Summary of the work of the Scientific Committee with respect to the AWMP and AWS

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INTRODUCTION TO THE AWMP

The Scientific Committee's role

- **IS** to provide robust scientific advice on proposed ASW catch/strike limit proposals and other related technical matters referred to it by the Commission

- **IS NOT** to comment on non-scientific related matters such as the rationale behind particular requests- such issues are in the realm of the Commission itself and other relevant Commission sub-groups

Mandate for an AWMP approach

- Originally, only *ad hoc* advice was provided
- Resolution 1994-4 recognised value of the framework developed to provide robust advice for commercial whaling (the RMP)
- Asked SC to develop a similar framework for providing robust advice for ASW i.e. taking into account uncertainty
- Later reinforced by Resolution 2014-1
- Recognised the differences in objectives between the two types of whaling

Management Procedures

- Objectives must be explicitly stated and assigned priorities;

- Data and analysis requirements must be realistic and specified

- Accept limitations and take the inevitable uncertainty explicitly into account;

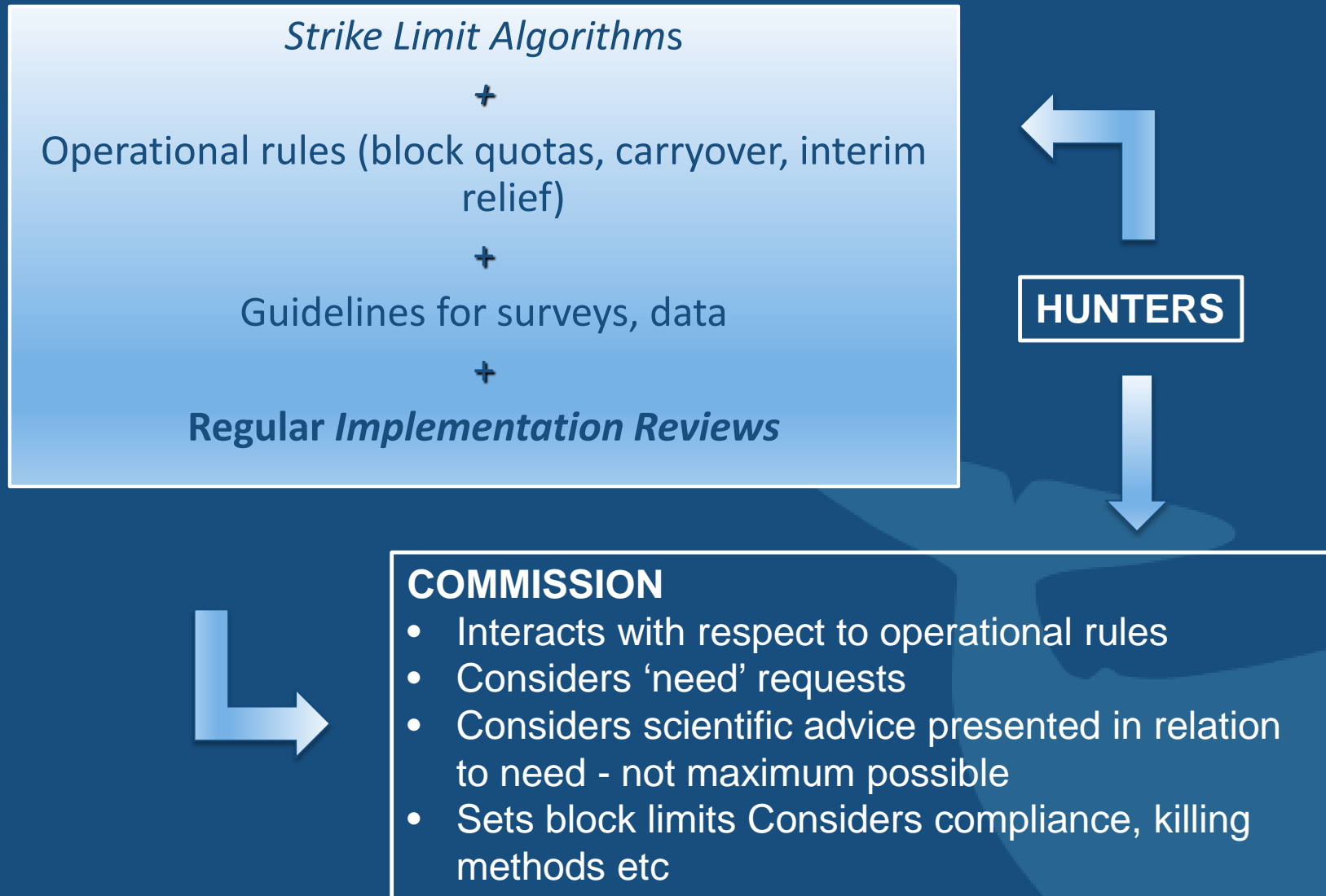- Rigorous testing with computer simulations;

- Include feedback monitoring

Types of whaling: objectives

Commercial	Aboriginal subsistence
USER	**USER**
The highest possible continuing yield) should be obtained from the stock	Allow harvests (in long-term) at levels appropriate to cultural and nutritional needs
Stability in catch limits	Stability implicit
CONSERVATION	**CONSERVATION**
Zero catches for stocks estimated at <54% of K	Risk of extinction not seriously increased
	Maintain at highest net recruitment level; if below must move towards it

Case-specific approach

- Case-specific approach agreed by the Commission to allow for:
    - the different nature of the hunts and
    - the available information on the relevant populations
- Development of *Strike Limit Algorithms (SLAs)* for each hunt
- A way to calculate safe removal levels that meet (to the extent possible) the needs of the communities

The broader picture of management

Strike Limit Algorithms

+

Operational rules (block quotas, carryover, interim relief)

+

Guidelines for surveys, data

+

Regular *Implementation Reviews*

HUNTERS

COMMISSION
- Interacts with respect to operational rules
- Considers 'need' requests
- Considers scientific advice presented in relation to need - not maximum possible
- Sets block limits Considers compliance, killing methods etc

Preparation for development

- Assemble information:
  - **Stock structure** (sets scale) and appropriate management unit (s)
  - **Abundance (and trends)**
  - **Biological parameters**
  - **Removals history** (direct and indirect)
  - **'Need'** – present and possible future – intended to cover range of hypothetical future scenarios to avoid having to revaluate *SLA*s too often

Extinction Is for Ever.....

Unless you use……
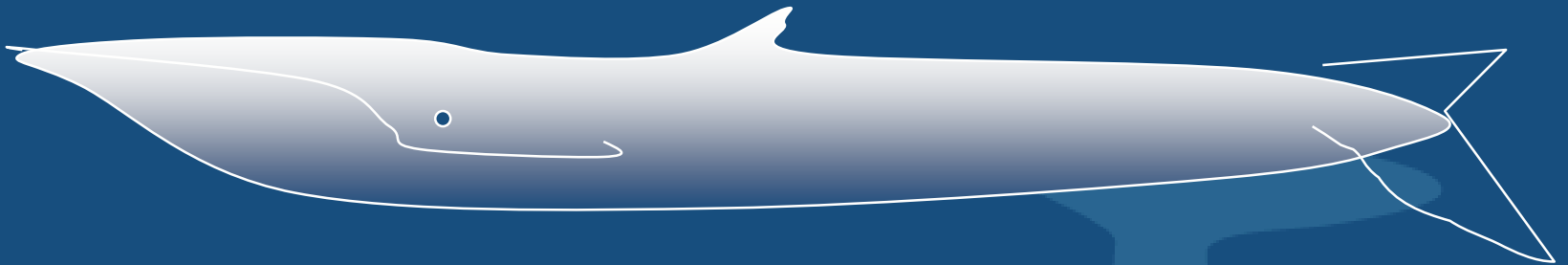
Balaenoptera electronicus

Summary of the Process

- Modelling framework:
    - Computer models of whale population(s) and the hypotheses – models 'conditioned'
    - *Evaluation* and *Robustness Trials* – scenarios that adequately cover key uncertainties

- Test candidate *SLA*s
    - do not know the 'truth' (but the operating models do!)

- Good *SLA*s:
    - realistic data requirements
    - best balance between conservation and need ('tuning')

- Pioneering and robust approach developed by IWC and now being used by other bodies
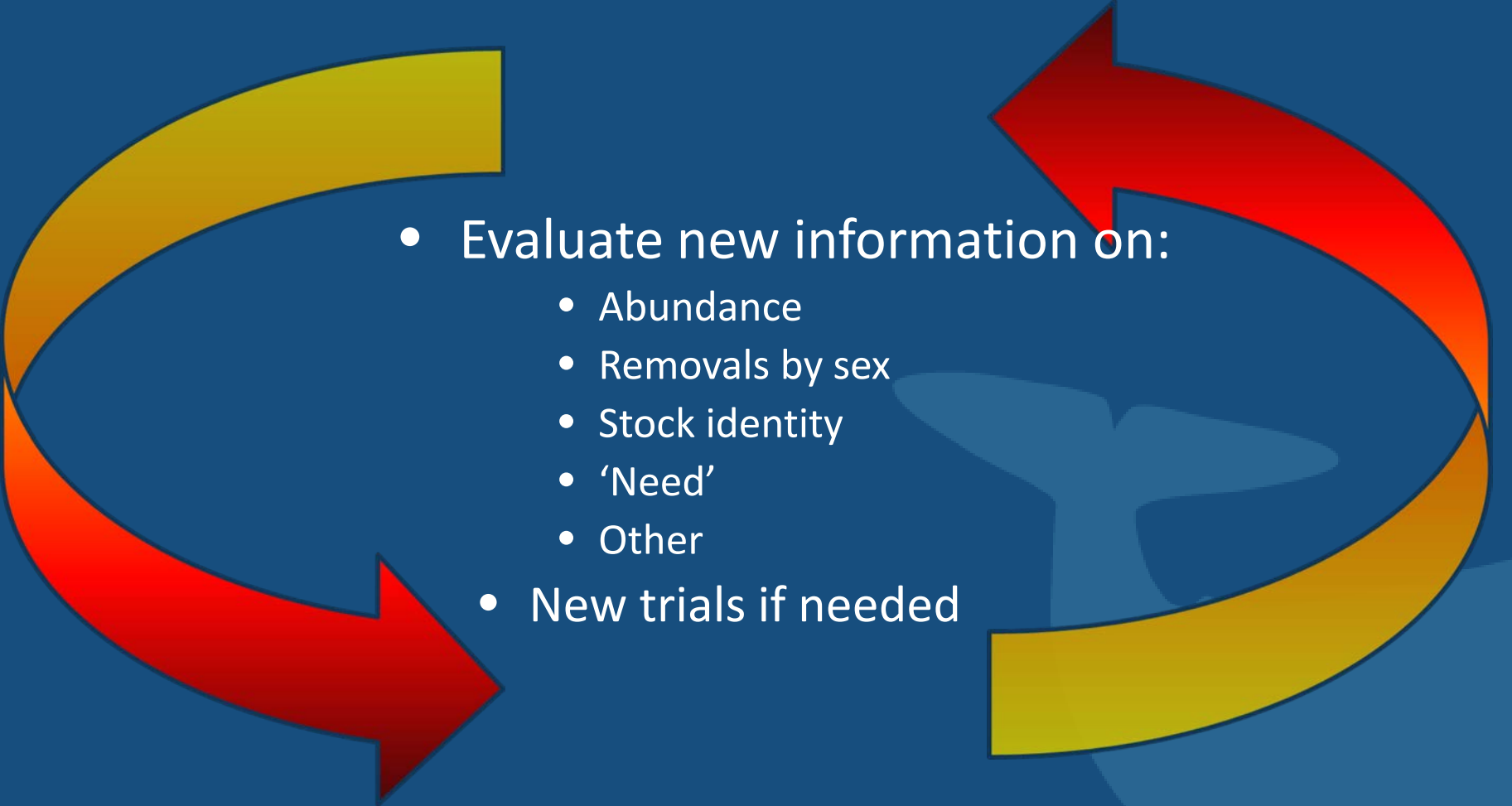
Summary of the Process

- Modelling framework:
  - Computer models of whale population(s) and the hypotheses – models 'conditioned' to show consistent with data
  - *Evaluation* and *Robustness Trials* – scenarios that adequately cover key uncertainties
- Teams develop candidate *SLA*s – do not know the 'truth' (but the operating models do)
- Review performance of candidates against conservation and need objectives (100 years)
- Recommend *SLA* to Commission

A bit more on selection

- Candidates must **first** meet conservation objectives for the *Evaluation Trials*:
  - Either population not at MSYL but moving to it, or
  - population at or above MSYL
    - a conservative approach is taken based on lower 5th percentiles
    - Evaluation is over full range not only worst case scenarios
- Selection **then based** upon ability to meet need under different scenarios ('need envelopes')
  - Average need satisfaction at 20 and 100 years
  - Measure of stability of catches

Feedback is essential:
Regular *Implementation Reviews*

- Evaluate new information on:
  - Abundance
  - Removals by sex
  - Stock identity
  - 'Need'
  - Other
- New trials if needed

Progress made prior to 2018

Hunt	Year SLA developed (IRs completed)	Next *Implementation Review*
Alaskan and Chukotka bowhead	**2000** (2007, 2012, 2018)	Estimated start 2026
Chukotka gray	**2004** (2010)	Start 2019
Makah gray	**2013** (2018)	Start 2019
West Greenland humpback	**2014**	Start 2020
West Greenland bowhead	**2015**	Start 2022
West Greenland fin	Expected 2018	Estimated start 2024
West Greenland common minke whales	Expected 2018	Estimated start 2025

Work since 2016 (IWC/AWS/GENO4)

- *SLA* focus had been on remaining* Greenland hunts (Item 4.1):
  - West Greenland fin whales
  - West Greenland common minke whales
- Intense intersessional work (workshops and a small working group meeting)

*NB it had not originally been considered necessary to develop *SLA*s for either the East Greenland common minke whale hunt or the St Vincent & The Grenadines hunts as the proposed catches were very small compared to the population sizes – but more of that later....

West Greenland fin whales

- Item 7.1.1 of IWC/67/ASW/GEN04, p.2
- Key factors considered in trials:
  - Stock structure hypotheses
  - Mixing matrices
  - MSYR
  - Survey bias
  - Need envelopes
- Age and sex incorporated in population models

West Greenland fin whales

- Two developers each provided three candidates (different 'tunings')
- Main information requirement is series of abundance estimates
- Main differences are how these are weighted over time
- Results were examined as explained earlier
  - No obvious 'winner' – different but equivalent
  - Agreed to also test an *SLA* that sets limit at average of two
  - Combined *SLA* gave best performance for need scenarios A and B

West Greenland fin whales

- SC **recommendation** (IWC/67/AWS/GEN04, p. 3 Item 7.1.1.3):

- **Agrees** combined *SLA*
  - achieved satisfactory conservation performance for need scenarios A and B
  - performed better on need satisfaction

- **Recommends** this '*WG-Fin SLA*' be used to provide management advice

- **Agrees** one focus of next *Implementation Review* be further examination of stock structure and especially the very conservative influx model

West Greenland common minke

- Item 7.1.2 of IWC/67/ASW/GEN04)
- Key factors considered in trials:
  - Stock structure hypotheses
  - Mixing matrices
  - MSYR
  - Survey bias
  - Need envelopes
- Age and sex incorporated into population models
- Imbalanced sex ratios well known for NA common minke whales and is taken into account in evaluating *SLA*s

West Greenland common minke

- One candidate similar to one of the fin whale candidates
- Main information requirement is series of abundance estimates
- Includes 'snap-to-need'
- Results examined as explained earlier
- Conservation performance satisfactory on all but most extreme trial where slightly below for lower 5th percentile
- Agreed not of conservation concern

West Greenland common minke

- SC **recommendation** (IWC/67/AWS/GEN04, p. 5 Item 7.1.2.3):
- Agrees tested *SLA* performed satisfactorily in terms of conservation performance for scenario A
- **Recommends** this *WG-Common minke SLA* be used to provide management advice
- **Agrees** one focus of next *Implementation Review* be further consideration of stock structure, including examination of Canadian genetic data
- **Established** advisory group to facilitate issues relating to samples

Obrigado, Go raibh maith agat, Thank you!

- To complete this complex work on *SLA* development on time involved a huge investment of effort from dedicated and talented people. Special thanks to the SWG and the Committee but especially to the developers, Lars Witting and Anabela Brandão, and to Cherry Allison and André Punt for the essential computing work

Makah management plan

- ASW agenda item 4.2, See Item 7.1.3 of IWC/67/ASW04, p. 6.
- Request from Makah Tribe to USA to authorise a tribal hunt for eastern gray whales
- At certain times of the year potential to catch animals from Pacific Coast Feeding Group or Western North Pacific Feeding Group
- A Management Plan had been approved by the SC in 2012
- New request from USA to review an updated plan received in 2018

4.2 Makah management plan

- Testing used modelling framework of the 5th Rangewide Workshop and evaluation followed the approach for *SLAs*

- Complex plan

  - Measures to restrict the number of PCFG whales that are struck or landed in a given 10-year period and to avoid, to the extent possible, striking or killing a WNFG gray whale

  - Includes as factors: time of year, odd and even year limits, photo-identification of individuals

Makah management plan

- SC **recommendation** (IWC/67/ASW/GEN04 item 7.1.3.2)
- **Agrees** plan adequately met conservation objectives for the PCFG, WFG and NFG
- **Plan** is dependent on photo-ID studies to estimate PCFG abundance and mixing proportions – conclusion dependent on these continuing
- **Thanks** to Andre Punt, John Brandon and Cherry Allison

BCB bowhead *Implementation Review*

- ASW agenda Item 4.3, Item 7.3 of IWC/67/ASW/GEN04, p. 8
- Aim:
    - review available information to check situation is as expected and determine if new trials are required to ensure *SLA* still meets objectives
    - Review catch and abundance data required by *SLA*
- Previous reviews had occurred in 2007 and 2012 – both concluded that the *Bowhead SLA* was still appropriate to provide advice

BCB bowhead *Implementation Review*

- Full review occurred and deadlines met
- Major topics:
- Stock structure:
  - new information from genetics and telemetry
  - concluded a single population with no substructure
  - Encouraged additional telemetry work (thanks to hunters)
  - Developed suggestions for future genetic work

BCB bowhead *Implementation Review*

- Abundance estimates:
    - Accepted new estimate for 2011 from a long-term photo-ID study (ca 27,000; 17,800 – 41,300)
    - Previous independent estimate (census) for same year was 16,820 (15,180 – 18,640)
    - Both acceptable for use in *SLA*
    - Plans for future surveys in accord with guidelines

BCB bowhead *Implementation Review*

- Biological parameters:
  - Welcomed extensive new information
  - Encouraged:
    - Continued collection of data from hunt
    - Work on baleen whale plate analyses to examine hormone levels and pregnancy
    - Continued aerial surveys
    - No need for new trials

BCB bowhead *Implementation Review*

- Removals:
  - Received 2017 harvest information from Alaska (57 struck and 50 landed) and Chukotka (total 4 animals from 2013-2017)
  - Review of Alaska catches from 1974-2016
  - Thanked co-operation of hunters wrt data
  - Entanglements/ship strikes
    - Low but monitor and evaluate at next IR
- Health analyses:
  - No cause for concern – continue the excellent work

BCB bowhead *Implementation Review*

- Conclusion
  - *Implementation Review* completed
  - No need for new trials
  - *Bowhead SLA* remains best way to provide advice
  - Special thanks to US scientists for comprehensive work and papers submitted to assist the review

5. Aboriginal Whaling Scheme

- ASW Item 5, IWC/67/ASW/GEN05
- The SC's AWMP uses case-specific *SLA*s to provide advice on strike/catch limits
- AWS management in the broader sense includes several components, some with scientific components
- This has been agreed in principle since 2002 but not some of the details and the Committee has been working on updating this

Scientific AWS components

- *SLA*s (case-specific)
- Operational rules (generic to extent possible)
  - Carryover, block quotas, interim relief allocations
- Guidelines for *Implementation Reviews*
- Guidelines for data and analyses (e.g. abundance, other data)

Scientific AWS components

- Ongoing work has been reported to Commission and discussed with hunters
- Completed this year
- SC recommends the updated AWS contained in IWC/67/AWS/GEN05, p.3
- It notes that any Commission AWS may include additional non-scientific provisions

1. CARRYOVER (p.3)

- A provision to enable (some) strikes not used in one year to be used in a subsequent year or years – not a new concept

- Allows for inevitable fluctuations in the success of the hunt due to environmental conditions and/or whale availability

- Does NOT allow hunts to take more than total strikes agreed by Commission

CARRYOVER- SC role

- SC's role is not to recommend a particular approach but rather to provide advice on these when asked by Commission

- In 2001 and 2016 Commission approved examination of scenarios incorporating:
  - a 50% interannual variation within blocks and
  - a 50% allowance to the next block

- This did not commit Commission to use these

CARRYOVER - evaluating

- Examine conservation performance as for *SLAs*
- Need (at least) following information:
  - Initial start date (e.g. start of new block, specific year)
  - An expiration period (cannot be carried over indefinitely
  - Limits on use (e.g. maximum number of strikes allowed in any one year)

CARRYOVER - monitoring

- *Implementation Review* process includes monitoring of carryover

- Should new information (e.g. abundance data) result in severe decrease in quota, this would trigger review of existing carryover provisions and conservation implications

- May lead to recommendations for change

CARRYOVER - additional

- Schedule language: should avoid ambiguity
- SC offers to help with actual numbers if requested
- US/Denmark request:
  - '...allow for the carry forward of unused strikes from the previous three blocks, subject to the limitation that the number of such carryover strikes used in any year does not exceed 50% of the annual strike limit'.
- Tested using *Bowhead SLA* and *WG-Humpback SLA* and Commission's objectives met
- More when discussing individual hunts under next agenda item

2. BLOCK QUOTAS (p.4

- Block quotas of up to 8 years are acceptable (advice provided in context of biennial meetings in 2013)
- Note also need for abundance estimates every 10 years

INTERIM RELIEF, p.4

- As for hunts, a variety of factors including environmental conditions can prevent a successful abundance estimate being obtained (time delay to allow analyses/acceptance)
- However, cannot have uncurtailed strike/catch limits in long-term absence of data
- SC has recommended 10 years for *SLAs*
- Interim relief approach should this be exceeded in rare and unforeseen cases
- Two successive interim allowances not allowed

INTERIM RELIEF

- 'Grace period' applies to period after 10 years
- Allows a one-block extension of existing limits
  - Tested so far for BCB bowheads and WG humpbacks so far
  - Testing for others on SC workplan – not immediate relevance
- Recommend updating as soon as new estimate accepted but could be at end of block

INTERIM RELIEF

- If (in extreme circumstances) no acceptable estimate is obtained, this would trigger an immediate *Implementation Review*

- In absence of positive alternative evidence would not be able to use *SLA*s to provide advice and Commission should use great caution

Implementation Reviews, p.5

- Central to functioning of the AWMP:
  - Review information to see if new trials are needed
  - Review information required for *SLA* e.g. catches and abundance
  - Data availability Procedure A applies
- Timing
  - Regular reviews every 5-6 years, only one at a time
  - Planning at least two years before and resources (e.g. additional workshops) identified

Special *Implementation Reviews*

- Under exceptional circumstances may call immediate review e.g.
  - Major mortality events
  - Major habitat changes (natural or anthropogenic)
  - Dramatically low abundance
  - Information from harvest (e.g. health, biological parameters)

Possible outcomes

- No need for new trials and existing *SLA* is acceptable

- New trials run and existing *SLA* is acceptable

- No need for new trials or change to advice but special topic identified for next review

- New trial results require development of modified or new *SLA* requiring reconsideration of management advice

GUIDELINES FOR SURVEYS, p. 6

- Committee's general advice is applicable
- Plans should be provide in advance in sufficient detail to be reviewed (field work and estimation approach)
- Committee can nominate an observer
- Data available under Procedure A
- New computer programmes lodged with Secretariat

6. GUIDELINES FOR DATA/SAMPLES

- Schedule specifies data requirements
- Additional information especially valuable in context of *Implementation Reviews* e.g
  - genetic samples (IWC guidelines)
  - Photo-identification data
  - Health assessments
  - Traditional knowledge

go raibh maith agat!

I would particularly like to thank Cherry Allison, Anabela Brandão, Doug Butterworth, Eva Dereksdóttir, Geof Givens, Kjartan Magnússon (sadly no longer with us), André Punt, Lars Witting, Jette Donovan Jensen and all the members of the SWG of the AWMP over the last two decades. The SWG has undertaken ground-breaking work over the last two decades in a spirit of great collaboration and co-operation, even when there were disagreements, as inevitably there were. I would also like to thank the hunters and their representatives who have made major contributions in terms of not only data provision but also advice on the AWS.