CONCERNS RE THE REPORT OF THE MAY 2006 WORKSHOP ON "FINDING A BALANCE: WHITE SHARK CONSERVATION AND RECREATIONAL SAFETY IN THE INSHORE WATERS OF CAPE TOWN, SOUTH AFRICA", AND SUGGESTED REMEDIES

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PREFACE

At the outset, I would wish to distinguish what are three different issues:

1) Are white sharks is South African waters endangered?
2) Should white sharks in South African waters continue to enjoy full legal protection?
3) Should shark capture devices be recommended for Cape Town (False Bay) to enhance recreational safety?

I understand that only 3) fell within the ToR of the 29-30 May 2006 Workshop. However, 1) and 2) have also been raised either in the Workshop Report itself or in commentary thereon, making it important to be clear on the relationships (or absence thereof) between these three questions.

PRIMARY CONCERNS ABOUT WORKSHOP CONCLUSIONS AND RECOMMENDATIONS

Issues in the Workshop Report are taken in reverse order of their appearance there, as this assists logical flow.

Conclusion E.2

"White sharks are declining in some parts of the world and consumptive impacts in False Bay may influence abundance elsewhere in southern Africa and worldwide, as we are dealing with an open population (records of animals travelling to Australia etc)."

Statements such as this, without associated quantification, are problematic. Certainly the population has been shown to be open, but what matters is whether rates of transfers such as that mentioned are appreciable when compared to natural growth rates. The fact that downward trends in population abundance indices off Australia are in sharp contrast to near stability off South Africa (see FAO, 2004) immediately suggests a low rate of mixing. Some fairly simple computations based on these trend data and related

population information would seem likely to throw light on whether this rate is indeed sufficient to justify drawing this conclusion.

Recommendation B.14

"*Shark capture devices (e.g. shark nets or drum lines) are not recommended for False Bay for the following reasons:*

- *White sharks appear to be transient in False Bay and such devices would therefore be less effective in ensuring local reductions in shark numbers.*
- *Capture devices may lead to unsustainable catches at the regional and national scale due to:*
    - *i) The transient nature of the sharks and the fact that the population is open*
    - *ii) Large and small White sharks may be caught, leading to higher impact*
- *Shark nets will result in unacceptable levels of bycatch and entanglement of whales, dolphins, and possibly seals (increased inshore shark activity seems to occur in spring and summer which co-incides with the occurrence of whales).*
- *Globally there is a move away from capture devices due to their broader ecosystem impacts.*"

This conclusion, and the associated rationale, are core elements of the Report, and as such merit particular scrutiny. They appear to be based upon, though are not identical to part of the "Recommendations" section of a supporting Annexure to the Report: Dudley *et al*. – Shark deterrent options for Cape Town. This Annexure asserts clearly that the shark nets off Natal are effective because they bring about a local reduction in shark numbers. In the absence, to my knowledge, of serious consideration being given to the removal of the nets off Natal, the fundamental question that then needs to be addressed is whether the differences between the situations off Natal and off Cape Town have been persuasively demonstrated to be sufficient to justify the conclusion of the Report **not** to recommend such nets off Cape Town.

The definitive nature of the first bulleted statement "would therefore be less effective" contrasts with the lesser certainty evident in the Dudley *et al*. wording "may be less effective". Further the "transient" nature accorded white sharks in False Bay does not (at face value given what is set out in the Report) seem a compelling basis upon which to differentiate Natal waters and False Bay. Surely these and other shark species involved in attacks off Natal have transient behaviour to various extents there too? The mechanism advanced to explain why shark nets off Natal are effective does not require an annual period of local residency. It is sufficient for different sharks of the same species to prefer different movement corridors/pathways, so that if those moving/migrating close to a particular beach are extracted, slow replacement by others in the population arising from a diffusive process becomes readily countered by subsequent capture of these new individuals to maintain the lower threat to bathers. Such data as there are for white sharks off Natal are consistent with the catch rate trends over time that are to be expected in

such circumstances: an initial sharp decline followed by subsequent apparent stabilisation (indicating that the continued level of removals is likely sustainable), as evidenced by the initial 1960's drop, and the subsequent 1980's drop in Richards Bay when nets were introduced there (Cliff *et al*., 1996a). Admittedly there are reliability problems with the 60's data, and the feature identified in the 80's data is inferred from rather few points; nevertheless, though not definitive, these data are certainly suggestive of a "local depletion" mechanism that does not subject the overall population to levels of removal that are unsustainable.

The second bulleted point as worded - that capture devices *may* lead to unsustainable catches - is subject to the same reservations as E.2 above. Qualitative arguments alone are inadequate: i) comments about "transient nature" remain non-definitive for the reasons stated above; and ii) fewer older than younger sharks can be removed sustainably from the population because of the effects of natural mortality, but this qualitative truism doesn't advance the debate unless accompanied by some attempts at quantification.

The shark nets off Natal lead to bycatch and entanglements. Where is the information that justifies the conclusion that that level is acceptable, but the level that would occur off Cape Town is not? Regarding the whale concerns mentioned, those would seem likely to apply only to right whales, which are present in winter and spring, rather than spring and summer as stated. If these are a particular concern, why not lift nets during the 2-3 month period of their peak occurrence, in the same way that nets off Natal are lifted during the sardine run to reduce marine mammal and other fatalities?

I am not suggesting that recommendation B.14 is necessarily wrong – rather only that the evidence as presented provides inadequate justification. Further evaluations might well provide such justification (though they could also demonstrate the reverse). Surprisingly there is no allusion in the Report to the possibility of an adaptive approach – say the "try it first experimentally at a low level" to improve quantitative estimation and hypothesis discrimination abilities – it is after all likely that only responsibly conducted exercises of that nature would ultimately allow the question of the sustainability of a certain level of removals to be addressed.

Recommendation B.1

"*White Sharks should continue to enjoy full legal protection and be reserved for non-consumptive utilisation.*"

The appearance of this recommendation in the Report is puzzling. None of the conclusions listed immediately preceding it in the Report has pertinence to this issue. Further the issue seems not to have been part of the Workshop ToR, so why is this recommendation included? This becomes of greater concern given that the City of Cape Town has adopted the principle to "endorse and support the continued protected status of white sharks". Is this Workshop recommendation the basis to motivate this statement, so as to imply a scientific justification which very arguably is **not** to be found in the

Workshop Report? For example, in regard to the three reasons offered for this decision in 1991 (from the Annexure to the Report authored by Kock and Johnson):

- White shark populations declining in many regions internationally – there are few regions for which trend data are available; for South Africa such data scarcely suggest any decline.
- Life history strategy predicts vulnerability to over-exploitation – aside from the scientific questionability of this remark, if this *were* the case, then the estimates of the intrinsic growth rate parameter *r* listed in Table 3 of Dudley and Simpfendorfer (2006) suggest four other shark species that would merit consideration for protected status ahead of white sharks.
- A suspected decline in the South African population at the time protected status was accorded – subsequent data and analyses would not seem to have borne this out.

Of concern also is that WWF's website cover note for the Report refers to the "*endangered* Great White Shark", thereby implying that the Report provides evidence to justify this categorisation, which in turn provides implied motivation to limit extractive practices. But where is that evidence? A steady cpue series coupled with a somewhat dated population estimate (Cliff *et al.*, 1996b) which is (likely substantially) negatively biased because is refers to only a component of the population (FAO, 2004) are (pending desirable more thorough quantitative analysis) more suggestive of a population never much reduced by past extractions.

Yes or no answers to either of the "endangered" or "protected" questions of the Preface would not seem to necessarily dictate the answer to the question of whether or not nets should be installed off Cape Town. Thus if either of the first two considerations are to be raised in the context of the third, their specific relevance thereto first needs clarification.

OVER-ARCHING CONCERNS

These are two:

- the Workshop decision not to recommend the use of nets may well be the correct one, but the supporting evidence offered does not constitutes adequate justification;

- within and associated with the Workshop Report are commentary/ recommendations about the status of the white shark population and its need for protection, which struggle to square with the scientific evidence available; a particular associated concern arising is lack of consistency with scientific management advice provided locally for the management of other marine populations – unless scientific presentations to the public (such as this Workshop Report) place a high weight on such consistency, ultimately scientific credibility will be the loser with the consequence that genuine conservation will suffer.

WHAT ACTION TO TAKE?

The Workshop clearly needs to be reconvened to reconsider its core recommendations on nets, and in particular to provide a stronger scientific rationale to support them if they are to be re-affirmed.

However, it would probably be best to precede such a meeting with some quantitative analyses to throw better light upon the issues under discussion and hence bolster the ultimate motivations provided. The level of such analyses in the Workshop Report is weak – for example, such quantitative inferences as were drawn are typically based on deterministic comparisons with no attempts made to assess statistical precision and hence the reliability of the inferences. Two key issues which need attention are:

- re-evaluation of the size of the white shark population, making use of up-to-date tag-recovery data and in particular taking size information into account to be able to effectively "extrapolate" from a component of the population to the whole;

- simple dynamic models fitted to the Natal shark net cpue and related data to throw more light on what levels of extraction are likely to be sustainable.

The first step in such an exercise would likely best be to convene a small discussion group, including in particular Natal Sharks Board scientists and quantitative analysts, to clarify exactly what data are available for such exercises, and to discuss how the associated models might be best structured.

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