1	70.5
80	7	3	0.8	0.	49	97	115	116	72	43	23	16	9	4	3	0	0	0	547	3.86	0.11	260	436	0.87	1.00	0.96	0.13	0.70	0.87	0.95	0.19	0.4	11.7	111.7	52.8
80	8	3	0.8	0.	56	110	150	132	69	48	20	16	4	3	2	0	0	1	611	3.69	0.18	260	479	0.86	1.00	0.96	0.16	0.80	0.86	0.95	0.20	4.0	19.5	84.0	50.1
80	9	3	0.8	0.	66	145	185	155	78	42	27	5	3	2	0	0	0	0	708	3.46	0.13	260	533	0.84	1.00	0.95	0.20	0.91	0.84	0.95	0.22	10.0	20.5	51.7	39.1
81	0	3	0.8	0.	1	81	178	209	162	98	50	12	5	2	1	0	0	0	798	3.33	0.10	260	578	0.84	1.00	0.95	0.22	1.00	0.84	0.95	0.22	13.4	13.4	36.4	36.4
81	1	3	0.8	0.	2	1	3	1	3	4	0	3	4	0	0	0	0	0	21	5.52	2.50	262	20	1.00	1.00	0.99	0.01	0.10	1.00	0.93	0.10	44.5	43.3	2,740.0	179.2
81	2	3	0.9	0.	5	13	32	12	16	7	7	3	5	4	3	0	1	0	108	4.64	0.38	262	100	0.90	1.00	0.99	0.05	0.19	0.90	0.95	0.24	21.4	14.4	476.4	30.5
81	3	3	0.9	0.	10	39	44	35	21	22	15	15	10	5	4	4	0	0	224	4.71	0.50	262	200	0.92	1.00	0.99	0.06	0.30	0.92	0.96	0.22	23.3	18.3	332.9	39.9
81	4	3	0.9	0.	22	48	66	73	37	34	22	17	9	8	1	1	1	0	339	4.38	0.21	262	287	0.91	1.00	0.98	0.08	0.41	0.91	0.95	0.21	14.6	6.8	231.4	44.6
81	5	3	0.9	0.	35	85	100	86	54	46	29	20	13	6	11	4	0	1	490	4.32	0.36	262	402	0.92	1.00	0.97	0.10	0.50	0.92	0.94	0.21	13.1	18.7	173.5	42.3
81	6	3	0.9	0.	48	101	128	129	83	54	20	20	17	6	6	2	2	0	616	4.09	0.13	262	474	0.91	1.00	0.97	0.13	0.59	0.91	0.94	0.22	7.1	9.0	121.3	36.2
81	7	3	0.9	0.	56	140	176	134	91	69	28	28	14	9	6	5	0	0	756	4.01	0.27	262	557	0.91	1.00	0.96	0.15	0.70	0.91	0.95	0.21	5.0	18.7	98.2	43.6
81	8	3	0.9	0.	67	170	207	176	114	73	34	23	12	10	5	1	1	0	893	3.86	0.22	262	612	0.90	1.00	0.96	0.17	0.79	0.90	0.95	0.22	1.0	17.9	73.4	40.7
81	9	3	0.9	0.	75	212	247	198	137	81	39	14	8	4	2	0	1	0	1018	3.67	0.17	262	656	0.90	1.00	0.96	0.20	0.90	0.90	0.95	0.23	3.9	18.2	50.3	36.9
82	0	3	0.9	1	88	243	297	226	147	73	25	10	1	0	0	0	0	0	1110	3.43	0.11	262	691	0.88	1.00	0.95	0.24	1.00	0.88	0.95	0.24	10.2	18.8	30.5	30.5
82	1	3	0.9	0.	3	8	7	8	4	3	3	2	1	4	2	0	0	0	45	4.84	0.73	266	44	0.92	1.00	0.99	0.03	0.10	0.92	0.92	0.20	28.9	26.3	812.4	51.9
82	2	3	0.9	0.	7	22	18	21	18	19	8	10	8	5	1	2	0	1	140	5	1.06	266	122	0.95	1.00	0.99	0.04	0.20	0.95	0.94	0.24	33.1	26.0	518.8	30.9
82	3	3	0.9	0.	18	46	44	64	39	31	17	14	11	10	4	4	2	2	306	4.75	0.78	266	264	0.95	1.00	0.98	0.07	0.30	0.95	0.93	0.26	26.5	22.9	286.6	22.7
82	4	3	0.9	0.	27	77	89	101	74	55	22	28	22	22	10	3	3	2	535	4.79	0.26	266	414	0.97	1.00	0.98	0.09	0.41	0.97	0.95	0.23	27.5	2.3	213.9	36.7
82	5	3	0.9	0.	42	119	134	133	90	71	45	37	20	18	14	5	5	1	734	4.57	0.42	266	510	0.97	1.00	0.97	0.12	0.51	0.97	0.94	0.24	21.7	14.5	147.2	30.6
82	6	3	0.9	0.	50	168	182	182	120	88	59	52	29	16	7	9	6	2	970	4.46	0.23	266	640	0.97	1.00	0.97	0.14	0.60	0.97	0.95	0.24	18.8	6.0	112.3	31.7
82	7	3	0.9	0.	66	185	218	221	147	109	56	31	23	13	8	5	2	1	1085	4.17	0.15	266	689	0.96	1.00	0.97	0.16	0.70	0.96	0.95	0.23	11.0	5.3	86.7	35.3
82	8	3	0.9	0.	97	241	276	263	174	127	60	46	27	16	6	2	1	0	1336	4.03	0.27	266	755	0.96	1.00	0.96	0.18	0.79	0.96	0.94	0.23	7.3	15.7	67.8	35.4
82	9	3	0.9	0.	110	309	367	326	204	129	43	23	15	8	5	1	0	0	1540	3.7	0.17	266	795	0.95	1.00	0.95	0.23	0.91	0.95	0.95	0.25	1.5	16.0	38.0	26.6
83	0	3	0.9	1	115	348	406	387	221	136	43	17	8	4	0	0	0	0	1685	3.59	0.14	266	824	0.95	1.00	0.95	0.25	1.00	0.95	0.95	0.25	4.4	15.6	29.5	29.5

32

86	1	4	0.8	0.1	0	2	7	6	2	1	0	1	0	0	0	1	0	0	20	4.25	0.18	248	19	0.81	1.00	1.00	0.03	0.11	0.81	1.00	0.23	5.5	-	13.9	821.6	33.2
86	2	4	0.8	0.2	4	4	11	13	6	5	2	3	1	1	0	0	0	0	50	4.28	0.16	248	49	0.85	1.00	0.99	0.03	0.19	0.85	0.95	0.16	6.2	-	9.4	737.9	76.3
86	3	4	0.8	0.3	9	16	26	16	15	5	3	1	0	1	2	1	0	0	95	3.8	0.16	248	92	0.80	1.00	0.99	0.06	0.29	0.80	0.95	0.19	5.7	-	21.9	363.5	49.5
86	4	4	0.8	0.4	12	25	34	27	26	18	5	3	2	3	0	2	0	0	157	4.08	0.27	248	150	0.84	1.00	0.99	0.06	0.39	0.84	0.96	0.15	1.2	-	19.6	335.2	81.3
86	5	4	0.8	0.5	17	47	63	43	31	21	10	5	8	4	1	1	0	0	251	3.98	0.25	248	225	0.84	1.00	0.98	0.09	0.50	0.84	0.96	0.18	1.2	-	22.6	198.7	58.6
86	6	4	0.8	0.6	32	60	82	61	52	22	12	7	4	3	1	1	0	0	337	3.75	0.17	248	298	0.83	1.00	0.97	0.11	0.60	0.83	0.95	0.19	7.0	-	22.0	134.7	48.4
86	7	4	0.8	0.7	31	80	87	74	50	32	11	12	5	2	0	0	0	0	384	3.72	0.19	248	329	0.82	1.00	0.97	0.13	0.69	0.82	0.96	0.19	7.7	-	23.1	113.1	53.0
86	8	4	0.8	0.8	38	76	115	101	58	25	12	6	4	1	0	0	0	0	436	3.57	0.12	248	366	0.81	1.00	0.97	0.15	0.81	0.81	0.96	0.18	11.4	-	21.4	85.4	53.6
86	9	4	0.8	0.9	39	91	111	86	78	31	8	5	3	3	1	0	1	0	457	3.61	0.13	248	386	0.81	1.00	0.97	0.15	0.89	0.81	0.96	0.17	10.4	-	21.1	84.1	65.7
87	0	4	0.8	1	52	116	144	89	69	40	8	5	3	0	1	0	0	0	527	3.4	0.12	248	417	0.80	1.00	0.96	0.18	1.00	0.80	0.96	0.18	15.6	-	25.2	54.5	54.5
87	1	4	0.8	0.1	4	4	2	2	3	2	1	0	0	0	0	0	0	0	18	3.33	0.50	250	18	0.78	1.00	0.98	0.02	0.10	0.78	0.83	0.28	16.8	-	45.9	909.3	0.2
87	2	4	0.8	0.2	1	5	13	12	10	7	6	2	4	2	0	0	0	0	62	4.9	0.51	250	61	0.97	0.02	0.00	0.00	0.19	0.97	0.99	0.14	22.4	-	9.9	1,293.4	96.1
87	3	4	0.8	0.3	11	25	39	28	27	8	7	4	3	1	2	1	0	0	156	4.01	0.20	250	145	0.84	1.00	0.98	0.07	0.30	0.84	0.94	0.24	0.1	-	18.4	255.5	21.7
87	4	4	0.8	0.4	18	44	70	39	30	12	21	13	2	2	3	0	3	0	257	4.11	0.28	250	225	0.86	1.00	0.98	0.09	0.41	0.86	0.95	0.21	2.6	-	22.7	212.3	39.3
87	5	4	0.8	0.5	16	57	82	58	35	34	13	12	6	8	3	2	1	2	329	4.27	0.33	250	286	0.88	1.00	0.98	0.09	0.51	0.88	0.97	0.18	6.6	-	21.2	194.2	57.6
87	6	4	0.8	0.6	30	63	93	86	55	36	25	15	9	8	4	3	0	0	427	4.23	0.31	250	371	0.89	1.00	0.98	0.10	0.60	0.89	0.96	0.17	5.6	-	19.5	168.9	67.0
87	7	4	0.8	0.7	21	84	132	95	65	39	21	12	7	6	2	4	1	1	490	4.06	0.23	250	396	0.87	1.00	0.98	0.13	0.70	0.87	0.98	0.18	1.4	-	18.9	115.5	57.2
87	8	4	0.8	0.8	51	108	145	128	72	48	26	19	11	7	1	1	0	0	617	3.87	0.22	250	485	0.87	1.00	0.96	0.14	0.80	0.87	0.95	0.18	3.4	-	22.0	92.4	57.2
87	9	4	0.8	0.9	49	136	160	129	95	62	26	10	5	4	1	0	0	0	677	3.73	0.19	250	518	0.86	1.00	0.97	0.17	0.90	0.86	0.96	0.19	6.9	-	21.4	67.0	51.4
88	0	4	0.8	1	60	145	220	166	96	42	19	9	2	1	0	0	0	0	760	3.47	0.11	250	541	0.84	1.00	0.96	0.21	1.00	0.84	0.96	0.21	13.3	-	21.7	40.0	40.0
88	1	4	0.9	1	1	2	9	5	3	6	4	1	1	1	0	2	0	0	35	5.2	0.75	253	34	0.99	0.01	0.00	0.00	0.10	0.99	0.96	0.17	31.6	-	15.3	2,482.1	71.9
88	2	4	0.9	2	7	19	16	18	18	8	10	4	2	3	3	3	0	1	112	4.79	0.87	253	102	0.93	1.00	0.99	0.04	0.20	0.93	0.94	0.23	21.2	-	30.4	499.1	26.7
88	3	4	0.9	3	12	31	41	38	26	14	16	13	5	6	2	1	2	0	207	4.56	0.40	253	183	0.91	1.00	0.99	0.06	0.31	0.91	0.95	0.20	15.4	-	18.1	324.6	42.8
88	4	4	0.9	4	20	37	62	57	51	34	20	11	6	5	7	5	1	4	320	4.7	0.41	253	269	0.94	1.00	0.98	0.07	0.40	0.94	0.95	0.18	18.9	-	15.0	281.8	60.3
88	5	4	0.9	5	22	72	87	92	61	34	38	18	8	11	4	5	3	2	457	4.52	0.24	253	368	0.93	1.00	0.98	0.10	0.51	0.93	0.96	0.20	14.4	-	10.4	180.8	49.2
88	6	4	0.9	6	36	95	108	103	78	54	38	26	18	7	8	1	1	2	575	4.39	0.37	253	444	0.92	1.00	0.97	0.11	0.60	0.92	0.95	0.19	11.1	-	18.6	145.6	53.1
88	7	4	0.9	7	47	140	175	142	86	63	41	29	12	12	9	2	2	0	760	4.11	0.29	253	540	0.92	1.00	0.97	0.14	0.70	0.92	0.96	0.21	4.0	-	20.7	95.3	40.7
88	8	4	0.9	8	49	133	185	204	123	59	35	21	10	5	8	1	1	1	835	3.99	0.11	253	583	0.91	1.00	0.97	0.16	0.80	0.91	0.96	0.20	1.0	-	10.8	78.0	45.8
88	9	4	0.9	9	65	180	253	209	149	76	32	18	7	2	1	0	0	1	993	3.72	0.16	253	666	0.90	1.00	0.96	0.20	0.90	0.90	0.96	0.22	5.9	-	18.3	49.7	36.2
89	0	4	0.9	1	77	211	240	242	142	66	29	15	2	0	1	0	0	0	1025	3.56	0.05	253	658	0.89	1.00	0.96	0.22	1.00	0.89	0.96	0.22	9.9	-	9.9	36.2	36.2

1	4	0.9	0.	1	7	6	7	7	4	2	4	2	1	1	1	0	1	44	5.25	1.10	251	43	0.95	1.00	1.00	0.03	0.10	0.95	0.97	0.29	31.9	-	27.1	857.8	9.7		
89	2	4	0.9	0.	6	15	11	30	12	7	11	6	7	9	6	3	0	1	124	5.52	1.00	251	110	1.00	1.00	0.99	0.03	0.20	1.00	0.95	0.16	38.6	-	23.5	737.0	71.8	
89	3	4	0.9	0.	7	20	43	54	43	29	24	19	13	8	8	3	0	0	271	5.25	0.38	251	226	0.98	1.00	0.99	0.05	0.30	0.98	0.97	0.18	31.9	0.1	378.3	64.2		
89	4	4	0.9	0.	35	64	80	72	66	40	36	28	22	11	14	2	6	2	478	4.87	0.51	251	363	0.98	1.00	0.97	0.08	0.40	0.98	0.92	0.21	22.3	-	19.1	229.7	35.7	
89	5	4	0.9	0.	24	82	148	123	106	56	48	32	21	17	11	4	2	1	675	4.67	0.40	251	492	0.97	1.00	0.98	0.11	0.51	0.97	0.96	0.22	17.3	-	14.0	152.2	36.4	
89	6	4	0.9	0.	50	110	198	166	133	68	53	37	21	21	6	5	1	2	871	4.4	0.33	251	583	0.97	1.00	0.97	0.13	0.60	0.97	0.95	0.22	10.5	-	16.2	110.6	33.0	
89	7	4	0.9	0.	63	147	244	210	167	102	51	48	25	12	7	5	1	2	1084	4.28	0.30	251	682	0.97	1.00	0.97	0.15	0.71	0.97	0.95	0.22	7.5	-	16.5	84.5	34.7	
89	8	4	0.9	0.	75	202	299	242	192	118	70	41	25	14	4	0	3	0	1285	4.11	0.27	251	758	0.96	1.00	0.96	0.17	0.81	0.96	0.95	0.22	3.2	-	17.9	63.9	34.7	
89	9	4	0.9	0.	92	239	334	311	212	123	60	38	17	11	4	3	0	1	1445	3.94	0.22	251	787	0.96	1.00	0.96	0.20	0.90	0.96	0.95	0.22	-	1.1	-	18.1	47.8	34.3
90	0	4	0.9	0.	96	269	379	342	264	119	56	24	5	3	0	0	0	0	1557	3.75	0.15	251	801	0.95	1.00	0.96	0.22	1.00	0.95	0.96	0.22	-	5.8	-	17.1	32.9	32.9
90	1	4	1	0.	0	5	9	6	9	5	8	5	3	4	1	3	0	1	59	6.1	1.03	250	55	1.00	1.00	1.00	0.03	0.10	1.00	1.00	0.32	52.5	-	8.7	827.3	4.0	
90	2	4	1	0.	2	10	26	29	21	22	23	9	9	7	4	6	0	3	171	5.82	0.55	250	147	1.00	1.00	1.00	0.05	0.19	1.00	0.98	0.28	45.5	2.9	456.8	10.9		
90	3	4	1	0.	18	56	70	66	60	45	34	27	21	12	8	5	5	0	427	5.04	0.58	250	325	1.00	1.00	0.98	0.08	0.30	1.00	0.94	0.30	26.0	-	16.3	226.9	2.3	
90	4	4	1	0.	38	82	92	100	97	56	30	34	23	29	12	8	10	4	615	5.03	0.32	250	443	1.00	1.00	0.97	0.10	0.38	1.00	0.92	0.28	25.7	-	8.7	175.1	7.4	
90	5	4	1	0.	51	138	171	174	133	103	79	46	45	25	12	23	11	2	1013	4.91	0.32	250	667	1.00	1.00	0.97	0.14	0.52	1.00	0.94	0.28	22.7	-	8.5	104.7	7.8	
90	6	4	1	0.	61	169	259	241	190	130	71	57	42	35	17	12	11	1	1296	4.66	0.41	250	756	1.00	1.00	0.97	0.16	0.60	1.00	0.95	0.29	16.5	-	16.1	75.0	6.9	
90	7	4	1	0.	88	228	326	317	230	169	98	67	43	32	12	12	3	2	1627	4.44	0.37	250	855	1.00	1.00	0.96	0.19	0.70	1.00	0.94	0.29	11.0	-	17.2	49.6	5.9	
90	8	4	1	0.	111	311	457	387	300	197	100	53	47	33	13	5	2	2	2018	4.2	0.29	250	923	1.00	1.00	0.96	0.23	0.80	1.00	0.95	0.29	5.0	-	17.8	30.4	6.1	
90	9	4	1	0.	133	391	563	480	352	220	111	48	37	22	6	6	3	0	2372	4	0.24	250	977	1.00	1.00	0.96	0.26	0.90	1.00	0.95	0.30	-	-	18.2	16.4	5.6	
91	0	4	1	1	167	479	689	605	423	237	93	33	15	8	0	0	0	0	2749	3.74	0.16	250	999	1.00	0.37	0.61	1.00	1.00	1.00	0.95	0.30	-	-	-	59.8	4.3	