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Ms. Barbara Shroeder
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Room 13657
Silver Spring, MD 20910

Ms. Sandy McPherson
U.S. FWS National Sea Turtle Coordinator
U.S. Fish & Wildlife Service
7915 Bay Meadows Way
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Jacksonville, FL 32256

Dear Ms. Shroeder and Ms. McPherson:

The Southern Shrimp Alliance ("SSA') submits these comments in response to the solicitation of additional information and analysis regarding the proposed designation of nine distinct population segments ("DPSs") of loggerhead sea turtles and their proposed listing as endangered or threatened. 76 Fed. Reg. 15932 (March 22, 2011). These comments supplement those previously submitted by SSA which are incorporated by reference into these comments.

SSA is the national voice of shrimp fishermen and processors in eight states from Texas to North Carolina. SSA has been intimately involved with turtle conservation measures for many years directly and through its members. In preparing these comments, SSA consulted with several scientists. Based on their analyses, it is clear that the proposed actions are not based on the best scientific information available and that the best scientific information available does not support the designation of DPSs for loggerhead turtles or the uplisting of the species from threatened to endangered.

Nesting Data

In issuing the proposed rule to designate nine loggerhead DPSs and to designate seven as endangered, 75 Fed. Reg. 12598 (March 16, 2010) ("Proposed Rule"), the National Marine Fisheries Service ("NMFS") and the Fish and Wildlife Service ("FWS") (collectively the "Services") used old nesting data showing only a continuing decrease in nesting populations, particularly with respect to the largest nesting colony in the proposed Northwest Atlantic DPS, the Peninsula Florida Recovery Unit. For this key Recovery Unit, the nesting data for 1998 through 2007 (the most recent period in the data used by the Services) reflects a continuous decline. Using data only showing a declining population produces but one result and conclusion. However, the most current data through 2010 show a continuing increase in the nesting population, contradicting and confounding the conclusions in the Proposed Rule.

Appendix I to this supplemental comment uses all the data, 1989-2010, to update the results of the analysis presented in SSA's September 2010 comments regarding status of the Peninsula Florida Recovery Unit. That analysis shows the data are not consistent with the single declining population trend line used by the Services for the 100 year population projections that are a cornerstone of the Proposed Rule. Rather, the data suggest three population growth segments: 1989-1997 (increase); 1998-2003 (decrease); and 2004-2010 (increase). *See* Figure 2 in the attached Appendix I. In other words, the nesting growth rate is not consistent with the theory that the population of this Recovery Unit has been, and will continue to be, in decline.

The model used by the Services to predict population trends produced an inappropriate and inaccurate result because it did not use the most current data and because it forced the use of a single trend line, ignoring the fact that the data show there are three trend lines, two of which show an increasing population. Forcing the use of a single trend line increases the variance of data around that single trend line causing more pessimistic estimates of quasi-extinction risk. In other words, the scatter of individual data points around a single, forced trend line is large when compared to the scatter of points around the individual trend lines actually represented by the three population growth segments. The large scatter indicates that the line chosen does not truly fit the data, thereby producing questionable and unreliable results. Significantly to that point, the National Academy of Sciences' ("NAS") review of the methodology and conclusions of the Loggerhead Biological Review Team ("BRT"), whose work is the foundation for the Proposed Rule, concluded the Services' model made "no attempt to fit models to data." Assessment of Sea Turtle Status and Trends, National Research Council of the National Academies, July 15, 2010 ("NAS Report") at 90. Had the Services done so using all of the data to reflect the three population trends, the trend lines would have better fit the model and the conclusions of the Proposed Rule would be different.

Furthermore, if the Services had used all the available data through 2010, it would have shown the current population for the Peninsula Florida Recovery Unit includes 23,848 nesters. Using the Services inappropriate model and an SQE critical value of 0.3, the nesting population 100 years in the future for this one recovery unit will be 8,175 nesters, 34.3% of the current population. The question is whether a population containing 8,175 nesters 100 years from now constitutes an "immediate" risk of extinction. Although the BRT Report offered no opinion on what constitutes an unacceptable population level, the BRT did note that thresholds of less than 30% of current population size indicate a high likelihood of quasi-extinction. The present threshold value estimate based on data through 2010 and the Services own model is 34%. The updated analysis provided in Appendix I documents conclusively that there is no immediate risk of extinction.

Before the close of the extended period for a final agency decision on the Proposed Rule, the Services will have available 2011 nesting data. That data, plus any other relevant data becoming available in the extended period for consideration of the Proposed Rule, must be considered by the Services. Indeed, the Services should reopen the comment period briefly to solicit comment and analysis regarding the 2011 data at a minimum.

Population Size

Based on the Services estimates that nesting females represent one percent (1%) or less of the total population, the Peninsula Florida Recovery Unit alone represents a present population of 2,384,800 loggerheads from that one nesting aggregation. Using the Services inappropriate model and its pessimistic estimates, the population size 100 years from now would still approach one million loggerheads (817,500) for this single Recovery Unit in the proposed Northwest Atlantic DPS. Such numbers do not suggest an immediate risk of extinction. In stark contrast to the conclusions in the Proposed Rule, the risk of extinction is very low or nonexistent.

In Water Survey Data

SSA reaffirms the assertion in its initial comments that nesting data is an incomplete indicator of population levels and trends. The NAS analysis of the BRT Report on which the Proposed Rule relies found that "sea turtle population assessments ... are based too heavily on abundance estimates of adult females at nesting beaches. Although abundance estimates of adult females are critical, without knowledge of accompanying changes in demographic rates for all life stages, the proximate and ultimate causes of population trends cannot be determined." (Emphasis added.) NAS Report at 103. As noted in SSA's previous comments, the Proposed Rule did not even consider the results of several inwater surveys that provide important demographic and population trend information – information showing a significant increase in turtle populations.

NAS went on to state unequivocally that the Services "should ensure that abundance estimates of life states in addition to adult females are generated and that demographics are integrated with estimates of abundance in population assessments." *Id.* at 104. NAS identified "in-water abundance" as one of "[t]he most serious demographic data gaps to be addressed." *Id.* at 103.

Not only did the Proposed Rule fail to use the inwater abundance data that was then available (e.g. South Carolina Department of Natural Resources 2009 discussed in SSA's initial comments), but there currently exists even more such data – data confirming an increase in the abundance of loggerheads. *See* South Carolina Department of Natural Resources 2010 Annual Report to the National Marine Fisheries Service: "Relative Abundance, Distribution and Health of Sea Turtles in the Near Shore Waters of the Southeastern United States;" and Northeast Fisheries Science Center 2011: "Preliminary Summer 2010 Regional Abundance Estimate of Loggerhead Turtles (*Caretta caretta*) in the Northeastern Atlantic Ocean Continental Shelf Waters." The latter suggests there were as many as 801,000 (521,000-1,111,000) large juvenile and adult loggerheads in the survey area which is only a portion of the overall range of the loggerheads in the proposed Northwest Atlantic DPS. All of these inwater data contradict the conclusions of the Proposed Rule.

It is also important to note that during the six month comment extension, additional in water survey data from the AMAPPS program will become available. Consistent with the requirement in the Endangered Species Act that the Services use the best available data, the AMAPPS data should be incorporated into the Services final analysis.

Threats Analysis

The total neritic juvenile and adult loggerhead population of the proposed Northwest Atlantic DPS had been estimated by NMFS to be on the order of 230,000. As noted in our initial comments, SSA believes that number is unreasonably low using NMFS' own data. Indeed, we now know that the abundance of these life stages in only a portion of the overall range is on the order of 801,000 individuals. Not only can the Services no longer rely on old data to suggest extinction is imminent, but in assessing the threats to the loggerhead population the Services must now recognize that the threat to loggerheads from the shrimp trawl fishery, as well as from other fisheries, is small. Even if we use the outdated NMFS estimate of 3,948 loggerheads killed by shrimp trawls at 2002 levels of effort, the fraction taken would represent only 0.5% of the population of loggerheads in the neritic waters of the Northwest Atlantic using the fractional 801,000 population estimate. In 2009, total shrimp trawl mortality was estimated to have been 1,451 loggerheads. *See* January 5, 2011 Memorandum to Roy Crabtree from Bonnie Ponwith, Southeast Fisheries Science Center, NMFS). This take represents only 0.2% of the 801,000 population estimate. In short, the threats analysis Proposed Rule has grossly overestimated actual threats. However, that overestimate becomes even greater if the actual population estimate for the entire proposed Northwest Atlantic DPS discussed in SSA's original comments, 2.3 million turtles, is used.

Policy Issues

In reaching a decision on the Final Rule, the Services may wish to consider the implications of the Proposed Rule for turtle conservation internationally. It is an unstated but accepted principle of international negotiations that nations with a direct stake in the affected geographic region have greater influence on the outcome of multilateral conservation negotiations. If the Services proceed with the designation of DPSs, the Services will be diminishing, if not eliminating, the role the U.S. can play in international conservation discussions involving loggerhead turtles outside the proposed Northwest Atlantic DPS. Such a result cannot be good for turtle conservation. As you know, few nations share the depth of the U.S. commitment to turtle conservation. Many nations place economic interest far ahead of turtle conservation. An unintended, but real, consequence of designating DPSs as set forth in the Proposed Rule could well be to diminish international turtle conservation efforts to the detriment of the turtles.

SSA recognizes this will not likely be the result with respect to U.S. negotiating strength within the Convention on International Trade in Endangered Species of Wild Fauna and Flora ("CITES"). However, the trade issues regulated by CITES are not the major conservation concern for loggerhead turtles. The international conservation issues that require attention for the conservation of loggerheads include habitat conservation, fisheries bycatch, and turtle consumption. These are not issues directly or adequately addressed by CITES.

Conclusion

The Proposed Rule did not rely on the best scientific information available. The Proposed Rule used old data and failed to consider other critical data, such as inwater abundance surveys and more recent nesting data, even though that data had been used and relied on by the Services in other documents. If all of that data had been used, as discussed above and in SSA's initial comments, the foundation and conclusions of the Proposed Rule crumple. SSA urges the Services to issue a Final Rule that makes no DPS designations and no change to the species' listing status.

Sincerely,

John Williams
Executive Director

## APPENDIX I
## To The Supplemental Comments

## UPDATE OF THE DIFFUSION MODEL TO THE PENINSULAR FLORIDA POPULATION

Figure 1 plots the number of nesting females in Peninsular Florida. The open symbols are new data and the filled symbols were used by Conant et al. (2009). Three time series were used for analysis:

1989-2007, as used by Conant et al.,

1989-2009, as used by Gallaway and Gazey (2010), and

1989-2010, the update used in this document.

Table 1 records the population parameter estimates by series following the methodology used by Conant et al. (2009). Note that while the update (1989-2010 series) had the smallest negative growth rate, the standard deviation (SD) of the growth rate and variance of observations were greater than the other two series. The trend lines by series with the three-year running sum values are plotted in the upper panel of Figure 2. Here, the trend lines that are to be used for 100 year projections are superimposed on the data. If the data were consistent with the Diffusion Model then they should follow the trend line. Scatter-plots of the residuals (the data value minus the predicted value) versus the predicted value are provided in the lower panels of Figures 2. If the data and Diffusion Model were consistent, the residuals should be randomly distributed around the zero line. Instead, the plots suggest that the series can be partitioned into three segments: 1989-1997, 1998-2003, and 2004-2010. Following Morris and Doak (2002), the growth rates for these segments can be shown to be significantly different ($P < 0.001$). In other words, the growth rate is not stationary over the observed history. As pointed out by Gallaway and Gazey (2010), the application of these parameter estimates to 100 year projections generate pessimistic estimates of quasi-extinction risk (actual risk is smaller than estimated) because the variance includes the variation associated with the change in trends over the data history.

The cumulative probability of reaching a prescribed population size (quasi-extinction size) 100 years into the future is a straightforward calculation given a particular set of population parameters. However, uncertainty in the estimates of the population parameters (*i.e.*, the mean of the growth rate and the variance in that rate) must be addressed by computing the uncertainty in the probability of the population change. A computer-based method known as "parametric bootstrap" was used by Conant et al. (2009) to approximate the confidence intervals for the quasi-extinction probability. Because the accepted standard probability distributions that govern the population parameter estimates are well known, the computer can draw values of the parameters from the appropriate distributions. If both of these drawn values lie within their 95% confidence interval they are used to calculate the quasi-extinction probability throughout the 100 year horizon. By repeating the process many times, a range of quasi-extinction probabilities are generated that lie within the 95% confidence interval of the population parameter estimates. The extreme quasi-extinction probabilities define the upper and lower boundaries of probability over the 100 year horizon. Conant et al. chose to only focus on the cumulative quasi-extinction probability at 100 years and computed a metric introduced by Snover and Heppell (2009) named the susceptibility to quasi-extinction (SQE). The SQE was computed as the proportion of the bootstrap simulations with a cumulative probability greater than 0.9 at 100 years. In other words, the SQE is the probability that the cumulative probability of quasi-extinction 100 years in the future will be greater than 0.9. Based on simulations of loggerhead turtle populations, Snover and Heppell (2009) recommend a critical SQE value of 0.4. While Conant et al. (2009) acknowledged the linkage between the cutoff of 0.9 and the critical SQE value of 0.4, they used a critical SQE value of 0.3 instead of 0.4 without any justification for the change and without any discussion on the impacts of this change on the assessment of viability.

Table 2 lists the nester thresholds at SQE critical values of 0.3 and 0.4 for the three time series. The thresholds are the population levels that can be expected 100 years from now given the data series and SQE risk. For example, using the 1989-2007 series and SQE = 0.3, the reader must decide if a population of 1,000 nesters (or 5.3% of the 2005-2007 population) 100 years in the future constitutes "immediate" risk of extinction. Guidance on unacceptable population decline is not provided by Conant et al. (2009). They do state in their synthesis section that thresholds of less than 30% of current population size indicate a high likelihood of quasi-extinctions.

The actual cumulative probabilities of quasi-extinction using the 1989-2010 series with thresholds of 1,000, 2,610, and 8,175 nesters are plotted in Figure 3. The lower CI is not plotted because it is 0 for all years into the future (i.e., follows the x-axis). Note that the mean probability of detecting (>1%) a drop in the population to 1,000 or 2,610 nesters is far into the future (>60 years).

## Literature Cited

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Gallaway, B.J. and W.J. Gazey. 2010. Comments on proposed listing of nine distinct population segments of loggerhead sea turtles as endangered or threatened. Unpublished manuscript.

Morris, W.F. and D.F. Doak. 2002. Quantitative conservation biology: theory and practice of population viability analysis. Sinauer Associates, Sunderland, MA USA.

Snover, M.L., and S.S. Heppell. 2009. Application of diffusion approximation for risk assessments of sea turtle populations. Ecological Applications, 19: 774-785

Table 1. Regression output using three time series for Peninsular Florida. Parameter $\mu$ is the mean log population growth rate, $\sigma^2$ is the variance of the log population growth rate and CI is the 95% confidence interval.

| Statistic | 1989-2007 | 1989-2009 | 1989-2010 |
|---|---|---|---|
| Trend ($\mu$) | -0.0260 | -0.0199 | -0.0093 |
| SD($\mu$) | 0.0225 | 0.0206 | 0.0233 |
| Lower CI ($\mu$) | -0.0654 | -0.0556 | -0.0496 |
| Upper CI ($\mu$) | 0.0133 | 0.0159 | 0.0311 |
| Var ($\sigma^2$) | 0.0054 | 0.0052 | 0.0070 |
| Lower CI ($\sigma^2$) | 0.0030 | 0.0029 | 0.0041 |
| Upper CI ($\sigma^2$) | 0.0126 | 0.0113 | 0.0150 |
| Effective Sample Size | 17 | 19 | 20 |

Table 2. Nester thresholds at susceptibility to quasi-extinction (SQE) values of 0.3 and 0.4. Current population is the sum of nesters in the final three years of the series. SQE = 0.3 was used by Conant et al. (2009) as the critical value. SQE = 0.4 was recommended by Snover and Heppell (2009) as the critical value to be used for loggerhead turtles.

| | Current | SQE = 0.3 | | SQE = 0.4 | |
|---|---|---|---|---|---|
| Series | Population | Threshold | Precent | Threshold | Precent |
| 1989 - 2007 | 18,744 | 1,000 | 5.3 | 2,420 | 12.9 |
| 1989 - 2009 | 19,887 | 2,610 | 13.1 | 3,980 | 20.0 |
| 1989 - 2010 | 23,848 | 8,175 | 34.3 | 11,970 | 50.2 |

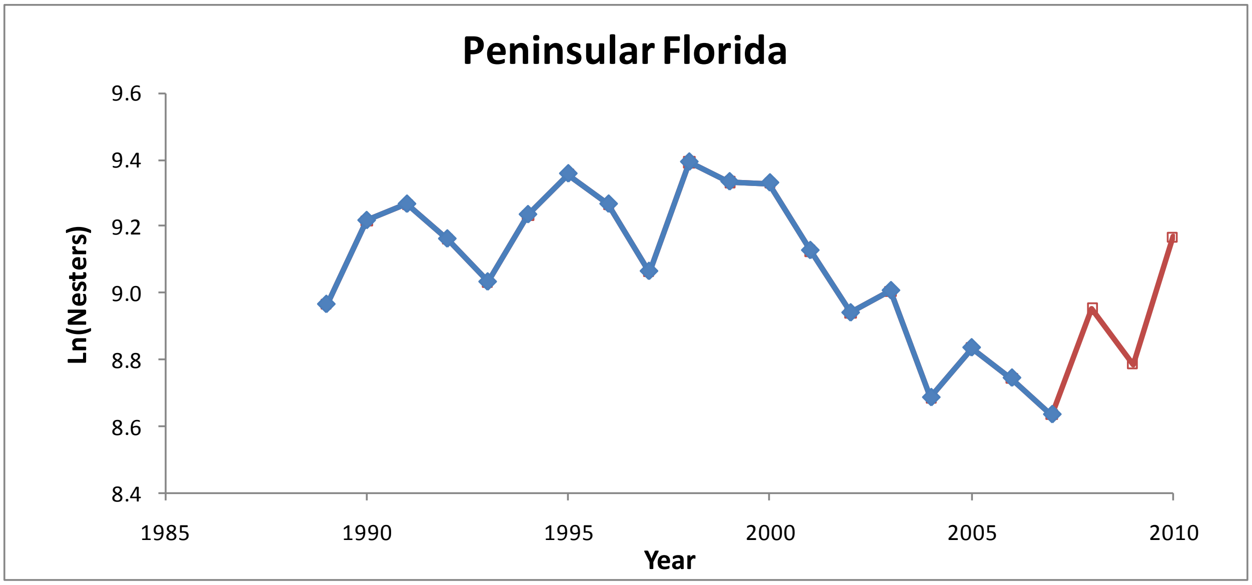


Figure 1. Number of nesting females at Peninsular Florida. Open symbols are new data and the filled symbols as used by Conant et al. (2009).

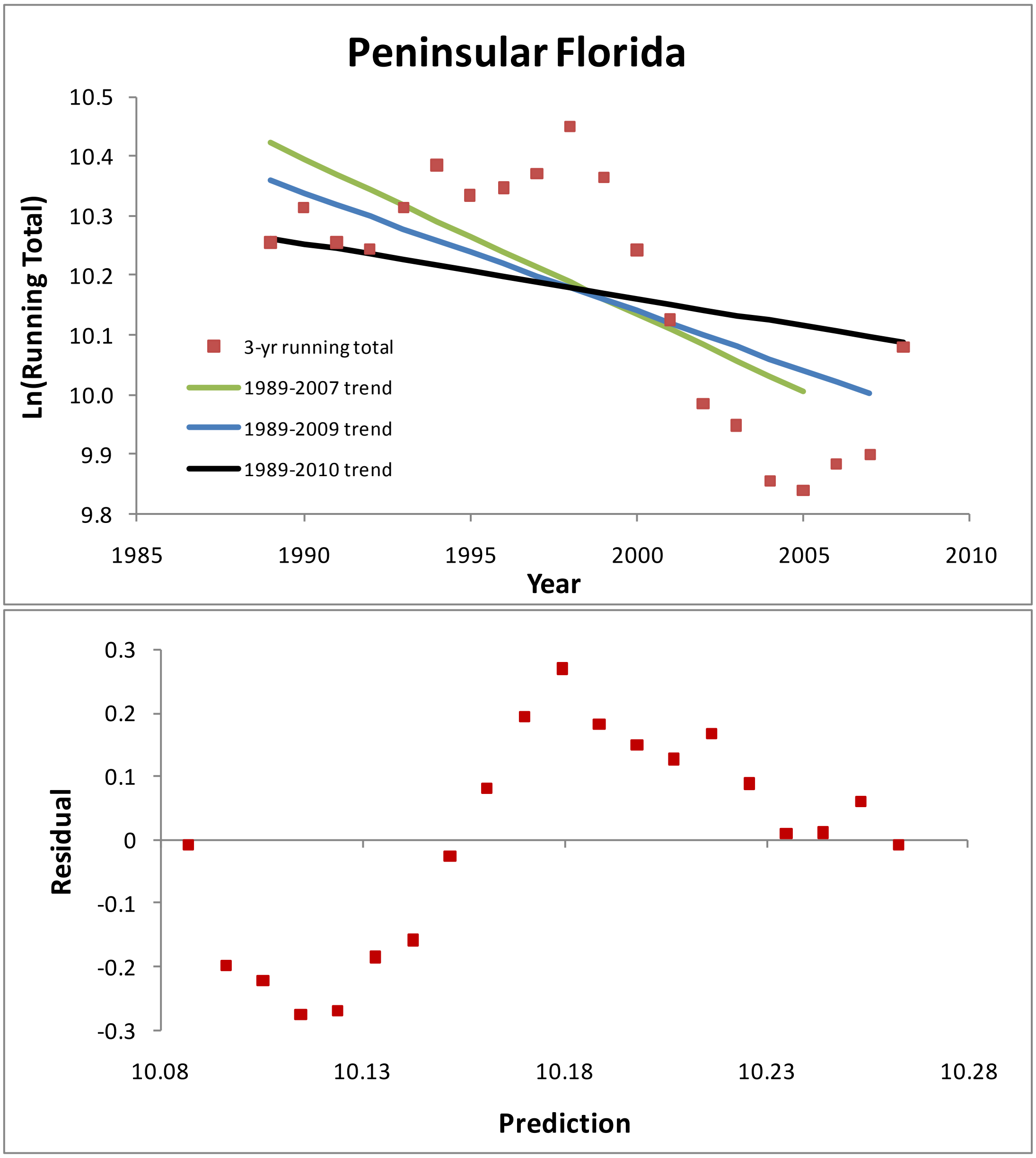


Figure 2. The logarithm of the three-year running sum of nesters and predicted trend lines using three data series and the associated residuals (data minus the predicted value) using the updated 1989-2010 series (lower panel) for the Peninsular Florida population.

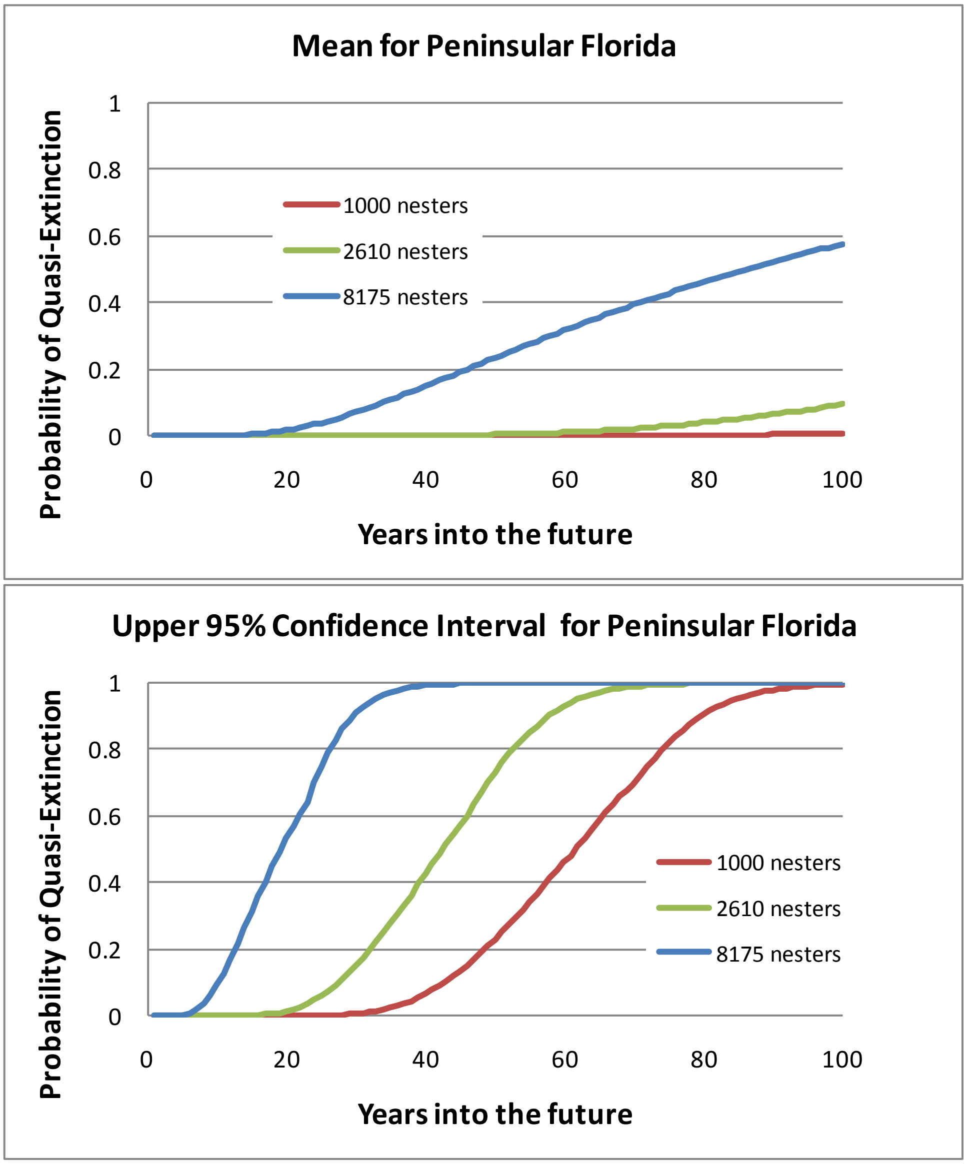


Figure 3. Cumulative probability of quasi-extinction for Peninsula Florida Unit using the 1989-2010 updated data series with quasi-extinction thresholds of 1,000, 2,610 and 8,175 nesters. Upper panel is the mean and the lower panel is the 95% upper confidence interval.