A Review of
An Assessment of the Loggerhead Turtle Population in the Northwestern Atlantic Ocean.

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August 2008

Report prepared for the
Center for Independent Experts
System for Independent Peer Review

EXECUTIVE SUMMARY

The assessment report[1] assembles data on the populations of loggerhead turtles in the northwest Atlantic and presents results of analyses of the assembled datasets. Its main conclusions are that there are five genetically distinct stocks, that nest-count indices have decreased for most of them over the last ten years or so, and that over about the same period, recruitment to the neritic juvenile stage has decreased to very low current levels. The other analyses make little further contribution to these assessment conclusions.

The data assembled appear to be comprehensive. However, the data have apparently been collected on a basis of availability, not necessarily with a population assessment in mind, and not all the data are very helpful to the assessment. Analyses, such as they are, take the form of simple plots of the data or of simple hypothesis tests applied to one data set at a time. There is little attempt to build synthetic models of the population being assessed. Few conclusions are drawn from the data, and it is often unclear how the analyses carried out are relevant to the assessment. The report concludes that the data are inadequate to support a full assessment, but does not point out the most serious shortcomings or recommend how to make the situation better.

The report has problems of structure: its 'Executive Summary' is not a summary of the report, but apparently the report itself, and is too verbose to be considered a summary; the sections that follow give more the impression of being appendices to the 'Executive Summary' than that of composing a logically constructed assessment report; these sections deal with different types of data and are independently constructed; and the report makes little attempt to synthesise the different data sources.

The research recommendations are inconclusive. Although this section starts by proclaiming the inadequacy of the present data, it continues with a wordy suggestion to continue doing much the same as before.

[1] a draft NOAA/NMFS Technical Memorandum 'An Assessment of the Loggerhead Turtle Population in the Northwestern Atlantic Ocean: A Report of the Turtle Expert Working Group'; 144 pp. dated July 2008.

INTRODUCTION

The document for review is a draft NOAA/NMFS Technical Memorandum 'An Assessment of the Loggerhead Turtle Population in the Northwestern Atlantic Ocean: A Report of the Turtle Expert Working Group'; 144 pp. dated July 2008. It consists of a series of sections, starting with 'Stock Structure' and proceeding essentially through different types of data on the species in question. These sections are preceded by an 'Executive Summary'. A major problem with the document is its structure. It is not clear as to what the 'Executive Summary' is to be considered a summary. It is not a summary of the rest of the document, and has no sound claim to be a summary of anything, being a verbose and discursive piece of writing.

It seems more as if the 'Executive Summary' is the assessment report itself, and the following sections compose a series of appendices. They are hardly linked or cross-referenced at all, and there is little overall synthesis of the information they contain. The 'Executive Summary', to which the following sections stand in the nature of appendices, does not refer in any orderly way to them, or appeal to their—rather scarce—conclusions to support its statements.

The report gives a strong impression of being a compilation of sections written by different people, with little in the way of overview or synthesis; and of being oriented around the gathering, and subsequently the analysis, of data, rather than an attempt to answer a specific set of questions and seek for information that will serve that end.

A stock assessment is a problem in population dynamics. The best quantitative assessments use mathematical models of population dynamics and fit them to appropriate data. Qualitative assessments use one or more accepted index series as a basis for judging the state of the stock. It is difficult to conclude from the document presented that the 'best possible assessment was used', as no recognisable stock-assessment format has been followed, and the most significant index series (apart from nest-survey data) have not been identified or interpreted. The individual sections analyse data sets and present numerical results, but in general without making clear which analyses are of population-dynamic significance or the relevance of their results to the aims of the assessment.

The report would be improved by the inclusion of an introductory section, laying out some of the necessary background on the distribution, biology, etc. of the species, but much more by a sound view of the assessment problem as a problem in population dynamics.

The 'Executive Summary' proposes a number of possible explanations for an observed recent decline in nest counts on nesting beaches in the south-eastern U.S. These are:

- natural variation in nest numbers;

- response to increased nesting by other turtle species;
- change in life history parameters;
- directed fisheries;
- bycatch;
- shift in sex ratio (in the adult population; if to males, then reduced numbers of females; if to females, then impaired fertilisation);
- 'changes in current preferred habitats or preferred diet increase vulnerability to mortality by stage/age class' (quoted verbatim because uninterpretable).

Having proposed these hypotheses, the report comes to no clearly stated conclusions about them.

GENERAL COMMENTS ON THE DATA USED

The use of data appears to be comprehensive, in that, as far as this reviewer is aware, all available data have been assembled and examined. However, there appears to be a general problem that most of the data have not been collected with any specific objective, but simply because it is available. This imposes on the assessment scientists the necessity of critically examining the data to ensure that it is apt to their purpose, if necessary filtering the data or making selections from it, and explaining carefully the methods used to collect the data, its likely faults, and, if appropriate, the methods used for selection. In these respects the report is deficient. There is also the further problem that the analyses, such as they are, have been those suggested by the data, not by the problem, and generally the results of the analyses are difficult to interpret in the context of the assessment and make little contribution to it.

GENERAL COMMENTS ON THE ANALYTICAL METHODS USED

The statistical methods used are mostly quite simple. There is a great reliance on significance tests without explanation of how the critical levels were selected or what they mean, rather than an emphasis on seeking to summarise the data and demonstrate its salient features. In many cases there are large numbers of significance tests on small subsets of the data, and it would be more informative to build more comprehensive models capable of summarising the data and demonstrating the salient features of its structure. There appears to be no attempt to build, or examine the possibility of, a population-dynamic model for (any of) the populations considered.

But there are so many people collecting so many different types of data in different parts of the species' range and on different segments of its life history that some attempt to at least create the structure of a synthetic model to relate all the different quantities would be in order.

GENERAL COMMENTS ON THE REPORT

The structure is poor.

The report is long on description, but short on substance. The reader is irritatingly often sent elsewhere for important details on the methods used for collecting or analysing data, yet in spite of these frequent absences of significant detail, the report is quite long. Part of the problem is a failure to distinguish the relevant from the less relevant: Pages devoted to tabulating the settings of an algorithm for filtering ARGOS locations or detailing the equations for converting one size measurement to another are of marginal significance to the objective of this report.

The writing is not good, generally far too wordy, and reveals a deficient knowledge of English. In particular: the authors seem unaware of the distinction not only between 'censoring' and 'truncation' in statistical usage, but also between 'censor' and 'censure' in ordinary English; they are also (like many biologists) enamoured of the word 'bias' without being very precise as to its meaning; and the frequency of slips in syntax and spelling is excessive. 'The data suggest a steep decline with a probability of 0.88': what does this mean? Does it mean that there is an 88% probability that nest counts are decreasing, or an 88% probability that the decrease is 'steep'? And what does 'steep' mean, anyway? In nesting beach studies, we read that turtles were 'identified as putative neophyte nesters'. The word 'putative' means 'supposed', and it is difficult to 'identify' something as a supposed anything; 'supposed to be first-time nesters' would be appropriate.

The appendices are titled: Population Structure; Nesting Trends and Viability Assessment; In-water trends and size distribution; Spatial distributions; Life history and demographics; Directed harvests; Bycatch. Some present and analyse data, while others cite reports of analyses carried out elsewhere.

POPULATION STRUCTURE

Data: mitochondrial haplotype frequencies; microsatellite markers in nuclear DNA.

Methods: standard methods of genetic frequency analysis.

Results: five distinct populations in the northwest Atlantic: northern U.S., Peninsular Florida, northern Gulf of Mexico, Dry Tortugas/Cay Sal, Quintana Roo. Populations elsewhere, also

apparently distinct from the northwest Atlantic and from each other: Cape Verde Islands, Brazil, Greece, Turkey.

Comments: this appears uncontroversial and a standard method of assessing distinctions between populations.

NESTING TRENDS AND VIABILITY ASSESSMENT

Data: nest surveys from nesting beaches.

Methods: exponential regression of nest counts against time, using classical (least-squares) and Bayesian methods for fitting models. Stochastic extrapolation of regression lines as a 'population viability assessment'.

Results: most Atlantic loggerhead nesting populations have been decreasing over about the last 10 years; persistence of these decreases would put several of them at risk of extinction.

Comments: methods are in general poorly described or not described at all, and the reader sent elsewhere to find out about them, which is unsatisfactory. Nesting survey methods, including the sampling design for surveys that are not complete, are not described at all. No description of the regression models is given, nor of the priors used for the Bayesian fitting. For the methods used in the stochastic extrapolation of the regressions, the reader is referred to an unpublished and unavailable document.

Here, as generally elsewhere, there is a naïve reliance on significance testing without any attempt to show that the sampling and the experiment have been designed in such a way that the results of significance tests will have appropriate meaning. In the context of an assessment of this kind, statistical significance tests are generally inappropriate, and a 'weight-of-evidence' approach is to be preferred, and is better provided by the Bayesian analyses.

It is not stated whether the loggerhead turtle is a synchronous periodic nester. From the nest-count figures it doesn't appear to be, and the analyses of nest-count data make little mention of correcting the mean squared error for the correlation of residuals that synchronous nesting induces.

The description of the methods for the stochastic extrapolation of the nest-count regressions is strikingly unclear. Considering that two pages of text are devoted to explaining the methods, the reader is left with very little idea of how the extrapolations were executed. If the same amount of space were to be assigned to describing in logical sequence the parameter estimates used and the algorithms applied to the stochastic extrapolation, it would be more profitable. The authors make much use of the word 'bootstrap', which is properly applied to the

re-sampling of data. It is not clear that they do not mean 'Monte Carlo simulation'; if they do mean 'bootstrap', it would be helpful to know what data are being re-sampled.

IN-WATER TRENDS AND SIZE DISTRIBUTION

Data: size data, and in some cases catch rates, from accidental (apparently live-) captures, including those in a power plant cooling system and several kinds of nearshore fishing gear, a nearshore trawl survey, and beach-cast dead or injured turtles; also some reference to a small, and somewhat sporadic, aerial survey in Chesapeake Bay.

Data and data collection methods are not described; fishery sampling in Pamlico Sound is not described (how many fishermen, sampling rate, etc.)

Methods: the use of catch, or catch rate, data is limited to plots against time. Sizes are plotted as frequency functions, dataset by dataset. The size range plotted is limited to 40–110 cm, whether by truncation or because turtles outside that range do not occur in the data is not quite clear.

Results: catch rates seem generally to have increased, in the power-plant data quite markedly, up to about 2004, but to have decreased from that peak in the most recent years. The length mode in the plotted range is 5–10 cm greater since about 2000 than before, accompanied by, and apparently not entirely owing to, a continued drop in the proportion of turtles shorter than 55 cm since 1994 to, presently, very low values.

Comments: data collection methods are inadequately described. The different data sets agree moderately well with one another, both as regards catch rates and size distributions. If relative vulnerabilities to capture remain constant over time changes in the length distribution in the captures should reflect corresponding changes in length distribution in the nearshore population. However, very little of the length data considered here relates to turtles of reproductive size, and the relationship of changes in size distribution of immature turtles to a drop in nest counts is not clear. Some attempt to link size to age by a growth curve would appear to be overdue.

'SPATIAL DISTRIBUTION' (MOVEMENTS, FROM TAGGING, AND SURVEYS)

Data: conventional (recovery) tags, limited to 3777 tags applied on the Atlantic coasts of North America and subsequently recovered; also tracks from 248 satellite-linked radio tags. For recovery tags, the tagging methods are not described, including the sampling designs and tagging opportunities: whether exclusively, mostly, or only partly nesting females, or what other tagging opportunities are taken or created and what proportion of tagging or recoveries they account for.

Satellite tags were put on juveniles and adult females mostly in Georgia and further north on the U.S. east coast, but on males mostly in Florida. For some reason, the document includes 2 pages of marginally relevant tabulations of the settings used to filter ARGOS locations, but little information on the tagging locations, the data transmitted by the tags, &c.

Assembled data from a number of different, mostly aerial, survey programmes is also used to describe seasonal distributions.

Results: tags are most often recovered in the region where they were applied, the few recovered elsewhere are usually recovered in adjacent regions. Satellite tracks showed that most turtles remain near shore (within the 200-m isobath), although juveniles ranged more widely offshore in what appears to be a well-defined plume east and somewhat north of the mid-Atlantic states. In winter, turtles are not found near shore north of C. Hatteras.

Survey data confirm that the coastal distribution in winter is restricted.

Comments: tagging data confirms that the identified populations are largely distinct.

There is some interest in how surface time varies with season; it would seem possible that tags might transmit water temperatures at the surface and perhaps at some other defined depths.

The use of survey data to describe distribution seems confounded by the limited coverage of the surveys, especially south of C. Hatteras. Survey sightings north of C. Hatteras conform less well to the distribution of survey effort and are more informative about the limits of turtle distribution.

The description in the document of how survey data can be used seems confused. The last paragraph of the survey section says: 'Differences in seasonal surfacing behaviour (sic: the authors intend 'Seasonal differences in surfacing behaviour') may bias (affect) density estimates'. However, density estimates are not used in this document, and if differences are only seasonal, the seasonal distributions should be unaffected. A more pertinent concern would be whether local or regional differences in water temperature (or other environmental variable) affect surfacing behaviour and therefore availability and the apparent distributions. It would seem likely that habitat use and behaviour do affect surfacing and therefore availability, which would also bias the appearances of distribution. The concentration on density estimates in this paragraph seems misplaced, seeing that they do not appear.

LIFE HISTORY

Data: (by inference) size data from unspecified sources; marking and tag-return data, as well as size data, from nesting beach monitoring; sex data for hatchlings from a number of regions; sex-

ratio data for ‘juveniles’ (undefined) from several sources (sampling methods not specified); sex and length data for beach-cast turtles, leading to sex-ratio estimates for a set of defined length classes.

Results: a size distribution from one near-shore capture data-set and statistical parameters of size distributions for supposed first-time nesters on several beaches are presented. (The size distribution of repeat nesters is not considered, and I would have expected it to be of at least some interest, if only for comparing with that of supposed first-time nesters.) Several pages later, these are used in some rules for classifying turtles by length, these classes then being used in analysing sex ratios.

Nesting-beach tagging results are used to distinguish (supposed) first-time nesters from (supposed) repeat nesters and to estimate survival rates for mature (i.e. nesting) females. It is not stated whether the survival rates are annual or per breeding period; in this section we also find that loggerheads do have a multi-year nesting cycle and four years is mentioned as a value supported by some of the data.

Comments: the initial discussion of life history stages is not justified at its start and in the end goes nowhere significant, and the only useful *definitions* of stages crop up several pages later. As far as I can make out, the stage definitions correspond to:

1. length less than 15 cm;

2. length over 15 cm, less than the mean length of stage 3, and not in stage 3; presumed not in stage 3 because living offshore;

3. susceptible to capture by the (unspecified) methods used nearshore by the NMFS in North Carolina;

4. larger than the mean of stage 3 and not in stage 3 or stage 5;

5. reproducing adults.

A significant, but unstated, assumption appears to be that the sampling methods used by NMFS in N. Carolina (N.C.) define, without sampling bias, the lower limb of the size distribution of neritic turtles, but that the upper limb of the N.C. size distribution is generated by sampling bias, and that there exist neritic juveniles that are not captured by these methods. However, the definition in the top line of Table 10 of these older juvenile stages as ‘oceanic or neritic’ raises questions as to whether the N.C. size distribution can be used to define a stage boundary. The existence of a well-defined left-hand limb for the size distribution in the N.C. nearshore data is not necessarily fully informative about the right-hand limb of the distribution of sizes of oceanic juveniles. This report refers to a conclusion, from an analysis of length data, that ‘recruitment to

the neritic stage is nearly complete by 59.5 cm SCL', but without saying what lengths were analysed or how the data were gathered. Such a conclusion would need to be supported by analysis of lengths of turtles caught offshore by unbiased methods.

The left-hand limb of the distribution of reproducing adults has been generated by the distribution of sizes of supposed first-time nesters; there is no reason not to use the size distribution of all nesters, repeats as well as first-timers, especially since first-time nesters are not reliably distinguished from repeat nesters.

The analysis of tag data by mark-recapture methods (again, not well described) probably needs some careful examination to ensure that the assumptions of the analysis methods are met in the data. Tag loss and failure to distinguish first-time nesters from repeat nesters might be significant problem factors. The survival estimates presented here are astoundingly low, if they are annual rates and not nesting-interval rates. Annual survival at 80% implies a life *expectancy* of 5 years, which for a marine turtle, a member of a group of supposedly long-lived species, seems unlikely. Table 10 shows 22 to 35 years to reach adulthood; adult life expectancy of 5 years after such a long-delayed maturity is *prima facie* inconsistent and unlikely. Such low survivals might be consistent with the rather low proportions of repeat nesters shown in Table 13, but these proportions might not be accurate.

Analysis of sex ratios, again, returns to a series of hypothesis tests for which, again, the motivation is that they are available. Sex ratios are analysed for a length range thought to be exclusively immature and for one, or two, thought to be exclusively adults; however, since these are only length classes, there is no reason not to look at sex ratios in the length range in between, which might be informative. As far as I could make out, the sex-ratio analyses have been carried out exclusively on a dataset of beach-cast carcasses, and therefore are ratios of deaths, not of the live population, and may not be unbiased estimates even of that, depending on sex-related differences in distribution, buoyancy, susceptibility to different hazards, and other factors. However, the various discussion paragraphs don't seem to hold that clearly in mind ('they may better represent the secondary sex ratios of turtle assemblages. . .'—p.90.) The length-specific sex composition of deaths will only reflect the sex ratio in the standing stock if death rate and stranding rate at that length are the same for both sexes. All turtles will die sooner or later, and if hatchlings are preponderantly female (cf. Table 14) then over the entire age range deaths will also be preponderantly female. *If* strandings are unbiased for sex, clues to a varying sex ratio with size in the live population are to be found not in the stranding sex ratio *per se*, but in its variations from the expected overall female preponderance. In connection with stranding sex ratios, the report uses the word 'bias' rather freely, but the authors appear to be referring to the overall

female preponderance rather than to length- (or area-, or season-) related *deviations* from this overall proportion, which is what 'bias' truly connotes.

It is a bit odd that this whole section is called 'Life History' but seems so much concerned with sex ratios and not at all with length composition. Surely an analysis of the distribution of lengths in the strandings would be of at least some interest?

DIRECTED TAKES

Data: data from a past Cuban fishery.

Results: the directed fishery in Cuba may have affected population status in the past but has been closed.

Comments: no data from directed fisheries in other jurisdictions.

BY-CATCH

Data, Analysis and Results: none.

Comments: it passes belief that a document calling itself an assessment of the species should state that loggerheads are by-caught in numerous fisheries, can list 15 documents dealing with by-catch, all produced in the present decade, and then cite not a single value from any of them. Not an order of magnitude, a general statement about which length classes are most affected—nothing.

RESEARCH NEEDS AND RECOMMENDATIONS.

This section starts by finding the data 'woefully inadequate' to determine the causes of the declines in nesting, but proposes no definite remedies. The assessment has not concentrated on the population-dynamics problem, any kind of synthetic model, or looked at the sensitivity of any conclusions to assumptions about the data or about its completeness or precision, and therefore is not well placed to make proposals. The reviews and analyses of the different kinds of data available have not identified which ones could contribute better to a population assessment, or how they would need to be improved in order to do so. Even where the report names a specific lacuna in the data—'the Florida researchers did not believe that they had intercepted a sufficient proportion of females to [estimate the proportion of first-time nesters]'—this section does not specifically recommend doing anything about it. The overall tone of these two pages is

‘Everything being done is valuable and useful, so let’s carry on doing it’, in spite of the leading statement that the available data is not giving the answers.

It appears that there are four major life-history events: egg-laying (nesting); hatching; recruitment from the oceanic juvenile stage to the neritic juvenile stage, and recruitment from the neritic juvenile stage to mature reproductive adults. The present attempt at an assessment is hampered by a lack of quantitative information particularly about the last two.

A short list of priority research topics might be:

1. Improve sampling design, effort, coverage, and techniques for tagging on nesting beaches to obtain statistically sound estimates of rate of recruitment to nesting-female populations, size of nesting-female populations, nesting longevity and survival of adult females, re-migration interval, and trans-migration frequency; investigate how re-nesting interval, nests per nesting year, eggs per nest, vary over time or are affected by other (individual, environmental or population) factors.

2. Develop programmes to monitor and estimate the rate of recruitment to the neritic juvenile stage.

3. Investigate, and if feasible inaugurate, a programme for collection of specimens and data from turtles by-caught in fisheries, including location, size, and sex.

4. SPO tag 65–75-cm turtles to follow their movements with a view to finding out why they become less available to the present nearshore monitoring methods when they exceed 80 cm in length; develop methods for monitoring the numbers of the entire neritic juvenile segment.

5. Given a defined offshore distribution of juveniles from satellite-linked radio-tag locations, assemble oceanographic data and analyse conditions in this area with a view to finding out what limits this distribution.

Appendix I. Bibliography of Materials Provided

Turtle Expert Working Group. In prep. An Assessment of the Loggerhead Turtle Population in the Northwestern Atlantic Ocean. *Submitted as* NOAA Technical Memorandum NMFS-SEFSC-xxx.

Appendix II. Statement of Work.

External Independent Peer Review by the Center for Independent Experts

Loggerhead Turtle Expert Working Group Report

TEWG Project Overview

The National Marine Fisheries Service's (NMFS) Southeast Fisheries Science Center (SEFSC) convened a Loggerhead Turtle Expert Working Group (TEWG) to assess the status of loggerhead turtles in the North Atlantic Ocean. Scientists from NMFS, NGOs, and academia with expertise in loggerhead biology and data analysis comprised this group. All members contributed their expertise to the group, with the goal of producing a draft report that assesses loggerhead status in the Atlantic.

The TEWG concept was established by the SEFSC at the behest of NMFS in 1995 to assess the status of turtle species in the Atlantic. Previous TEWG reports addressed loggerhead turtle status in 1998 (TEWG 1998) and 2000 (TEWG 2000). The current loggerhead TEWG was initiated to address the recent declines in loggerhead nest in the U.S. The TEWG met in December 2006, April 2007, and September 2007. The SEFSC has the lead for conducting stock assessments on Atlantic sea turtles, and assembled an international group of government scientists, academics, and NGOs to assess the status of loggerheads.

Overview of CIE Peer Review Process:

The Office of Science and Technology implements measures to strengthen the NMFS Science Quality Assurance Program (SQAP) to ensure the best available high quality science for fisheries management. For this reason, the NMFS Office of Science and Technology coordinates and manages a contract for obtaining external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of stock assessments and various scientific research projects. The primary objective of the CIE peer review is to provide an impartial review, evaluation, and recommendations in accordance to the Statement of Work (SoW), including the Terms of Reference (ToR) herein, to ensure the best available science is utilized for the National Marine Fisheries Service management decisions.

The NMFS Office of Science and Technology serves as the liaison with the NMFS Project Contact to establish the SoW which includes the expertise requirements, ToR, statement of tasks for the CIE reviewers, and description of deliverable milestones with dates. The CIE, comprised of a Coordination Team and Steering Committee, reviews the SoW to ensure it meets the CIE standards and selects the most qualified CIE reviewers according to the expertise requirements in the SoW. The CIE selection process also requires that CIE reviewers can conduct an impartial and unbiased peer review without the influence from government managers, the fishing industry, or any other interest group resulting in conflict of interest concerns. Each CIE reviewer is required by the CIE

selection process to complete a Lack of Conflict of Interest Statement ensuring no advocacy or funding concerns exist that may adversely affect the perception of impartiality of the CIE peer review. The CIE reviewers conduct the peer review, often participating as a member in a panel review or as a desk review, in accordance with the ToR producing a CIE independent peer review report as a deliverable. The Office of Science and Technology serves as the COTR for the CIE contract with the responsibilities to review and approve the deliverables for compliance with the SoW and ToR. When the deliverables are approved by the COTR, the Office of Science and Technology has the responsibility for the distribution of the CIE reports to the Project Contact.

Requirements for CIE Reviewers:

Three CIE reviewers are required to conduct a desk review (no travel is required) of a Loggerhead TEWG draft report (approximate length 120 pages), and each reviewer's duties shall occupy a maximum of 5 days to conduct the peer review and produce a CIE independent peer review report.

The CIE reviewers shall have expertise with current quantitative skill as it relates to an understanding of life histories and stock assessment of large, long-lived, highly migratory marine vertebrates. CIE reviewers shall expertise and experience with generating stock assessments in a data poor situation and in the use of count data as proxies for population size (e.g., number of nests for this report) and population growth rates. The CIE reviewers shall have the requested expertise necessary to complete an impartial peer review and produce the deliverables in accordance with the SoW and ToR herein.

Statement of Tasks for CIE Reviewers:

The CIE reviewers shall conduct an independent peer review of the TEWG loggerhead stock assessments to determine whether the best possible assessment was utilized through the TEWG process. The CIE reviewers shall conduct preparations prior to the peer review, conduct the peer review, and complete the deliverables in accordance with the ToR and deliverable dates as specified.

The reviewers shall evaluate the draft North Atlantic assessment report of the Loggerhead TEWG. Their primary responsibility is to conduct an impartial peer review to ensure that assessment results are based on sound science, and the CIE reviewers shall not comment on management decisions. The reviews shall consider whether the input data, assessment methods, and results are adequate and support the conclusions. If a reviewer finds the assessment to be deficient, then he/she shall recommend remedial measures, including an appropriate approach for correcting and subsequently reviewing the assessment. The evaluation shall explicitly address the following Terms of Reference.

Terms of Reference:

1. Evaluate the adequacy, appropriateness, and application of data used in the assessment.

2. Evaluate the general adequacy, appropriateness, and application of methods used in the assessment.

3. Evaluate the adequacy, appropriateness, and application of the methods used to assess population status and trends.

4. Review research recommendations provided in the report and make any additional recommendations warranted.

5. Prepare a Peer Review Report as described in Annex 1, summarizing the CIE Reviewer's evaluation of the Loggerhead TEWG report and addressing each Term of Reference, including a statement on whether the assessment was based on sound science, appropriate methods, and appropriate data, with a copy each sent to Dr. David Sampson at david.sampson@oregonstate.edu and Mr. Manoj Shivlani at shivlanim@bellsouth.net.

Schedule of Milestones and Deliverables:

27 March 2008	CIE shall provide the COTR with the CIE reviewer contact information, which shall then be sent to the Project Contact
11 April 2008	The Project Contact shall send the CIE Reviewers the Loggerhead TEWG report
25 April 2008	Each reviewer submit independent peer review report to CIE
8 May 2008	CIE shall submit draft CIE independent peer review reports to the COTRs
22 May 2008	CIE shall submit final CIE independent peer review reports to the COTRs
28 May 2008	The COTRs shall distribute the final CIE reports to the Project Contact

Background References:

Turtle Expert Working Group. 1998. An Assessment of the Kemp's Ridley (Lepidochelys kempii) and Loggerhead (Caretta caretta) Sea Turtle Populations in the Western North Atlantic. NOAA Technical Memorandum. NMFS-SEFSC-409, 96 p.

Turtle Expert Working Group. 2000. Assessment Update for the Kemp's Ridley (Lepidochelys kempii) and Loggerhead (Caretta caretta) Sea Turtle Populations in the Western North Atlantic. NOAA Technical Memorandum. NMFS-SEFSC-444, 115 p.

Acceptance of Deliverables:

Upon review and acceptance of the CIE reports by the CIE Coordinator and Steering Committees, CIE shall send via e-mail the CIE reports to the COTRs (William Michaels William.Michaels@noaa.gov and Stephen K. Brown Stephen.K.Brown@noaa.gov) at the NMFS Office of Science and Technology by the date in the Schedule of Milestones and Deliverables. The COTRs will review the CIE reports to ensure compliance with the SoW and ToR herein, and have the responsibility of approval and acceptance of the deliverables. Upon notification of acceptance, CIE shall send via e-mail the final CIE reports in *.PDF format to the COTRs. The COTRs at the Office of Science and Technology have the responsibility to distribute the final CIE reports to the Project Contacts.

Request for Changes:

Requests for changes shall be submitted to the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the Contractor within 10 working days after receipt of all required information of the decision on substitutions. The contract will be modified to reflect approved changes. The Terms of Reference (ToR) and list of pre-review documents herein may be updated without contract modification as long as the role and ability of the CIE reviewers to complete the SoW deliverable in accordance with the ToR are not adversely impacted.

Key Personnel:

Contracting Officer's Technical Representative (COTR):

William Michaels, COTR, NMFS Office of Science and Technology,
1315 East West Hwy, SSMC3, F/ST4, Silver Spring, MD 20910
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ANNEX 1

Format and Contents of CIE Independent Peer Review Report

1. The reviewer's report shall be prefaced with an executive summary of findings and/or recommendations.

2. The main body of the reviewer's report shall consist of a background, description of the review, summary of findings, and conclusions/recommendations. The summary of findings shall address each Term of Reference. Reviewers are also encouraged to provide any criticisms and suggestions for improvement of the TEWG process.

3. The reviewer's report shall include as separate appendices the bibliography of materials provided for the review of the Loggerhead TEWG draft report and a copy of the CIE Statement of Work.