

Final Peer Review Report for Status Review of the Humpback Whale (*Megaptera novaeangliae*) Under the Endangered Species Act

Comment #	p. #	Comment	Response
Comments on Executive Summary			
1	v	This is strange to say before a review of genetics and to even include such speculation. Who is on that committee?	The executive summary is necessarily brief, but the main body of the report provides much more information on this topic. Based on numerous comments related to the sub-species question, we have also modified the text in both body of report and the executive summary to better qualify the uncertainty surrounding possible sub-species. We provided a list of committee members as a footnote.
2	v	This sounds premature to me. Would it not be better to say something like "... on the assumption that at least three subspecies will eventually be described, named, and recognized."	We agree, and have revised draft provides a more nuanced view of the sub-species question.
3	v	Sub-species debates have been going on for quite some time. Most recently the NOAA-SWFSC has taken favor with sub-species definitions following on a 'journal club' and a pre-meeting workshop at the 2009 SMM meeting in Quebec City. One of the major problems with sub-species approaches is the arbitrary nature of such evaluations. This statement seems to be guided on a combination of biogeography, long-term movements and identity, and genetics. However the genetic differentiation of the Arabian Sea population from all other populations around the world (See Pomilla et al 2005; Pomilla et al-IWC report) is more significant than many other ocean basin comparisons and yet it is being grouped with the Southern Hemisphere humpbacks. Furthermore, it was at the 2002 IWC and in a taxonomic review by Brownell and Perrin that of all the humpback whale populations worldwide, the Arabian Sea population merited sub-specific status. The problem is how this information is uniformly and consistently applied, particularly as it relates to management decisions. I agree that there are divisions below the species level for humpbacks but whether those are DPS or sub-species.	The sub-species section was revised considerably to reflect this and other comments. In the revised draft, we focus more on the degree of divergence among whales from difference ocean basin and the possibility (only) that this divergence may be consistent with sub-species. The updated report also cites more recent literature on this topic.

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4	vi	For this analysis this is too vague a term and should be changed to mating areas. How well known are mating areas. While we know they mate in the tropics, is that the only part of their range this occurs?	We do not agree with this comment. Among other things, the unit to manage is a “population” not an “area”. The fact that specific mating areas are not all identified does not matter at this level. The existing text has been retained; however, a footnote has been inserted after the first mention of “breeding areas” to define the term as used in this document.
5	vi	This is a double-may phrase – makes no sense. Potentially means could and could means potentially so why use both?	We have corrected the text.
6	vi	Why not just Southeast Africa/Madagascar DPS to simplify?	We agree, and made this change.
7	vi	It would be good to clarify here if these are all ages or just mature.	We agree, and have edited to clarify.
8	vii	It would be good to clarify here if these are all ages or just mature.	We agree, and have edited to clarify.
9	vii	This whole statement is correct if at first DPS are defined correctly in a two step process. First, define the unit to conserve and then 2nd evaluate status, trend and probability to extinction (similar to IWC, no loss of distinct demographic unit). But what about other possible DPSs not fully considered. For example the B2 sub-population, genetically distinct (albeit low levels of genetic differentiation) and possibly containing only a few hundred animals.	The BRT's approach was to identify the best supported DPS configurations and evaluate extinction risk of each DPS identified. With only a few exceptions (e.g., West Pacific 2, Cape Verde Islands), the BRT was sufficiently confident in the DPS configurations that evaluation of additional, less supported configurations would not be considered useful.
10	vii	What about noise/ interference with communications? That might be added to climate change	Noise was considered and ranked as low but increasing threat.
11	vii	Why include this one reference in Ex. Sum. Delete?	We agree, and deleted the reference.
12	vii	This paragraph is about the NORTH Pacific subspecies, no? If so, should say so here.	Text was clarified.

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13	vii	Should be more specific From noise? Oil spills? Ship traff? or all of the above?	This is further explained in the body of the document.
14	vii	Whaling. Isn't this the same as "directed takes"? And where in the region are humpback whales whaled?	This is further explained in the body of the document.
15	vii	Moderately (or minor) reduce pop growth through combined effects or each individually? Need to define moderate in terms of effect on population growth... or perhaps PBR	Modified with "each" to clarify individually.
16	vii	The west coast of Africa has extensive oil and gas leases currently proposed and in operation. This is not highlighted at all and was discussed in the IUCN review of SH humpbacks and during the IWC reviews. I have to take complete exception with the fact that the review can find a concern off Western Australia from energy exploration for a population that was reviewed to be several times larger than the populations off west Africa. This is simply incorrect and erroneous. NB. This information was provided to the BRT via Jackson and Flemming report. See supporting Materials #1	We agree that oil and gas extraction is a potential threat and added text that acknowledges this.
17	vii	This seems irrelevant. Issue is whether there are threats where ever they are	We disagree; in this case the population faces increased risks due to its location in a relatively constrained geographic location.
18	vii	How about prey availability, given it is the only species that feeds in the subtropics which are generally less productive and subject to extensive fishing.	Prey availability was unknown, and this is stated later in the report.
19	vii	This is the Western Gray Whale of humpback whales and yet it isn't getting appropriate attention. We are in the process of trying to get a Conservation Management plan set in motion at IWC, but requires government interest and effort and support.	No change necessary.

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20	vii	Unclear. Does this mean the BRT worked “collectively” (which would be implicit and therefore unnecessary to say)? Or the BRT evaluated the collective array of threats facing each DPS? Or?	Removed "collectively".
21	viii	Past, present, or future?	Text was clarified.
22	viii	Needs more explanation. Just who and how many on the BTR and what are the boundaries of bins in terms of points?	This is further explained in the body of the document.
23	viii	Although I don't believe the subspecies question is as important as this report makes it out to be, I note that the decision to consider a three subspecies structure is not noted here.	We agree with the comment that the sub-species question is not likely to influence the DPS designations to any great degree, and have added a section on this in the body of the report.
24	viii	Does this mean then that there are some insignificant DPSs as well?	Removed significant.
25	viii	Variously referred to as Southeastern Pacific, Columbia/Ecuador, and other names throughout. Need to be consistent.	We agree, and have edited the document for consistency.
26	viii	If it's not “not at risk” or moderate risk, then it must be at high risks	We edited to report the percentage support for each of the three categories.
27	viii	This is not a score	This is correct, but no revision is necessary.
Comments on Chapter I			
28	1	Was that comprehensive evaluation this document? If so, should be “began a” and should make the connection more explicit. If not, is there a citation for the 2010 review?	Text was clarified per reviewer's suggestion.

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29	2	The evaluations of humpbacks in other fora such as IWC also strive to determine DPS and are documenting them within these basins. Whether these can be assessed in a rigorous way is another story. But they appear to exist and would potentially double the number of DPS identified by this Review.	As discussed in the report, a DPS has a specific interpretation under the ESA, as described in the joint USFWS-NMFS DPS Policy. Units identified by the IWC do not necessarily conform to this definition, which states that a population must be both 'discrete' and 'significant' in order to be considered a DPS. This issue is discussed at length in the report.
30	2	By whom?	We deemed it unnecessary to include these details here.
31	2	Also subspecies?	As noted in the report, the BRT concluded that it would be useful to evaluate the sub-species question.
32	2	Aren't BRTs supposed to make recommendations to the agency re listing?	The BRT was tasked with evaluating biological status and threats, not making a listing recommendation.
33	3	Understand that this is limited by ESA, but for some of the DPSs, the extent of current and emerging threats to limit recovery may need to be considered. Thus the risk of extinction may just be too high a bar.	We evaluated status with respect to the risk categories described in the report. We agree that understanding factors limiting recovery is also important information to consider, however, and edited the text to make this point.
34	3	For me, this is a missed opportunity. It would have been more work for the BRT, but this would have been an interesting and valuable exercise. It would have at least provided something to discuss or challenge below the 'risk of extinction' level. Do we know why the BRT was not asked?	The report has been edited to clearly state the charge to the BRT and the purpose of the report.
Comments on Chapter II			

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35	5	Why not assume no information on three subspecies and just review re DPS and leave subspecies question to later research. Does it make a difference if a DPS is a DPS of a species or subspecies?	We now describe the differentiation among ocean basins more clearly and discuss whether or not these differences might be consistent with sub-specific divergence. We added a section discussing whether the 'taxon' of reference (possible sub-species based on ocean basins versus the global species) makes any difference to identified DPS.
36	5	This seems more ad hoc than should fly for this review. What about the considerable debate about whether sub-species exist and whether one can reliably, consistently, and rigorously delimit subspecies? **See supporting materials #2	We do not think this report is the appropriate venue to present a detailed discussion regarding the nature or validity of sub-species. The BRT accepted the opinion of experts who have specifically reviewed this question and proceeded on that basis. However, we also edited the report to make it clear that we are primarily describing differentiation among ocean basins that may be consistent with potential sub-species.
37	6	It would be helpful if this figure included dots with labels for breeding grounds.	This figure has been deleted, as a subsequent figure shows the breeding grounds.
38	8	To be useful for identifying DPSs given policy guidance, this section should discuss what is known about where the whales mate. It is noted elsewhere that they mate on calving grounds, but it is not clear whether there is any information to suggest they may mate on feeding grounds or elsewhere. A definitive statement about such possibilities (i.e., there is no evidence they mate on feeding grounds or this is unknown) would be helpful.	We have edited this section for clarity per the reviewer's suggestions.
39	9	Sounds like a pretty safe upper limit but not very realistic.	No change necessary.
40	9	This is a strange section heading given previous headings	We modified heading.

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41	9	I think this overstates the singularity of the DR concentration (Silver and Navidad Banks) to the neglect of numerous other smaller concentrations in the Greater and Lesser Antilles and along the coast of Venezuela.	We revised the text to discuss the other areas.
42	10	Some mention of Roman and Palumbi seems warranted, even if the results/conclusions are disputed.	Roman and Palumbi's paper is important but does not deal directly with current trends, which is the section here; rather the debate surrounding this paper centers on the size of the North Atlantic humpback whale population prior (perhaps greatly prior) to whaling. We have added a reference to the issue, however, in the context of a new section related status to the recovery plan.
43	10	There is information on survival probability in Rosenbaum <i>et al.</i> 2002 Journal of Heredity on this matter as well. **See supporting materials #3	While Rosenbaum <i>et al.</i> (2002) has survival information, it is more of a model that we do not feel would add significantly to this section.
44	10	If so, why is only one of these provided in the paragraph?	Text has been clarified.
45	10	To be useful for the purpose of determining DPSs given the policy guidance, these genetic sections should discuss the extent to which there is a detectable genetic difference between the various populations. Where this has not yet been analyzed it should be so noted.	We agree, and have added this here and elsewhere in relevant sections of the document.
46	10	Has a "Gulf of Maine" population been introduced in this report yet?	Yes.
47	11	This sounds really strange to me. What are 'inland' waters, and might it not be significant that 'inland and coastal' waters are the areas most easily and often observed where feeding behavior can be documented?	Removed "inland "

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48	11	Not sure what is meant here by ‘territorial’ waters. Within 12nmi of shore? Also, saying that ‘more than half feed’ is hard to interpret – more than half spend some time, from a little to a lot, feeding in US territorial waters, or more than half of their aggregate annual nutrition is obtained in same, or??	Text was clarified.
49	11	I remain reluctant to be so strong about this point. There is lots of turnover, I’m told, in the animals on the DR banks through the winter, and lots of other areas where the whales sing, nurse etc. in the wider Caribbean region.	Text was clarified.
50	11	“Broad” in what sense? As in widely spaced from each other? Or large? Another general point is that using the term “breeding” loosely with migratory cetaceans is problematic. Conflating mating, calving, and nursing leads to confusion and muddle. Important these terms be clearly defined and used consistently.	Text was clarified.
51	11	Why this level of detail for SPLASH but not YONAH? Probably less for SPLASH is better?	We disagree, and believe the level of detail provided (a brief summary) for the SPLASH and YONAH projects is appropriate. Citations to both studies are provided for readers desiring a greater level of detail.
52	11	Measure of uncertainty	The 18,302 estimate was an average between feeding and breeding ground estimates, no measure of uncertainty was given in the original document.
53	12	Earlier “best” estimates were reported, so seems unnecessary to report the preliminary estimate, particularly given the lack of uncertainty.	The text simply attempts to summarize the current literature.
54	12	Perhaps worth saying something here re validity of the ratios even if the absolute numbers don’t quite line up with Barlow <i>et al.</i> ?	We agree, and have edited the text accordingly.
55	12	Is the Johnson and Wolman estimate credible?	Text was clarified.

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56	12	Logic here not clear. Why the “however”?	Removed "however".
57	13	While the Arabian Sea population likely has SH origin, it should not be lumped in with SH populations. It shows the greatest differentiation of any of the DPSs compared to one another. By this very nature, it actually ‘throws a wrench’ into why it would be considered the same sub-species in the Southern Hemisphere when it is extremely differentiated from all populations, even more than the other sub-species are to one another or at the same level. So by the logic applied, if you we are to go that route, it should be its own sub-species.	Text has been clarified.
58	13	Including the Arabian Sea in the introduction to Section I is confusing as the reader then expects the population to be discussed as part of this section rather than Section J.	Text has been clarified.
59	13	Lower level of detail regarding trends, in terms of time frame, citations etc, than for N. Pacific?	We do not feel that the somewhat greater detail for the North Pacific is unjustified given the scope and greater precision of the SPLASH estimate and the delisting petition focused specifically on these populations.
60	13	So the east Africa DPS was assessed at IWC as having one trend at this rate. Compare to humpback whales off the east coast of Madagascar (C3 breeding sub-stock, DPS) that potentially had a much reduced rate of recovery. See IWC 2009 or 2010. **See supporting materials #4	These general overview statements of the southern hemisphere populations have been deleted from this section, which now focuses only on population structure issues. Information available for the abundance and trends of each DPS is now discussed in the extinction risk section. The difference between a flat trend and an inability to measure a trend is now clarified.

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61	13	Not obvious what this means. Does it mean the Gabon and SE Pacific populations could be increasing, decreasing, stable – any of those? No evidence exists one way or the other? Whereas for Oceania there is sufficient evidence to say something and it indicates stability? I.e. I think it would be important to clarify the difference between non-availability of data and inability to discern.	These general overview statements of the southern hemisphere populations have been deleted from this section, which now focuses only on population structure issues. Information available for the abundance and trends of each DPS is now discussed in the extinction risk section. The difference between a flat trend and an inability to measure a trend is now clarified.
62	13	Overall, there is now increasing evidence that greater complexity in population structure exists within each of the SH oceanic populations. What implications does this have for DPS? This information is starting to come out and much of these points in the review were completed before 2011 (around 2010).	The information we are aware of is discussed in the DPS section. Per earlier comments, we have modified the text to more clearly describe information on available patterns of genetic differentiation, and compare these patterns in different parts of the species' range.
63	14	Overall, these sections do not take into account Rosenbaum et al 2009, PloS ONE which provides the most comprehensive and largest SH humpback whale genetic assessment and provides key evidence for DPSs within the oceanic regions. I know this is taken up later but the key results are not given adequate or correct assessment based on what the BRT has proposed as DPSs compared to what we have published, evaluated at IWC, etc...	We now cite and discuss the results of Rosenbaum <i>et al.</i> 2009.
64	14	Check reference. Possibly not published as this data has recently been submitted to Conservation Biology: Rosenbaum, HC., Maxwell, S., Kershaw, F. & Mate, B. “Quantifying broad scale movements and range-wide cumulative potential impacts for humpback whales in the South Atlantic Ocean.” For the purpose of the BRT and the NOAA technical report, this is the updated reference to Rosenbaum and Mate 2006	As far as we are aware, this paper has not yet been published.

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65	14	<p>Not sure about the wording here as all migrations would at some point have to occur in” Antarctic offshore waters”. Rather, there may be a migratory route that follows the coastline of Africa and one or more that occur in offshore African waters, for example, as whales move offshore to follow the Walvis Ridge as ~18°S. There is direct satellite telemetry evidence of this in the Rosenbaum <i>et al.</i> paper described in Comment I4. As such, this section should be expanded to reflect the length of the SWIO section on migration below. **See supporting materials #5</p>	<p>The offending clause was deleted in the final version.</p>
66	14	<p>This section for example insufficiently characterizes distribution and population structure that exists within the southeast Atlantic. The IWC SC has reviewed this information for approximately the last 5-7 years and has concluded that there is strong evidence for 2 breeding sub-stocks, and thus 2 DPSs in this region. To say that this “This section is organized by breeding ground stocks and is generally consistent with IWC management units for the Southern Hemisphere,” is misleading and doesn’t take into account the degree to which information exists and has been reviewed and verified. **See supporting materials #5--BUT IN PARTICULAR, The complexity that exists in the North Pacific Ocean and is becoming better understood may be similar in some ways to what we are seeing along the west coast of Africa. Certainly similar in some of the geographic extent and possible latitudinal separation of breeding stocks with associated feeding grounds. The available evidence we have points that way.</p>	<p>The BRT reviewed the available evidence for population structure in this area, including the latest information from the IWC. We disagree that "sub-stocks" would all necessarily meet the criteria described in the joint NMFS-FWS DPS policy.</p>

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67	15	This paragraph and migratory pathways are given too much weight based on a single publication where singing was detected. It does not take into account some of the more recent evidence for these populations that show connectivity and movements between migratory streams. Importantly, the concern is that for some areas, there was a reliance on older information that may be more familiar and not as strong a focus on assimilating new information.	Text was clarified.
68	15	Also, see Van Waerebeek, K. <i>et al.</i> “A newly discovered wintering ground of humpback whale on the Northwest African continental shelf exhibits a South Atlantic seasonality signature.” Paper SC/64/SH4 presented to the IWC scientific committee, Panama, 2012.	This information was not available to BRT to review and include in the report.
69	15	From this year’s IWC, evidence emerging that greater complexity for population structure than previously and traditionally thought. **See supporting materials #6	The BRT reviewed the available evidence for population structure.
70	15	Footnote to mark—recapture first time used several pages earlier instead?	Text has been clarified.
71	16	But what is meant here by the SW Atlantic? Is this estimate from photo-id data obtained mainly or entirely on the Brazil wintering grounds? Should make this clear.	Text has been clarified.
72	16	Would it not be just as likely that Brazil whales go to other parts of the Antarctic rather than staying N of 60?	Given the coverage of the surveys reported by Branch, we consider dispersal to other parts of the Antarctic to be unlikely.
73	16	See IWC 2012 (for report of SH 2011) for which abundance estimates were chosen and why. **See supporting materials #7	Comment is unclear; the section in question does not discuss abundance estimates.

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74	16	This is hard to comprehend. The numbers given apply to a 'portion' of a very large area. Would it not be helpful to readers if something were explained here about implications? For example, is it reasonable to conclude that 6000-8000 is about it for the entire region, or could there be twice, three times etc. that many? Or what?	This has been moved to the extinction risk section. The text has been modified to reflect that the population to which the estimates apply is somewhat uncertain due to some degree of substructure within the DPS.
75	16	Again, the reader is left to his own devices here. Should he see these numbers from the two different areas as corroborative, additive, or what? Also, whereas the method is given for the Cerchio estimates, none is indicated for the Findlay one.	Added Findley method. This whole topic has been moved to the extinction risk section, where the various estimates are now described in greater detail.
76	16	In my opinion and that of the IWC, these abundances represent two separate DPSs one along east Africa and one off Madagascar.	There is now some discussion of the differences among these areas. Based on the information available to the BRT, we do not believe these two sub-areas meet both criteria (discrete and significant) to be considered separate DPS.
77	16	See my point above about concern for Western Australia and energy development, especially when it is far more extensive off Western Africa.	The West Africa section was modified per the reviewer's comment; the BRT saw no need to modify the Western Australia section.
78	17	Similar clarity is needed for the Africa estimates above.	Comment not clear.
79	17	Method?	The number was right but citation was incorrect; has now been published as Felix <i>et al.</i> 2011 - have made correction in text.
80	17	Annual rates?	Yes.

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81	17	This trend only applies to one of the potential sub-stocks C1 which could be a DPS. This is a problem with this report that I am continually pointing out. By going to the 15 DPS, it is very easy to apply apples to oranges. There are many holes with other DPSs in terms of available data, but by 'lumping', one gets the appearance that certain data (especially trend which is important) could apply across the whole SW Indian Ocean for example.	This section has been moved into the extinction risk section, where the limitations of the trend inferences are more fully discussed.
82	17	Some general statement the first time trend data is noted about maximum plausible rate would be good, rather than note it within individual sections	This is done on page 10 in Chapter II section F.
83	18	I guess this answers my question, above.	No response necessary.
84	18	Are there older trends? Some of the other trends discussed are from ~20 years ago.	This section has been moved to the extinction risk section where it is treated in more detail.
85	18	There is also nuclear genetic information available for some sub-stocks and potential DPS.	This section has been revised to focus more on genetic differentiation among populations.
86	18	And northern hemisphere populations? But looking at the number of haplotypes listed in sections below doesn't seem like it is all that much more diverse?	Deleted S. Hemisphere.
87	18	The Breeding Stock B1/B2 substructure should be at least referred to here even if it is not considered as two DPSs. Two hypotheses currently stand: i) A single population with a wide ranging distribution that displays temporal heterogeneity in migration giving the genetic signal of two subpopulations; or ii) the existence of two genetically distinct subpopulations resulting from different breeding grounds (breeding ground for B2 not yet identified but assumed to lie further north of Gabon (see Van Waerebeek, K. <i>et al.</i> IWC paper in comment I4).	This structure is now explicitly discussed.

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88	18	I presume the number of haplotypes is at least somewhat influenced by sample size, so it seems like reporting sample size in each case would be warranted. 65 haplotypes from 70 samples would tell you something very different than 65 haplotypes from 500 samples....	Sample size has been added.
89	18	More recent evidence of connectivity between these populations is available. **See supporting materials #8	It is not clear from the comment which populations are referred to.
90	18	So, can the same thing not be said about this stock as was said above about the Brazil stock? Genetically diverse?	This section has been revised to focus more on levels of genetic diversity among populations as this is most relevant to determining discreteness.
91	18	I'm sure these comparisons of genetic diversity in the different stocks are important for assessment and conservation decision making, but how and why aren't obvious to the average non-geneticist. The details given here are proportionally greater than those given for the abundance estimates, but without some coaching, I don't see how most readers will be able to interpret and apply this stuff.	This section has been revised to focus more on levels of genetic diversity among populations as this is most relevant to determining discreteness.
92	19	This implies East Australia is part of Oceania?	Removed "other".
93	19	Symbol use is not consistent	Corrected text.
94	19	and therefore...	Text was clarified.
95	19	If Arabian Sea is treated separately from Southern Hemisphere populations then it should not be mentioned in the intro to the section above.	Text was clarified.
96	20	The Arabian Sea is in the northern hemisphere. If they are in the Gulf of Aden presumably they could go through the Suez? Also with animals off Sri Lanka it seems like eastern movements to connect with the western North Pacific are possible.	Text was clarified.

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97	20	Has there been a comparison with far western North Pacific samples collected during SPLASH? Either way this should be stated.	Added text to this section.
98	20	I think this is an important point that needs to be kept in mind. Not that this population isn't in big trouble, or that it's not sufficiently discrete to be classified and managed separately. What worries me is the degree to which this estimate is negatively biased, and how that could affect things down the road if/when it is "discovered" that there are quite a few more animals in the population. Recent examples are NA right whales and western Pacific gray whales.	We understand the reviewer's point, but believe the level of detail is sufficient as it stands. If new information becomes available, it can be considered at that time.
99	20	I keep reading this over and over again, trying to divine the take-home message of the entire paragraph. No luck. Once more, the lack of some kind of interpretive guidance as to what all the 'facts' mean, or even might mean, makes me wonder what the point of this document is. If just to compile facts and leave all interpretation to some other process, then I suppose that's 'ok'. But....	Text was clarified.
100	20	Perhaps it is because I don't study humpbacks but I find it strange that this comparison is "among all southern hemisphere breeding grounds" given that this population is in the northern hemisphere and is thought to be non-migratory (i.e., different from all S. hemisphere, and for that matter, northern hemisphere populations). At the least the genetic diversity should be compared to both N. and S. hemisphere populations	Removed S. Hemisphere.
101	20	Report haplotype diversity stats	Text was revised to add this information.
102	21	This is the most critical point and why I raise the point about consistency above. If anything that would merit sub-species (if we think to use this designation), then this would be one. Compare this level of differentiation with other SH populations to those that exist between NA, NP, and SH	We have revised the sub-species discussion. We also clarify that the Arabian Sea population is a DPS under any global taxonomic scenario.

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103	23	This issue is not adequately described. First, additional explanation is needed as to why it makes a difference for determining a DPS if one considers humpbacks to be a single species with not subspecies vs several subspecies. In all cases the main rational for DPS findings is that their loss would represent a significant range reduction. In what case might one of these 15 DPSs not qualified as such if there were no subspecies. Second I do not believe the BRT and listing process is the appropriate place to make decisions about whether there are multiple unnamed subspecies. If the current scientific consensus and literature do not recognize subspecies, this group should not step in to express its view. Third, if there were multiple sub-species, what does that mean in terms of how the species would be listed? Would the ESA list have to note DPSs under three unnamed subspecies that have not been recognized in the scientific literature? That seems like a bad precedent.	We have revised this whole section to deemphasize the importance of identifying sub-species. Rather, we have noted that the differentiation among ocean basis is substantial (possibly to the level of sub-species) and therefore focus largely on whether there are any DPS within ocean basins. We have also added a discussion of whether any or all so-identified DPS are also DPS when considered with reference to the global taxon.
104	23	I think most taxonomists would agree that subspecies don't 'exist' – they are a construct that is used to sort variability (yes, species are too, but obviously the scale is different). My suggestion would be to change the wording here to say something like: Although in recent decades no subspecies of humpback whales have been recognized, it is relevant to consider whether such recognition is likely in the near future.	We agree, and have edited the text along these lines.
105	23	Line spacing changes	Corrected text.
106	23	Again, I think this phrasing misleads, implying that a subspecies is other than just a classificatory construct.	Text has been clarified.
107	23	Again, I think this phrasing misleads, implying that a subspecies is other than just a classificatory construct.	We agree, and have edited the text accordingly.

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Comment #	p. #	Comment	Response
108	24	It is not a taxonomic committee; it's just a committee on taxonomy.	We agree, and have edited the text accordingly.
109	24	See above comment. Until the best information (meaning published information and not the opinion of any particular group of experts) has determined there are multiple species, it should be assumed to be one species with no subspecies..	In response to this and similar comments, we have extensively revised the section on sub-species and also conclude that the DPS identified are, for the most part, not very sensitive to the sub-species designations. We also note that several sub-species of humpback whale have now been proposed in the scientific literature.
110	24	Herein lies the problem with subspecies.....it is very subjective process between populations (for which significant differences can be measured) and species (for which objective measures to delineate units exist under certain species definitions. I think the BRT did the most reasonable process to look at sub-species, but the broader question is should they have? What value does it add?	We have significantly revised the discussion of potential sub-species to address this and other similar comments.
111	24	Whoa. Assuming, as implied, that "this opinion" refers to the numbers just cited, does it mean the BRT consists of "noted experts on cetacean taxonomy"? I don't think that was the intention, but the syntax certainly points in that direction.	Text was clarified.
112	24	I guess I should give up on this – I know I'll be overruled.	See comments on sub-species above.
113	25	Inconsistent approach to 3 vs 4 subspecies	Text has been clarified.
114	25	This phenomenon occurs in the eastern South Atlantic regularly, and is noted in our publications.	Removed "eastern Pacific".
115	25	But those "current studies" have been very limited.	We don't agree that the studies concerned have been so limited as to leave open the possibility that the Cape Verdes hosts a large number of unobserved whales. It is clear from several surveys of various islands in this group that the density of humpbacks there is low.

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Comment #	p. #	Comment	Response
116	25	Jann <i>et al.</i> (2003) provide direct (photographic) evidence linking Cape Verdes with Iceland and it should be cited here.	Citations were added.
117	25	Not clear why no mention is made of the evidence discussed by Reeves, Clapham and Wetmore (2002) and more extensively by Charif <i>et al.</i> (Mar Mamm Sci 17:751-68).	Added citations to text.
118	25	What is the basis for considering this a region separate from other parts of the Eastern (Norway) population since they both are said to go to Eastern NA calving areas? Consider deleting the reference to a central NA region?	As noted in the text, the basis for these divisions lies in genetic differences among whales from these three regions (Larsen <i>et al.</i> 1996). Larsen, A. H., J. Sigurjónsson, N. Øien, G. Vikingsson, and P. J. Palsbøll. 1996. Population genetic analysis of mitochondrial and nuclear genetic loci in skin biopsies collected from central and northeastern North Atlantic humpback whales (<i>Megaptera novaeangliae</i>): population identity and migratory destinations. Proceedings of the Royal Society of London Part B, 263:1611-1618.
119	25	Again, I worry about what this means – mating, calving, nursing, two or all three?	Text was clarified.
120	25	Does this include Iceland?	Yes, based references cited earlier in the report.
121	26	I don't think this makes any sense, if, as stated earlier, the 'breeding unit' is the relevant unit for present purposes.	Amended the text by replacing "when lumped together" with "which include..."
122	26	I agree with this although I also think it would be only fair to acknowledge the strong asymmetry in sample size between the two areas.	Text was revised to add this information.
123	26	Evidence for this? Certainly larger than seems to be present nowadays, but large is a relative and imprecise term.	Text was clarified.

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Comment #	p. #	Comment	Response
124	26	I just don't get this. The Cape Verdes are "near Northwest Africa" (of course this depends on the meaning of "near" (see "large," above)). I'm concerned about that lack of any whaling or other evidence for such an area elsewhere in the region. It's hard for me to imagine, given that the American whalers managed to find the so-called Cintra Bay right whale ground, that they would not also have found any concentration of "breeding" humpbacks that was of appreciable scale etc.	The reviewer's contention that American whalers would have found a large concentration of humpback whales if one existed ignores two things. First, the hunting of humpback whales ("humpbacking") by Yankee whalers was a secondary aspect of the industry, which was primarily interested in sperm whales and balaenids; humpbacks were generally a lot less valuable in terms of oil and baleen and thus were the focus of a subset of whalers who typically operated for only a year or so in the North Atlantic (rather than the multi-year voyages of, say, sperm whalers). Thus, there was not much incentive for most whalers to make a search for humpbacks a principal focus of a voyage. Second, there are examples of whalers possibly "missing" what might have been significant concentrations of animals elsewhere (e.g. humpbacks on Silver Bank, and perhaps right whales in the Bay of Fundy).
125	26	Some reference to the Johnston <i>et al.</i> 2007 Endangered Species Research paper and the Lammers <i>et al.</i> 2011 MEPS paper seems appropriate, given that Lammers et al actually proposed the NWHI may be this additional breeding area	The text was edited to add these references.
126	27	How does this differ at the species and subspecies levels? That is if they are different at a subspecies level, would they not also be different at a species level. If so the discussion above about whether and how many subspecies there are seem irrelevant and distracting could be deleted	The section on sub-species was significantly revised to deal with this and similar comments.
127	27	Uniqueness does not have degrees. A signature is either unique or it is not. Need to rephrase to say what is meant here.	Text was clarified.

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Comment #	p. #	Comment	Response
128	27	From each other and from all other populations – I think this needs to be said explicitly if true.	Text was clarified.
129	27	This doesn't seem to make sense. What is the basis for believing Ogasawara whales simply pass through the area? Also, the Ogasawara Islands are some 1000 mi due east of Okinawa and seem unlikely to be on the same migratory path. Both Ogasawara and Okinawa could be on a migratory path to the Philippines but if the genetics say Ogasawara whales are genetically distinct from the Philippines/Okinawa whales, why is it considered Ogasawara whales why are part of that stock?	Text was revised to explain more fully.
130	29	So when complexity is evaluated and exists based on genetic and demographic evidence, DPSs were found to exist for the North Pacific. Based on available evidence, there should be several more DPSs for SH populations.	We disagree with this comment. In both the NP and the SH, we lumped proximate breeding locations with no strong genetic differentiation or other evidence of discreteness into common DPS.
131	29	See previous comment. Further explanation needed as to why this area might only be part of a migratory route rather than a destination	Text was revised to add this information.
132	29	This section does not sufficiently summarize available genetic differentiation which is essential for DPS delineation. The differentiation results contained in Rosenbaum <i>et al.</i> 2009 and Olavarria <i>et al.</i> are essential for DPS evaluation and could significantly inform DPS (and have significantly informed IWC Stock Assessments).	We revised to focus more on genetic differentiation and cite these references.
133	29	Is this word appropriate here? Not sure, seems a little prejudgmental.	Removed "discrete".
134	29	I understand why this is written as it is but don't think it's necessary and could confuse some readers.	We agree, and have edited the text accordingly.

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Comment #	p. #	Comment	Response
135	30	Is this figure correct? Seems to show feeding areas, not breeding areas? Some reference to the A/B, B/C areas of overlap should be noted in the caption	We agree with the comment, and have replaced with figure 1 reproduced from IWC 2011, which shows the IWC hypothesized stock structure with breeding and feeding locations.
136	30	For consistency, the scores for this conclusion should be provided. Being able to compare scores between regions also helps with interpreting those other scores	Text was clarified.
137	30	So this makes it sound like “breeding” here means something specific, probably mating per se (independently of calving and nursing).	Text was clarified.
138	30	Isn't the Great Barrier Reef part of eastern Australia? Why this distinction?	Text was clarified.
139	30	Again, why no votes? Was everyone willing to provide all 100 votes in this one scheme? Hard to believe some would not have put at least a few points in other breakdown options. Knowing the degree of certainty on the BRT is important.	The BRT made some decisions by consensus, as noted in the report. The structured decision making process, particularly for population structure issues, was only employed when the BRT concluded that there was substantial uncertainty.
140	30	This is the justification for Section J above. So need to amend the introduction to Section I.	Text was clarified.
141	30	score?	The BRT made some decisions by consensus, as noted in the report. The structured decision making process, particularly for population structure issues, was only employed when the BRT concluded that there was substantial uncertainty.
142	30	This is a strange construction, comparing a population to “other ... grounds.” Oranges and grapefruit?	Text has been clarified.

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Comment #	p. #	Comment	Response
143	30	But this isn't one	Text has been clarified.
144	31	But connections to the western Pacific seem quite plausible given “Arabian Sea” animals around Sri Lanka?	It is a long way and many degrees of longitude from the Arabian Sea to the western North Pacific; and it is not clear if the humpbacks occasionally found around Sri Lanka have any connection to the Arabian Sea. While we do not preclude the possibility of a connection with the North Pacific, based on current evidence this cannot be more than speculation.
145	31	Yes but sample size for the Philippines, the population with the highest likelihood of interchange, is small	Text was revised to add this information.
146	31	Names could be simplified	Text has been clarified.
147	31	Since this was already covered just a paragraph or two above, I think you can delete this	Agree; text has been clarified.
148	31	For the humpback populations assessed to date and where there is sub-structure, this list does not reflect what has been found by the IWC.	We discuss the relationship between the DPS we identify and the IWC population structure.
149	31	Perhaps add parenthetical re Arabian Sea.	Text has been clarified.
150	31	Since you were so careful above not to lump the Arabian population in the “Southern Hemisphere Group” why do it here?	Text has been clarified.

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Comment #	p. #	Comment	Response
151	32	Note: this is an expansion of the policy criterion 2 which is any significant gap in its range. While I appreciate both feeding and breeding areas were considered, I don't know that you need to separate them here. What about the migratory corridor. Is it possible whales mate during migration? Are not migratory corridors a significant part of their range? Clearly treats along migratory corridors are a concern. I would combine them as in the policy statement but leave your discussion of this criteria as it is with an explanation why migratory corridors were not considered when evaluating this criterion.	In the revised text we clarified that we were simply applying the existing 'gap in the range' criteria; the breakdown between feeding and breeding ranges was purely for convenience of discussion and should be considered an expansion of the policy.
152	32	I am not convinced this term belongs in the mainstream of mysticete biology. It seems to me that the features discussed below fall comfortably under the terms behavior and ecology and therefore the diversity of behavior and ecology is what should be at issue here, rather than something ill-defined and not readily understood (and that provides a better "fit" to the significance criteria as they are given.	Text was clarified.
153	32	This is not in the Southern Hemisphere and there are other populations that eat fish. It is however the only population living entirely in the tropics and is therefore unique.	We agree, and have edited the text accordingly.
154	33	score?	The BRT made some decisions by consensus, as noted in the report. The structured decision making process, particularly for population structure issues, was only employed when the BRT concluded that there was substantial uncertainty.
155	33	So now they have 'risen' from proposed to putative. Is this the right place to be advancing this subspecies cause? I think not.	The entire sub-species section has been revised, and terminology regarding the possibility that whales from different ocean basins could be considered different sub-species has been made consistent throughout the report.

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Comment #	p. #	Comment	Response
156	33	'where documented geographic overlap between hemisphere populations occurs' NB—it may also occur among populations of humpback whales in the eastern South Atlantic.	We are unaware of any solid evidence documented.
157	33	I find this reasoning bizarre.	Text was clarified.
158	33	There we are. Now the subspecies are no longer qualified by an adjective!	The entire sub-species section has been revised, and terminology regarding the possibility that whales from different ocean basins could be considered different sub-species has been made consistent throughout the report.
159	33	This would be true even if there were no subspecies.	The entire sub-species section has been revised, and terminology regarding the possibility that whales from different ocean basins could be considered different sub-species has been made consistent throughout the report.
160	33	Again, bizarre wording as here we have population segments constituting portions of feeding range. One is whales and the other is acreage.	Text was clarified.
161	33	Yes, there is some overlap. But there also appears to be some uncertainty about the total feeding range of CVI animals, so you cannot say this so conclusively and unreservedly.	Agree; text has been clarified.

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Comment #	p. #	Comment	Response
162	33	I would suggest noting that the Cape Verde Islands (and perhaps also the Central American) population are also significant because there is some evidence that these areas are the only areas identified to date that may be use by individuals from both the N & S Hemisphere and thus are among the few areas were there might be an opportunity for genetic exchanges between the Hemispheres.. the Missing western North pacific calving grounds might be another given the NP genetic signal in the SE Pacific population.	The Pacific coast of Central America is known from photo-id matches to host humpbacks from both Northern and Southern Hemisphere populations, so the first point here is correct with regard to that area, although such a statement probably belongs elsewhere in the document rather than here. There is no direct evidence that the Cape Verde Islands host austral whales (the reviewer refers to a match between the CVI and the Antarctic Peninsula – this is wrong, and perhaps s/he is confusing this with matches between the Peninsula and the Pacific coast of Central America). Finally, the reviewer’s idea about the “missing” North Pacific breeding area is completely speculative.
163	33	Do they constitute “most” of the feeding whales in that part of the range?	Text has been clarified.
164	33	If it is the majority of the individuals that count, do not the eastern North Atlantic “breeding” populations make up the majority of whales feeding in the northern parts of the eastern North Atlantic?	Text was clarified.
165	33	But don’t these breeding groups constitute a majority of the whales feeding from Vancouver south?	Yes, but the text was referring to significance with regard to each other, not HI or WP. Section was edited for clarity.
166	33	Elsewhere it was the majority of whales on a feeding ground that determined whether a group was significant	Text was clarified.
167	34	Again what degree of overlap is required to make a DPS finding?	The BRT did not attempt to quantify this criterion, but rather considered this factor, along with others, in making a qualitative assessment of whether the whales utilized different feeding areas.

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Comment #	p. #	Comment	Response
168	34	So, to many readers, and probably users, this will be plucked out of context and suddenly there will be literature referring to ‘the Arabian Sea subspecies’. Sorry, but that’s the most parsimonious interpretation of this sentence as is, if lifted out of context.	Text has been clarified.
169	34	Yes, this terminology makes more sense than the alternative which would follow from the earlier phraseology – e.g. “unique cultural features”?	No response necessary.
170	34	score?	The BRT made some decisions by consensus, as noted in the report. The structured decision making process, particularly for population structure issues, was only employed when the BRT concluded that there was substantial uncertainty.
171	34	Which might, might it not, call into question the subspecies split that has now become a fait accompli? In which case this argument gets circular, or specious.	The entire sub-species section has been revised, and terminology regarding the possibility that whales from different ocean basins could be considered different sub-species has been made consistent throughout the report.
172	34	What about photo matches between the Cape Verde Islands and the Antarctic Peninsula? Does that not also indicate a potential for genetic exchange between the N/S Hemispheres and make that portion of its range ecologically unique?	The Pacific coast of Central America is known from photo-id matches to host humpbacks from both Northern and Southern Hemisphere populations, so the first point here is correct with regard to that area, although such a statement probably belongs elsewhere in the document rather than here. There is no direct evidence that the Cape Verde Islands host austral whales (the reviewer refers to a match between the CVI and the Antarctic Peninsula – this is wrong, and perhaps s/he is confusing this with matches between the Peninsula and the Pacific coast of Central America). Finally, the reviewer’s idea about the “missing” North Pacific breeding area is speculative.

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Comment #	p. #	Comment	Response
173	34	I'm afraid that using this logic, and perhaps influenced by a bias of BRT individuals that aren't familiar with geographies around Africa, that additional DPSs in Breeding Stock B and C have not been sufficiently considered. This may also be the case for other areas that are now starting to examine population subdivision after completing single, broad comprehensive assessments. This may not be in the BRTs remit to 'open up' debate to some of the most recent IWCs or publications for 2012.	We disagree. Most SH populations have very modest levels of genetic divergence from each other, the one exception being SEP.
174	36	This is a key table and would be much easier to interpret if the no columns were deleted. All that counts are the yeses and if they are not yes, the reader will figure out it's also a "no"	Added a new table that shows pairwise comparisons among populations.
175	36	I think this is wrongheaded.	Not clear what s/he feels is wrong.
176	36	disagree	Not clear what s/he feels is wrong.
177	36	This very much upweighs the differences from the SE Pacific and Arabian Sea, and downgrades all the other oceanic differences (and sub-population structure detected)	The footnote was actually not really reflective of how the BRT considered genetic data. We have revised to make it clear that the BRT considered all available genetic data in evaluating DPS structure.
178	37	I think there has been a bias in BRT knowledge and/or review of material. 8 of the 15 DPSs come from either the NP or SP (Pacific Ocean). For the S. Atlantic and Indian Ocean, a total of 4 DPSs exist, but this does not fully consider the information previously published or summarized by the IWC.	The BRT reviewed the information available, and believes its DPS conclusions are reasonable.
179	37	Show overlap between DPS 4 and 11	Done.
180	38	And also because of possible overlap and genetic exchange between N & S Hemisphere whales?	We disagree; to our knowledge there is no evidence of this.

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Comment #	p. #	Comment	Response
181	39	Since this includes the Northwestern Hawaiian Islands, yet all the studies to date focus within the main Hawaiian Islands, it would probably be good to specify main Hawaiian Islands, particularly given the NWHI could be the missing western Pacific DPS	Text was clarified.
182	40	As noted above, the basis believing this is a mixed in with the Okinawa/Philippines does not seem well supported and seems to me to be more likely part of the second western breeding group based on geography and genetics.	Text was clarified.
183	42	And possibly further north...sat tag evidence of whales continuing past Ghana (Rosenbaum <i>et al.</i> submitted to ConBio), and see Van Waerebeek, K. <i>et al.</i> “A newly discovered wintering ground of humpback whale on the Northwest African continental shelf exhibits a South Atlantic seasonality signature.” Paper SC/64/SH4 presented to the IWC scientific committee, Panama, 2012. The fact that the entire breeding distribution has not yet been determined for this population might be relevant in terms of the uncertainty of the status of this population.	Text was revised to add this information.
184	42	~18°S is where some whales diverge from the African coastline during the southern migration, but uncertain that they actually begin to feed at this latitude. Satellite telemetry evidence suggests that whales still continue direct migratory south to the more productive regions of the Southern Ocean Convergence Zone (inc. Bouvet Island) (Rosenbaum <i>et al.</i> , submitted to ConBio).	This paper was not available to the BRT at the time of the review.
185	42	By this logic C1 and C3 are considerably differentiated, lack of matches—similar to that suggested for other areas of NP.	The degree of genetic divergence appears to be much lower among these areas than among the areas we have identified as DPS, however.

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Comment #	p. #	Comment	Response
186	43	Longitude scale shifted ~45 degrees E! Show overlap between 4 and 11 – listed as Columbia and Ecuador but doesn't even include Columbia on map	The maps are only intended to illustrate rough locations of the DPS breeding locations.
187	48	This is a well-written section, fair to the facts etc. However, the logic of this concluding sentence is pretty strange. Taken out of context, it would lead the naïve reader to conclude that when the science is challenging, our policy is to err on the side of non-precaution. I do think a case could be made that the evidence for healthy, growing populations of humpbacks in nearly all regions where monitoring has been sufficient to assess trends provides a good basis for a provisional conclusion that contaminants are not having significant negative population effects. I also think though that the last clause – ‘except where unknown’ – completely undermines the message of the sentence, and it would be better if it were deleted.	Text was clarified.
Comments on Chapter III			
188	48	What about pipelines? And what is a spill from a ‘rig’? Is that how one would characterize Deepwater Horizon?	Text was clarified.
189	48	And gas?	Text has been clarified.
190	49	Characteristics that are relevant include much more than just ‘age’!	Text was clarified.
191	49	This terminology is bizarre. It is not ‘stranding events’ that are the concern but rather the mortality of the animals.	Text was clarified.
192	49	The West Indies population probably was NOT ‘significantly impacted’ by the 1987-88 or 2003 HAB-related UMEs, judging by the uninterrupted pattern of population increase.	Text was clarified.
193	49	Faulty logic	Comment unclear.

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Comment #	p. #	Comment	Response
194	50	I was not aware that Norway ‘acquired’ such a permit. Actually, as Mike Gosliner can attest, ‘acquire’ is the wrong word entirely, since the countries essentially issue the permits to themselves. They are not conferred by the IWC as implied here. Also, use of the term ‘originally’, especially so soon after reference to the 1946 convention, will be misinterpreted by some. The United States and other nations have used this ‘loophole’ in the past – e.g. to take gray whales (US), North Pacific right whales (Russia and Japan).	Text has been clarified.
195	50	This reference is now nearly 10 years old and things have changed, such that at least there is now a formal mechanism in place for SC review of permit proposals and results. Admittedly, that’s not regulation, but one does need to wonder how ‘regulation’ and quota-setting would be accomplished for ‘research whaling’ – I think this sentence is disingenuous and has no place in the review.	This is a matter of opinion.
196	50	Those ‘meetings’ are ‘completed’. See IWC Ann Rep 2011, p7 (agenda item 4.2).	Text was clarified.
197	50	What does this have to do with scientific whaling? It’s a non-sequitur.	Text has been clarified.
198	51	This worries me, since the source cited (Reeves 2002) says nothing whatsoever about a block quota of 20 whales over a 5-yr period. I looked carefully!	Removed erroneous reference and corrected.
199	51	I suspect the Europeans introduced themselves, but never mind.	Text has been clarified.
200	51	These would be Greenland, St Vincent and the Grenadines, and ???? I think the honest term would be exactly two.	Text was clarified.
201	51	Poaching is, by definition, illegal.	Text has been clarified.

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Comment #	p. #	Comment	Response
202	51	These are strong accusations to be making without citing credible references. Is there any evidence that humpback meat found in markets in Korea and Japan came from anything other than ‘bycatch’?	Agree, and language has been clarified.
203	52	And satellite tagging, which is invasive	Added satellite tagging.
204	53	If undocumented, how do you know they occur?	Text has been clarified.
205	54	This would seem self-evident since most populations have been increasing steadily for decades now.	Text was clarified.
206	54	This statement begs for a reference to support it.	A reference was added.
207	54	Again, this needs more support. Are the whales feeding in these southern areas? Right whales die in fishing nets off the SE US but that doesn’t mean they are feeding there. Humpback whales ‘overlap’ with fisheries in many parts of their range – unclear why this southern area would be singled out for attention here.	Was discussed as a threat in part due to the smaller size of this population.
208	55	Need to include reference for dB (e.g., re: 1 microPascal) to clarify whether this is in reference to air or water	The sentence was incorrect and has been deleted.
209	56	More likely to be “most” rather than “many”, given the likelihood of strandings (<10% even for coastal populations) and even smaller likelihood of a detailed enough examination to confirm/rule out ship strike. Should be “the vast majority likely go undetected or unreported”. Could cite the Williams <i>et al.</i> 2011 Conservation Letters publication in support. Antonelis <i>et al.</i> 2007 noted that several hundred humpback whales likely die in Hawaiian waters each year yet only one or two strandings are documented (17 th Biennial Conference abstracts).	Added the citation.

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Comment #	p. #	Comment	Response
210	56	Has there been a comparison of strandings from ship strikes versus reports in these countries? I suspect compliance is low and this is worth noting.	We don't know of any such comparison. Making note of low compliance without supporting evidence would not be appropriate.
211	56	Laist et al is the source of the 10 of 123 whales finding and that refers to the entire U.S. east coast not the southeast.. They also note all but one of those ship strikes whales was between Delaware Bay ad Okracoke.	Changed reference.
212	56	Again, wrong references and inaccurate information re the 1975-1996 data. I did not check the accuracy of the Glass reference but given the other errors found here, the authors should do so.	Changed reference.
213	58	Would it not be helpful here to specify which DPSs were rated where on the scale? Or at least refer to a relevant table?	Referenced table.
214	58	Some information on Arabian Sea entanglements could be better summarized as significant cause for concern for this population	Addressed in C.13
215	59	This is bizarre reasoning. The point is that 'Arctic waters' are being redefined or at least rejiggered geographically, so the 'however' here doesn't make sense. In other words, the last sentence does not, as implied, negate in any way the second to last one!	Changed "however" to "Currently"
216	59	Shouldn't this sentence come after the following one?	Re-ordered sentences
217	59	The Commission's "Report of the Workshop on Assessing the Population Viability of Endangered Marine Mammals in U.S. Waters" would be a useful reference to consult and reference on this issue. This report is also in the Commission's report "The Biological Viability of the Most Endangered marine Mammals and the Cost-effectiveness of Protection Programs.	This section was revised to cite the suggested workshop report and to more fully discuss and justify the BRT's decisions regarding use of PVAs for this particular status review.

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Comment #	p. #	Comment	Response
218	60	Again the above report (available on the Commission's website), would be useful to consult and reference.	See above.
219	60	In practice, five, since Near Threatened is effectively another 'risk category'.	Text was clarified.
220	62	There are some respected modelers that would strongly disagree with this statement and the conclusion in the next sentence.	Text was revised.
221	62	Expense might be a reason for limiting use of PVAs and I agree some or even many may not be worth the cost but for some it I think it could help appreciably. This seems to be based on a poor rationale	Text was revised to explain more fully.
222	62	PVAs are not the only thing that should ever be considered. Rather they should be used to trigger a more subjective review per ESA criteria	Text was clarified.
223	62	Quantitative? All but perhaps external risk factor here is based on quantitative data, though there are varying degrees of uncertainty.	Changed to "measures".
224	64	But scale, and turnover, matters. I do not think this 13yr old reference does justice to what is now known about this population's pattern of winter occurrence in the West Indies region as a whole.	This is not correct. Since the cited papers were published, there has been no new information (published or otherwise) that would change the conclusions given in the text regarding the relative abundance and distribution of humpbacks in the West Indies region. There are no data to indicate the existence elsewhere of any concentration of whales on the scale of Silver/Navidad Banks (on a daily basis at the peak of the winter it's perhaps 2,000 whales on Silver, 100 – one order of magnitude lower – in Samana Bay, and in some places another order of magnitude below Samana).
225	64	Unclear to me what a 'geological activity' might be in this context.	Changed to "oil and gas".

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Comment #	p. #	Comment	Response
226	66	I thought this document said earlier that the recent level of offtake by entanglement and ship strikes was unsustainable for the Gulf of Maine ‘subpopulation’.	True. Not sure how this contradicts that statement.
227	67	Although I certainly agree that NW Africa is a potentially hazardous area for these whales to calve, nurse, and generally overwinter, I don’t agree that some undiscovered ground there is a ‘plausible hypothesis’, so	This is what the BRT considered a plausible hypothesis.
228	68	With only 88 whales in the catalogue, while appreciate that there is uncertainty, I find little basis to conclude that this population is “not at risk.” In general where there seem to be relatively small populations for which there is no good abundance or trend data, it does not seem appropriate or precautionary to assume the population is “not at risk.”	The BRT was attempted to evaluate extinction risk, not to be precautionary.
229	68	So this DPS seems a good candidate for Data Deficient, but is that allowed? I guess not.	This was not a formal category, but the BRT noted the high degree of uncertainty due to limited data.
230	69	This actually might be a place to cite Reeves (2002) as there is not a lot of literature summarizing this.	Done.
231	70	The area should be identified.	Text was clarified.
232	70	Is this considered a moderate or minor threat?	Text was clarified to indicate that the threat was considered medium.
233	72	any tagging?	Text was clarified.

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234	74	While I do not have difficulty accepting uncertainty as a need to assume the worst and err on the side of higher risk, I have trouble accepting the premise that that a lack of information on size and growth is justification for considering a species to be “not at risk.”	The BRT reviewed the available information and used that to categorize risk. No information absolutely was not equated with "not at risk"; rather limited information tended to lead to likelihood points being placed in multiple categories, reflecting uncertainty about extinction risk.
235	78	It would be helpful to be consistent with terms. Moderate is used elsewhere.	Text was clarified.
236	79	Low risk or not at risk? There is no definition or category for low risk	Text was clarified.
237	79	Same	Text was clarified.
238	79	If this is the case for Western Australia, then it has to also be for Gabon/West Africa given the number of range states with active and extensive hydrocarbon operations in their territorial waters.	Text was revised to add this information.
239	83	If this applies to eastern Australia humpbacks presumably it also applies to other S. Hemisphere populations that feed on Antarctic krill (e.g., W. Australian humpbacks).	We agree, and have edited the text along these lines.
240	83	This was not to be considered?	In the revised report the BRT did consider protective regulations.
241	83	It would be worth noting the uncertainty associated with this estimate	The uncertainty was included.
242	84	I thought this review was not considering adequacy of regulations?	In the revised report the BRT did consider protective regulations to the extent possible.
243	84	This could use some additional explanation. This might reduce population growth from perhaps 10 % to 8 %. Is this the basis for considering a potentially substantial effect on recovery?	Kept as is.

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244	85	This does not seem consistent with the above description of “some whaling in the 20th century.”	We do not see the inconsistency.
245	85	The breeding range for this population has been inconsistently presented as “Columbia and Ecuador”, “Panama, Columbia and Ecuador”, “Panama to northern Peru”, and now Costa Rica to northern Peru. Would be good to be consistent throughout	Text was clarified.
246	86	Again, seems to be considering adequacy of regulations.	In the revised report the BRT did consider protective regulations to the extent possible.
247	87	Chile?	Comment not clear.
248	89	But given what has been said for other populations can be expected to be low or non-existent	Contaminants were generally ranked as “low” except where data were poor, in which case they were ranked as “unknown.”
249	91	Is this just for part of Gabon? Since they range from 6N-6S presumably this estimate is only for a small portion of the total range? This should be clarified.	Text has been clarified.
250	91	Using a Bayesian estimation methodology...	BRT reviewed available material and is comfortable with decision.
251	91	Gabon may have a mixture of two breeding stocks to which those abundances cannot be prescribed. See Barendse et al 2011 for abundance of whales off south Africa—numbering about 500. **See supporting materials #9	Text has been clarified to discuss possible substructure within this DPS.
252	92	Cookie cutter shark wounds?	No response needed.

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253	93	A major shipping lane does transect the Walvis Ridge which has been identified as a key migratory route for these whales. Again, incidence is likely to be low but worth mentioning.	Iguela region only; stated in sentence.
254	93	Information on Gabon and Congo contained in IWC reports but not cited here.	The IWC reports on climate change are referenced and discussed in that section.
255	93	See previous comment on updated abundance estimate. Should also include value range, this number alone conflicts with the previous one cited.**See supporting materials #7	The BRT utilized the available information.
256	93	Different from estimate above?	Text was clarified.
257	93	And currently detected by genetic results that have been endorsed by IWC SC. **See supporting materials #5	Included earlier in text.
258	93	This is interesting information and should be included in the sections above.	BRT is ok with its decision.
259	93	If the BRT had considered separate DPS for B1 and B2 whales, there would have likely been different conclusions with respect to extinction risk? It might be appropriate to add a sentence here identifying that there are still major uncertainties and that more research is needed.	Text was revised to add this information.
260	96	In particular what this estimate represents Arabian Sea humpbacks off Oman or the entire Arabian Sea humpback whale population has been questioned. Surveying in other parts of the range due to political issues is far more complicated than Oman.	Not particularly relevant to this paragraph.
261	98	See Pomilla et al 2006.	Text was revised to add this information.

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262	100	I suggest including this appendix in the text. It's only a page These are important enough to include in the body of the report not the appendices.	Tables are now included in the main body of the report.
263	101	And the west coast of Africa as per comments above.**See supporting materials #1	Main text was revised to add this information.
264	101	The earlier analysis suggested whaling could have a substantial effect on this subpopulation if Japan were to move ahead with its pans to catch humpbacks in the Antarctic.	Text was revised to add this information.
265	101	I suggest referencing and moving the table in Appendix D into this section.	BRT reconfirmed its DPS decisions
266	101	As several DPS are potentially missing then perhaps the level of extinction would change in one of them (e.g. B2 subpopulation) and the others would remain the same.	BRT reconfirmed its DPS decisions
267	102	It is not clear how to interpret this table. An explanation is needed.	Explanation has been added.
268	103	This is inaccurate. Again, DPS broken into 2, with the trend for one but not the other.	Text has been clarified to note that in some cases trends are based on a portion of a DPS.