


Animal Welfare Science and Bioethics Centre



Massey University

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 Collaborating Centre for Animal Welfare Science
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<http://animalwelfare.massey.ac.nz>

**Animal Welfare:
Surviving, thriving and promoting
rewarding wildlife behaviours**


*Using the Five Domains Model to understand
and improve zoo animal welfare*

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Key Published Sources

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OUR PURPOSE:

FOR ANIMALS TO 'THRIVE'
NOT MERELY 'SURVIVE'



Areas considered

- *The Freedoms, Provisions and Welfare Aims*
 - The Five Freedoms and importance of the Provisions
 - The Five Provisions / Welfare Aims Paradigm
- *The Five Domains Model*
 - Overview
 - Examples of its operation
- *Seven Key Applications of the Model*
 - Key general foci of AW management
 - Foundations of specific AW management objectives
 - Identifies previously unrecognised features of poor and good welfare
 - Monitoring changes in AW
 - Grading of AW compromise and/or enhancement
 - Prospective and retrospective AW assessments
 - Quality of Life assessments relevant to end-of-life decisions
- *Concluding comments*



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The 'Five Freedoms' – overview

Freedom	Provisions
1. Freedom <i>from</i> thirst, hunger and malnutrition	By providing ready access to fresh water and a diet to maintain full health and vigour
2. Freedom <i>from</i> discomfort and exposure	By providing an appropriate environment including shelter and a comfortable resting area
3. Freedom <i>from</i> pain, injury and disease	By prevention or rapid diagnosis and treatment
4. Freedom <i>from</i> fear and distress	By ensuring conditions and treatment which avoid mental suffering
5. Freedom <i>to</i> express normal behaviour	By providing sufficient space, proper facilities and the company of the animal's own kind

The 'Five Provisions'

- The Freedoms are *problematic*
- **BUT, the PROVISIONS are still *practically useful* in some ways**

Domain/category	Provisions
1. Nutrition	Provide ready access to fresh water and a diet to maintain full health and vigour
2. Environment	Provide an appropriate environment including shelter and a comfortable resting area
3. Health	Prevent or rapidly diagnose and treat injury and disease
4. Behaviour	Provide sufficient space, proper facilities and the company of the animal's own kind
5. Mental experiences	Ensure conditions and treatment which avoid mental suffering

The '*Five Provisions / Welfare Aims*' paradigm

Three key issues regarding the '*Five Freedoms*':

1. The *Provisions* more influential than the '*Freedoms*' because they provide *practical advice* on *animal welfare management*
2. Most *negative experiences* listed in the '*Five Freedoms*' can only be *minimised, NOT eliminated*
3. The '*Freedoms*' mostly focussed on *negative experiences*, BUT now we must ALSO include *positive experiences*.

The '*Five Provisions / Welfare Aims*' paradigm

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2. Most *negative experiences* listed in the '*Five Freedoms*' can only be *minimised, NOT eliminated*
3. The '*Freedoms*' mostly focussed on *negative experiences*, BUT now we must ALSO include *positive experiences*.

Three steps are therefore recommended:

1. *Avoid reference* to the '*Five Freedoms*' to *reduce misconceptions and confusion*
2. *Emphasise* the '*Provisions*', BUT update them to give attention both to *negative and positive experiences or states*
3. *Align each Provision* with salient *Animal Welfare Aims* that emphasise *animals' experiences* that most *affect their welfare*'.

The 'Five Provisions / Welfare Aims' paradigm

Provision	Animal Welfare Aims
1. <i>Good nutrition</i> : Provide ready access to fresh water and a diet to maintain full health and vigour	<u>Minimise</u> thirst and hunger and <u>enable</u> eating to be a pleasurable experience

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2. <i>Good environment</i> : Provide shade/shelter or suitable housing, good air quality and comfortable resting areas	<u>Minimise</u> discomfort and exposure and <u>promote</u> thermal, physical and other comforts

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3. Good health: Prevent or rapidly diagnose and treat disease and injury, and foster good muscle tone, posture and cardiorespiratory function	<u>Minimise</u> breathlessness, nausea, pain and other aversive experiences and <u>promote</u> the pleasures of robustness, vigour, strength and well coordinated physical activity

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4. Appropriate behaviour: Provide sufficient space, proper facilities, congenial company and appropriately varied conditions	<u>Minimise</u> threats and unpleasant restrictions on behaviour and <u>promote</u> engagement in rewarding activities

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4. Appropriate behaviour: Provide sufficient space, proper facilities, congenial company and appropriately varied conditions	<i>Minimise</i> threats and unpleasant restrictions on behaviour and <i>promote</i> engagement in rewarding activities
5. Positive mental experiences: Provide safe, congenial and species-appropriate opportunities to have pleasurable experiences	<i>Promote</i> various forms of comfort, pleasure, interest, confidence and a sense of control

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The 2015 Five Domains Model – overview

- **The Model:**
 - Is NOT a *definition* of animal welfare
 - *Characterising welfare* is preferred to *defining* it
 - Characterisation is in terms of the *key attributes* of welfare
 - Is NOT an accurate representation of *body structure/function*
 - Each Domain *focuses attention* on areas *relevant to animal welfare assessment and management*

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 - **It is designed to *facilitate systematic, structured, coherent and comprehensive* animal welfare assessments**

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The following POSTER gives more explicit guidance on, and numerous examples of, how to use the model to identify negative experiences and promote positive welfare states



The Five Domains Model

Physical/Functional Domains

Survival-Related Factors				Situation-Related Factors			
1: Nutrition		2: Environment		3: Health		4: Behaviour	
Restrictions on: Water intake Food intake Food quality Food variety Voluntary overeating Force-feeding	Opportunities to: Drink enough water Eat enough food Eat a balanced diet Eat a variety of foods Eating correct quantities	Unavoidable/imposed conditions: Thermal extremes Unsuitable substrate Close confinement Atmospheric pollutants: CO ₂ , ammonia, dust, smoke Unpleasant/strong odours Light: inappropriate intensity Loud/otherwise unpleasant noise Environmental monotony: ambient, physical, lighting Unpredictable events	Available conditions: Thermally tolerable Suitable substrate Space for freer movement Fresh air Pleasant/tolerable odours Light intensity tolerable Noise exposure acceptable Normal environmental variability Predictability	Presence of: Disease: acute, chronic Injury: acute, chronic; husbandry mutilations Functional impairment: due to limb amputation; or lung, heart, vascular, kidney, neural or other problems Poisons Obesity/leanness Poor physical fitness: muscle de-conditioning	Little or no: Disease Injury Functional impairment Poisoning Body condition appropriate Good fitness level	Exercise of 'agency' impeded by: Invariant, barren environment (ambient, physical, biotic) Inescapable sensory impositions Choices markedly restricted Constraints on environment-focused activity Constraints on animal-to-animal interactive activity Limits on threat avoidance, escape or defensive activity Limitations on sleep/rest	'Agency' exercised via: Varied, novel, engaging environmental challenges Congenial sensory inputs Available engaging choices Free movement Exploration Foraging/hunting Bonding/reaffirming bonds Rearing young Playing Sexual activity Using refuges, retreat, or defensive attack Sleep/rest sufficient

Affective Experience Domain

5: Mental State							
Negative Thirst Hunger (general) Hunger (salt) Malnutrition/malaise Rioted/over full Gastrointestinal pain	Positive Wetting/quenching Pleasures of drinking Pleasures of different tastes/smells Pleasure of salt taste Masticatory pleasures Postprandial satiety Gastrointestinal comfort	Negative Forms of discomfort: Thermal: chilling, overheating Physical: joint pain, skin irritation Physical: stiffness, muscle tension Respiratory: e.g. breathlessness Olfactory Auditory: impairment, pain Visual: glare/darkness eye strain Malaise from unnatural consistency	Positive Forms of comfort: Thermal Physical Respiratory Olfactory Auditory Visual Variety-related comfort	Negative Breathlessness Pain: many types Debility, weakness Sickness, malaise Nausea Dizziness Physical exhaustion	Positive Comfort of good health and high functional capacity Vitality of fitness	Negative Anger, frustration Boredom, helplessness Loneliness, isolation Depression Sexual frustration Anxiety, fearfulness, panic, anger Neophobia Exhaustion	Positive Calmness Engaged, in control Affectionate sociability Maternally rewarded Excitatory/playfulness Sexual gratification Secure/protected/confident Lives novelty Energetic/refreshed

Welfare Status



The 2015 Five Domains Model – operation

- **Key features of the Model:**
 - **Distinguishes between:**
 - *Survival-related ‘biological functioning’ (domains 1-3):
Related to sensory inputs from inside the body*
 - *Situation-related ‘environmental enrichment’ (domain 4):
Related to sensory inputs from outside the body*
 - **Identifies both -ve and +ve elements in each domain:**
 - *Physical/functional states (1-3)*
 - *Perceived external circumstances (4)*
 - *AND the aligned -ve and +ve affective experiences (5)*



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 - *Perceived external circumstances (4)*
 - *AND the aligned -ve and +ve affective experiences (5)*
 - **The foregoing details explain the biological/affective background to the model**

Let us now look as a few examples



The Five Domains Model



Physical/Functional Domains

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Affective Experience Domain

5: Mental State							
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Welfare Status

The 2015 Five Domains Model – operation

Domain 1: Nutrition

Restrictions on:



- Water intake**
- Food intake**
- Food quality**
- Food variety**

Voluntary overeating

Domain 5: Mental State

Negative

- Thirst**
- Hunger (general)**
- Hunger (salt)**
- Malnutrition malaise**
- Bloating, over full**

The 2015 Five Domains Model – operation

Domain 1: Nutrition

Restrictions on:

Water intake
Food intake
Food quality
Food variety

Voluntary overeating

Opportunities to:

Drink enough water
Eat enough food
Eat a balanced diet
Eat a variety of foods

Eating correct quantities

Domain 5: Mental State

Negative

Thirst

Hunger (general)
Hunger (salt)

Malnutrition malaise
Bloated, over full

Positive

Wetting/quenching pleasures of drinking
Pleasures of different tastes/smells
Pleasure of salt taste
Masticatory pleasures
Postprandial satiety
Gastrointestinal comfort



The Five Domains Model

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Welfare Status



The 2015 Five Domains Model – operation

Domain 4: Behaviour

**An animal exercises ‘agency’ when it engages in
voluntary, self-generated and goal-directed
behaviours**

**Many such behaviours are rewarding and are
accompanied by +ve affects**



The 2015 Five Domains Model – operation

Domain 4: Behaviour

Exercise of ‘agency’ impeded by:

Invariant, barren environment
(ambient, physical, biotic)
Constraints on environment-
focussed activity
Constraints on animal-to-
animal interactive activity
Limited sleep/rest
Limits on threat avoidance,
escape or defensive activity

Domain 5: Mental State

Negative

Anger, frustration
Boredom, helplessness
Loneliness, isolation
Depression, withdrawal

Unsatisfied sexually
Exhaustion
Anxiety, fearfulness, panic, neophobia



The 2015 Five Domains Model – operation

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Limited sleep/rest
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Opportunities to exercise 'agency' via:

Varied, novel, engaging
environmental challenges
Free movement, Exploration
Foraging/hunting, Bonding/Reaffirming
bonds, Rearing young, Playing,
Sexual activity
Sleeping/resting
Using refuges, retreat, or
defensive attack

Domain 5: Mental State

Negative

Anger, frustration
Boredom, helplessness
Loneliness, isolation
Depression, withdrawal

Unsatisfied sexually
Exhaustion
Anxiety, fearfulness, panic, neophobia

Positive

Calmness
Vitality/reward
Affectionate sociability
Maternally/paternally/group rewarded
Excitation/playfulness
Sexually gratified
Energised/refreshed
Secure/protected/confident

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Seven Key Applications of the Model

The Model:

1. Specifies key *general foci* for animal welfare management
2. Highlights the *foundations* of specific welfare management objectives
3. Identifies previously *unrecognised features* of poor and good welfare
4. Enables *monitoring of responses* to specific welfare-focused remedial interventions and/or maintenance activities
5. Facilitates *qualitative grading* of particular features of welfare compromise and/or enhancement
6. Enables both *prospective* and *retrospective* welfare assessments to be conducted
7. Provides *adjunct information* to support *Quality of Life evaluations* in the context of *end-of-life decisions*.



Seven Key Applications of the Model

The Model:

1. Specifies key *general foci* for animal welfare management
 - These *foci* relate to the *targets* of the Provisions:
 - Good nutrition
 - Good environment
 - Good health
 - Appropriate behaviour
 - Good application of the Provisions achieves *welfare-relevant affective outcomes*
 - We cannot *measure* affects directly, but we can *manage them* practically via the Provisions



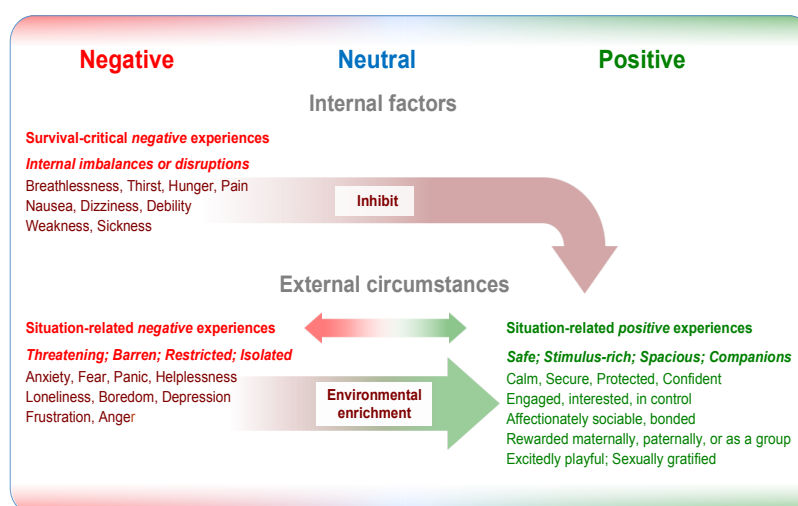
Seven Key Applications of the Model

The Model:

2. Highlights the *foundations of specific welfare management objectives*

- *Survival-critical negative affects:*
 - Minimise to low/tolerable levels that still motivate the required behaviours
 - Valence range is 'negative-to-neutral'
- *Situation-related negative affects:*
 - Replace them with situation-related positive affects via enrichments
 - Valence range is 'negative-to-neutral'
- *Situation-related positive affects:*
 - Provide opportunities to experience comfort, pleasure, interest, confidence and a sense of being in control
 - Valence range is 'neutral-to-positive'

Seven Key Applications of the Model



Seven Key Applications of the Model

The Model:

3. Identifies previously *unrecognised features of poor and good welfare*

- Common misconception: “*No pain, no welfare compromise*”
- Related to laws that refer to “*Pain and suffering*”
- Suffering taken to include: *mental cruelty, discomfort or distress*
- All of these descriptors are *generic – non-specific*

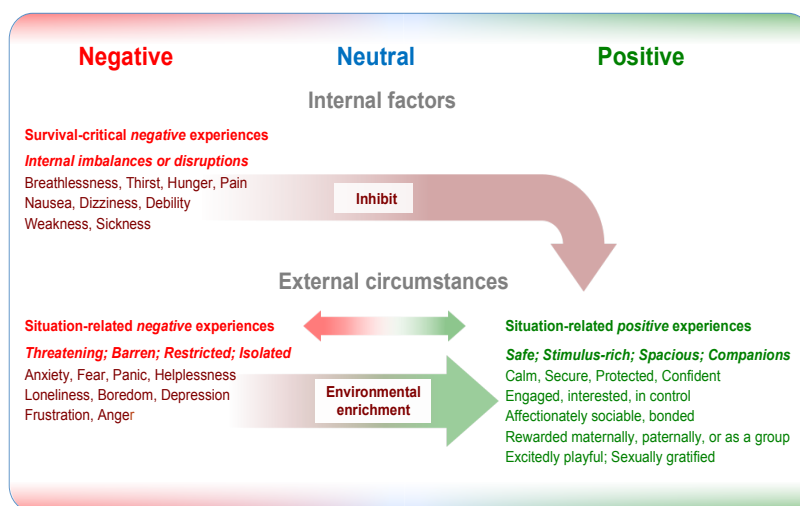
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- **The Model is much more specific with regard to negative affects**

Seven Key Applications of the Model



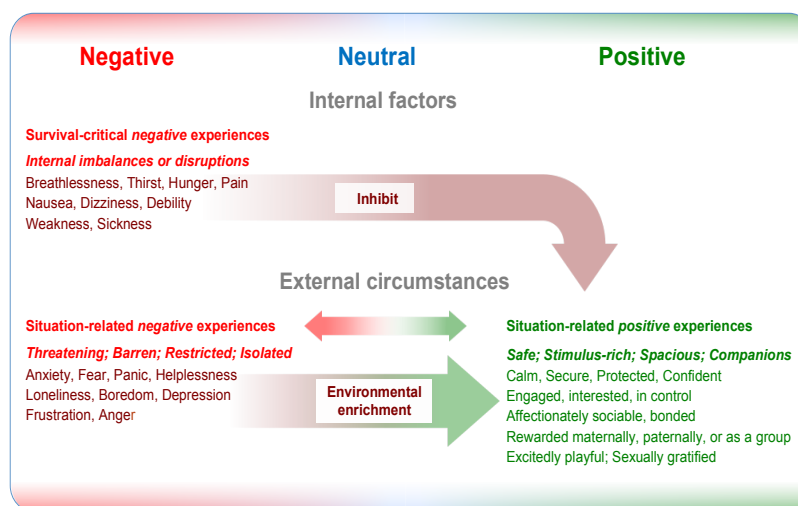
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- All of these descriptors are *generic – non-specific*
- The Model is much more specific with regard to *negative affects*
- The Model is ALSO very specific about possible *positive affects*

Seven Key Applications of the Model



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- All of these descriptors are *generic – non-specific*
- The Model is much more specific with regard to *negative affects*
- The Model is ALSO very specific about possible *positive affects*
- This *specificity enables* more precise targeting, via the Provisions, to *correct particular welfare compromises* and/or to *promote particular welfare enhancements*

Seven Key Applications of the Model

The Model:

4. Enables *monitoring of responses to specific welfare-focused remedial interventions and/or maintenance activities*
- Clearly, this is achieved by repeated Model-based welfare assessments
 - Note: only welfare attributes for which particular indices are available and observable can be monitored



Seven Key Applications of the Model

The Model:

5. Facilitates *qualitative grading of particular features of welfare compromise and/or enhancement*
- Five-tier compromise scale
 - Relates to *degrees/durations of physical/functional and situational impacts*:
 - A: None
 - B: Low
 - C: Mild-to-Moderate
 - D: Marked-to-Severe
 - E: Very Severe



Seven Key Applications of the Model

The Model:

5. Facilitates *qualitative grading* of particular features of *welfare compromise and/or enhancement*

- **Five-tier *compromise scale***
- **Relates to *degrees/durations* of *physical/functional* and *situational impacts*:**
 - **A: None**
 - **B: Low**
 - **C: Mild-to-Moderate**
 - **D: Marked-to-Severe**
 - **E: Very Severe**
- **Four-tier *enhancement scale***
- **Relates mainly to *use of opportunities* for *rewarding behaviours*:**
 - **0: None**
 - **+: Low-level enhancement**
 - **++: Medium-level enhancement**
 - **+++: High-level enhancement**

Seven Key Applications of the Model

The Model:

6. Enables both *prospective* and *retrospective* welfare assessments to be conducted

- ***Prospective applications* to anticipated *-ve* and/or *+ve* impacts:**
 - **During the devising of new zoo and aquarium enrichments**
 - **Changes in husbandry/housing of farm, working and sports animals**
 - **Evaluation of 'pest' control devices/tools and procedures**
 - **Evaluating RTT procedures – regulated in NZ since 1997**

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 - Changes in husbandry/housing of farm, working and sports animals
 - Evaluation of 'pest' control devices/tools and procedures
 - Evaluating RTT procedures – regulated in NZ since 1997
 - *Retrospective applications* to situations that have occurred:
 - Same as above
 - Forensic use in preparing Expert Witness Statements for cruelty court cases
 - Canadian experience
 - Recent visit to NZ and Melbourne by Dr. Rebecca Ledger

Seven Key Applications of the Model

The Model:

7. Provides *adjunct information* to support *Quality of Life evaluations* in the context of *end-of-life decisions*.
- QoL assessment is complex
 - No 'all-inclusive' metric for QoL exists
 - The welfare compromise and enhancement scales do not have a common base
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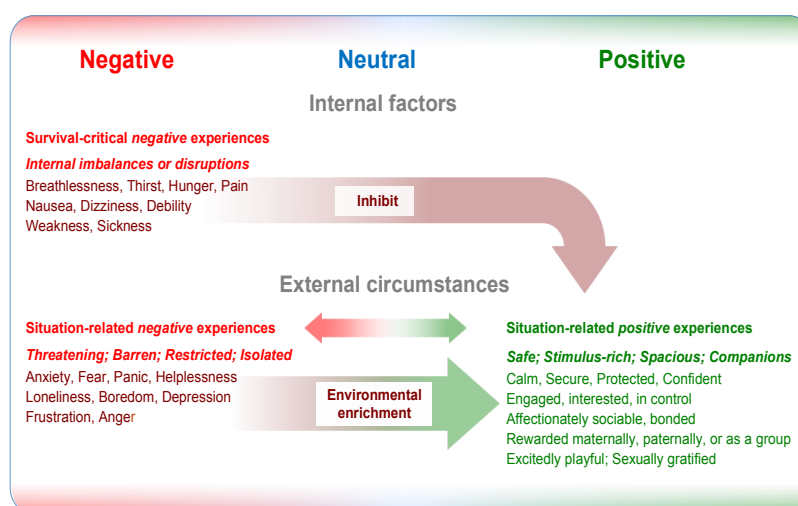
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7. Provides adjunct information to support *Quality of Life evaluations* in the context of *end-of-life decisions*.

- QoL assessment is complex
- No 'all-inclusive' metric for QoL exists
- The welfare compromise and enhancement scales do not have a common base
- Only welfare attributes for which particular indices are *available* and *observable* can be monitored
- Nevertheless, the Model can provide helpful adjunct information when making end-of-life decisions
- This relates to *interactions* between *survival-critical negative affects* and the *motivation* to engage in behaviours that may give rise to *positive situation-related affects*

Seven Key Applications of the Model



Areas considered

- ***The Freedoms, Provisions and Welfare Aims***
 - The Five Freedoms and importance of the Provisions
 - The Five Provisions / Welfare Aims Paradigm
- ***The Five Domains Model***
 - Overview
 - Examples of its operation
- ***Seven Key Applications of the Model***
 - Key general foci of AW management
 - Foundations of specific AW management objectives
 - Identifies previously unrecognised features of poor and good welfare
 - Monitoring changes in AW
 - Grading of AW compromise and/or enhancement
 - Prospective and retrospective AW assessments
 - Quality of Life assessments relevant to end-of-life decisions
- ***Concluding comments***



Concluding comments

QUESTIONS

Q: Is the minimalist aim of mere survival sufficient?

A: The biological functioning approach, focused on survival-related factors, can achieve survival,

BUT this will usually only minimise or neutralise –ve affective states

NEVERTHELESS: it is important to do this!



Concluding comments

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Q: How can survival be accompanied by a good *Quality of Life*?

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AND by providing them with *opportunities to have those experiences*



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AND by providing them with *opportunities to have those experiences*

Q: How can such +ve experiences be *identified*?

A: By using the latest version of the *Five Domains model*



Concluding comments

QUESTIONS

Q: How can the 2015 model be used to improve Quality of Life?

A: First, consider the potential +ve affects that are known to be aligned with survival-related and situation-related factors

Second, for each domain, assess whether the circumstances would impede or allow animals to have +ve (i.e. rewarding) experiences

Third, seek to introduce and/or maintain beneficial circumstances, recognising that such changes are enrichments



Concluding comments

QUESTIONS THAT SUPPORT ENRICHMENT INITIATIVES

- What opportunities have been provided for the animals' comfort, pleasure, interest, confidence, choice and challenge?
- What provisions have been made to ensure that consuming the food provided will be an enjoyable experience?



Concluding comments

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- What *environmental choices* will be available that *will encourage exploratory* and *food acquisition* activities which are *rewarding*?
- What provisions have been made to enable *social species* to engage in *bonding* and *bond affirming activities* and, as appropriate, other *affiliative interactions* such as *maternal, paternal and group care of young, play behaviour* and *sexual activity*?



Concluding comments

Let us be clear:

It is **NOT** possible to completely eliminate all of the negative experiences that animals may have

BUT it **IS** possible to **MINIMISE** them

AND it **IS** also possible to **REPLACE** some situation-related negative affects by positive ones using **ENRICHMENTS**.

THANK YOU