GENERAL

Guide:

p. 4: "In all instances where Guide recommendations are different from applicable legal or policy requirements the higher standard should apply."

p. 60: "An animal's space needs are complex, and consideration of only the animal's body weight or surface area may be inadequate. Important considerations for determining space needs include the age and sex of the animals; the number of animals to be co-housed and the duration of the accommodation; the use for which the animals are intended (e.g., production vs. experimentation), and any special needs they may have (e.g., vertical space for arboreal species or thermal gradient for poikilotherms)."

"Group housed, social animals can share the allotted space such that the amount of space required per animal may decrease slightly with higher stocking densities than smaller groups or individual animals."

"Consideration of floor area alone may not be sufficient in determining adequate cage size. With some species, cage volume and spatial arrangement may be of greater importance…. The height of an enclosure can be important to allow for expression of species-specific behaviors and postural adjustments. Cage height should take into account typical posture and provide adequate clearance for the animal from cage structures, such as feeders and water devices. Some species, e.g., nonhuman primates, cats and arboreal animals, use the vertical dimensions of the cage to a greater extent than the floor. For these animals, the ability to stand or to perch with adequate vertical space to keep their body, including their tail, above the cage floor can improve their well-being…."

"At a minimum, animals must have enough space to express their natural postures and postural adjustments without touching enclosure walls or ceiling, be able to turn around, and have ready access to food and water. In addition, there must be sufficient space to comfortably rest away from soiled areas."

"Floor space taken up by food bowls, water containers, litter boxes, and enrichment devices (e.g., novel objects, toys, foraging devices) should not be considered part of the floor space."

"When socially housed, animals should be provided sufficient space and structural complexity to allow them to escape aggression or hide from other animals in the pair or group."

"Breeding animals will require more space, particularly if neonatal animals will be raised together with their mother or as a breeding group until weaning age."

"Cage height should take into account typical posture and provide adequate clearance for the animal from cage structures, such as feeders and water devices."

ETS 123:

Any animal used or intended for use in a procedure shall be provided with accommodation, an environment, at least a minimum degree of freedom of movement, food, water and care, appropriate to its health and well-being. Any restriction on the extent to which an animal can satisfy its physiological and ethological needs shall be limited as far as practicable.

p.6: "…the basic physiological and ethological needs of the animals (freedom of movement, social contact, meaningful activity, nutrition, water) should be restricted only for the minimum necessary period of time and degree…"

p,7: "…the recommended standards of space represent minimum allowances. These may have to be increased in some circumstances, as environmental requirements for individual animals might vary according, for example, to species, age, physiological conditions, stocking density and whether the animals are kept as stock, for breeding or experiments, whether long-term or short-term…"

p.14: All animals should be allowed adequate space to express a wide behavioural repertoire.

p.15: "All animals should be provided with sufficient space of adequate complexity to allow expression of a wide range of normal behavior."

COMMON LABORATORY ANIMALS

RODENTS

Guide:

p.61: "…variables that may affect the animals' response to different cage sizes and housing densities include, but are not limited to, species, strain (and social behavior of the strain), phenotype, age, gender, quality of the space (e.g., vertical access) and structures placed within the cage. These issues remain complex and should be carefully considered when housing rodents."

p. 62 (footnote "a"): "Singly housed animals and small groups may require more than the applicable multiple of the indicated floor space per animal."

(footnote "c"): "Consideration should be given to the growth characteristics of the stock or strain as well as the sex of the animal housed. Weight gain may be sufficiently rapid (and juvenile rodents are highly active and show increased play behavior) that it may be preferable to provide greater space in anticipation of the animal's future size."

p. 63 (footnote "d"): "Other considerations may include culling of litters or separation of litters from the breeding group, as well as other methods of more intensive management of available

space to allow for the safety and well-being of the breeding group. Sufficient space should be allocated for mothers with litters to allow the pups to develop to weaning without detrimental effects to the mother or the litter."

ETS 123:

"Gerbils need comparatively more space than other rodent species in order to allow them to build and/or use burrows of sufficient size. Gerbils require a thick layer of litter for digging and nesting or a burrow substitute, which needs to be at least 20 cm long.

p.21: "When designing procedures, consideration should be given to the potential growth of the animals to ensure adequate space is provided (as detailed in Tables A.1. to A.5) for the duration of the study."

Table footnote for Rats: "In lifetime studies, animals should be provided with enclosures of a suitable size to enable the animals to be socially housed. As stocking densities towards the end of such studies may be difficult to predict, consequentially there may be occasions where space allowances per individual animal may fall below those indicated above. In such circumstances priority should be given to maintaining stable social structures.

RABBITS

Guide:

P. 63: "Larger rabbits may require more cage height to allow animals to sit up."

"For cats, dogs and some rabbits, housing enclosures that allow greater freedom of movement and less restricted vertical space are preferred (e.g., kennels, runs, or pens instead of cages)."

ETS 123:

p.25: "A raised area should be provided within the enclosure. This raised area should allow the animal to lie and sit and easily move underneath, but should not cover more than 40% of the floor space. While the enclosure height should be sufficient for the rabbit to sit upright without its ears touching the roof of the enclosure, this degree of clearance is not considered necessary for the raised area. If there are good scientific or veterinary reasons for not using a shelf then the enclosure should be 33% larger for a single rabbit and 60% larger for two rabbits. Wherever it is possible, rabbits should be kept in pens."

"In cages a raised area should be provided (see Table B.4.). Pens should contain structures that subdivide the space to allow animals to initiate or avoid social contact."

For breeding: “The enclosure should be designed so that the doe can move to another compartment or raised area away from her pups after they have left the nest.”

p.26: “If there are scientific or veterinary justifications for not providing a raised area then the floor area should be 33% larger for a single rabbit and 60% larger for two rabbits, to facilitate the rabbit’s locomotor activities and to enhance the opportunity to escape from a more dominant animal. Where a raised area is provided for rabbits of less than 10 weeks of age, the optimum size of the raised area should be 55x25 cm and the height above the floor should be such that the animals can make use of it.”

FERRETS

ETS 123:

p.39: “The design of the ferret enclosure should meet the animals’ species- and breed-specific needs…. The design of the enclosure should allow some privacy for the ferrets and enable them to exercise some control over their social interactions. Separate areas for different activities, such as by raised platforms and pen subdivisions, should be provided in addition to the minimum floor space detailed below.

Where nesting boxes are provided, these should be designed to contain the young ferrets within the nest.”

“It should be noted that … every encouragement is given to holding ferrets in large and socially harmonious groups both to increase the available floor space and to enhance the socialisation opportunities. Their design and construction should seek to provide an open and light facility giving the ferrets comprehensive sight of other ferrets and staff, outside of their immediate animal enclosure. There should also be provision for the ferrets to seek refuge and privacy within their own enclosure and, in particular, away from the sight of ferrets in other enclosures.”

“The ferret enjoys climbing and this height facilitates provision of suitable enrichment. The floor space should provide an adequate area for movement and to allow the animal the opportunity to select sleeping, eating and urination/defecation areas.

p.40: “Animal enclosures should be of a rectangular shape rather than square, to facilitate locomotor activities.”

CATS

Guide:

p. 63: “For cats, dogs and some rabbits, housing enclosures that allow greater freedom of movement and less restricted vertical space are preferred (e.g., kennels, runs, or pens instead of cages).”

"For cats, vertical space with perches is preferred and may require additional cage height."

"Dogs and cats, especially when housed individually or in smaller enclosures should be allowed to exercise and provided with positive human interaction."

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ETS 123:

p.29/30: "Raised, part-enclosed structures should be provided (e.g. a bed with three walls and a roof on a shelf approximately one metre off the floor) to give the cats a view of their surroundings and, if pair- or group-housed, the opportunity to maintain a comfortable distance from other cats. There should be a sufficient number of these structures to minimise competition. Structures should be distributed within the enclosure so that animals can fully use the space available.

There should also be provision for the cats to seek refuge and privacy within their own enclosure and, in particular, away from the sight of cats in other enclosures. Vertical wooden surfaces should be provided to allow claw-sharpening and scent-marking. Outside runs provide an environmental enrichment opportunity for cats in both breeding and user establishments and should be provided where possible."

DOGS

Guide:

p. 63: "For cats, dogs and some rabbits, housing enclosures that allow greater freedom of movement and less restricted vertical space are preferred (e.g., kennels, runs, or pens instead of cages)."

"Dogs and cats, especially when housed individually or in smaller enclosures should be allowed to exercise and provided with positive human interaction."
Cage height should be sufficient for the animals to comfortably stand erect with their feet on the floor."

p. 64: "Enclosures that allow greater freedom of movement and unrestricted height are preferred (i.e., pens, runs or kennels)."

ETS 123:

p.32: "The recommendations provided are for the beagle, the most commonly used breed. Account should be taken of individual breed characteristics if other breeds are used."

p.34: "The design of indoor and outdoor enclosures should allow some privacy for the dogs and enable them to exercise some control over their social interactions.
Separate areas for different activities should be provided. This can be achieved by, for example, inclusion of raised platforms and pen sub-divisions."

"These guidelines are intended to encourage the social housing of dogs and to permit adequate environment enrichment. It should be noted that within this concept and strategy every encouragement is given to holding dogs in large and socially-harmonious groups both to increase the available floor space and to enhance socialisation opportunities."

"The space allowances detailed below are based on the requirements of beagles, but it should be noted that allowances significantly in excess may be required for giant breeds such as St. Bernards or Irish wolfhounds. For breeds other than the laboratory beagle, space allowances should be decided in consultation with veterinary staff and the responsible authority."

NONHUMAN PRIMATES

Guide:

pp. 64: "…due to conformational differences of animals within groups, more space or height may be required to meet the physical and behavioral needs of the animals. Therefore, determination of the appropriate cage size is not based on body weight alone…."

p. 65: "Cage height should be sufficient for the animals to comfortably stand erect with their feet on the floor. Baboons, patas monkeys and other long-legged species might require more height than other monkeys, as might long-tailed animals with prehensile tails. Overall cage volume and linear perch space should be considerations for many neotropical and arboreal species. For brachiating species, cage height should be such that an animal can, when fully extended, swing from the cage ceiling without having its feet touch the floor. Cage design should enhance brachiating movement."

ETS 123:

p. 42: "In contrast to non-arboreal laboratory mammals, the flight reaction of non-human primates from terrestrial predators is vertical, rather than horizontal; even the least arboreal species seek refuge in trees or on cliff faces. As a result, enclosure height should be adequate to allow the animal to perch at a sufficiently high level for it to feel secure. The structural division of space in primate enclosures is of paramount importance. It is essential that the animals should be able to utilise as much of the volume as possible because, being arboreal, they occupy a three-dimensional space. To make this possible, perches and climbing structures should be provided."

"The enclosure should allow the animal to adopt as wide a behavioural repertoire as possible, provide it with a sense of security, and a suitably complex environment to allow the animal to run, walk, climb and jump."

p.46: "The following factors will determine the enclosure dimensions for a given species:
– the adult size of the animal (juvenile animals, though smaller, are usually more active than adults, thus requiring similar space allowances for physical development and play), and sufficient space to provide a complex and challenging environment and the size of group to be accommodated.

"The following principles should apply to the housing of all species of nonhuman primates: enclosures should be of adequate height to allow the animal to flee vertically and sit on a perch or a shelf, without its tail contacting the floor; the animal should be able to display a normal locomotor and behavioural repertoire; there should be room for suitable environmental enrichment; apart from exceptional circumstances, the animal should not be singly housed; enclosures should not be arranged in two or more tiers vertically."

p.47: "As height is a critical feature of the enclosure, all non-human primates should be able to climb, jump and occupy a high perch."

Marmosets:

p.51: "The natural behaviour of marmosets and tamarins indicates that the captive environment should provide some degree of complexity and stimulation, factors which are more valuable than simply increasing enclosure dimensions to promote species typical behaviour."

"For marmosets and tamarins the volume of available space and the vertical height of the enclosure are more important than floor area, due to the arboreal nature and the vertical flight reaction of these species. The minimum dimensions and design of the enclosure should take into account the purpose for which the animals are maintained (breeding, stock, short or long experiments) and enable the inclusion of sufficient devices for improving the environmental complexity."

Squirrel monkeys:

p.54: "As arboreal animals, squirrel monkeys need sufficient climbing possibilities which can be provided by wire-mesh walls, poles, chains or ropes. Though they do leap over gaps if provided with structures, they prefer to run along or swing on horizontal and diagonal branches or rope bridges. Perches or nest boxes where they can sit huddled together for resting and sleep will be utilised…. The animals should be offered a choice of sites within the enclosure to allow for activity, to enable them to retreat from social contact and to allow them to select comfortable temperatures and lighting conditions."

Macaques and Vervets:

p.57: “The enclosures should include vertical and diagonal structures for climbing, facilitating the use of the whole volume of the enclosure…. A space should be left between the shelf and enclosure wall to allow for the animal to suspend its tail freely.”

“For the animals to feel secure, the design and interior dimensions of the enclosure should at least allow them to climb above human eye level.”

Baboons:

p.61: “For the animals to feel secure, the design and interior dimension of the enclosure should be at least high enough to allow them to climb above human eye level.”

AGRICULTURAL ANIMALS - GENERAL

Ag Guide:

p. 17: “Floor area is only one of the components that determine the space requirements of an animal. Enclosure shape, floor type, ceiling height, location and dimensions of feeders and waterers, features inside the enclosure, and other physical and social elements affect the amount of space sensed, perceived, and used by the animals in intensive management systems….”

“Determination of area requirements for domestic animals should be based on body size, head height, stage of life cycle, behavior, health, and weather conditions.”

“Unless experimental or welfare considerations dictate otherwise, space should be sufficient for normal postural adjustments, including standing, lying, resting, self-grooming, eating, drinking, and eliminating feces and urine. When animals are crowded, body weight gain and other performance traits may be depressed…, and the animals may show altered levels of aggressive behavior…..”

ETS 123:

p.67: “Appropriate design of farm-animal enclosures is essential to ensure that suitable space is available within the enclosure to allow the animals to carry out a range of normal behaviour. Floor type, drainage, provision of bedding (and hence ease of maintaining hygiene) and the social circumstances (group size and stability) will all impact on the space requirements for the animals.”

“Sufficient space should be provided for each animal to stand up, lie comfortably, stretch and groom themselves, with access to a communal lying area and adequate room for feeding. The lying area should allow all animals to lie in lateral recumbency simultaneously, bearing in mind that whilst some farm animals, for example pigs, generally prefer to lie in physical contact with other conspecifics, others, such as equines prefer a degree of spatial separation. Under conditions

of high temperatures, where animals need to lie with complete spatial separation to facilitate heat loss, a greater lying area should be allowed."

"The height of enclosures should allow natural rearing and mounting behaviour."

BEEF CATTLE

Ag Guide:

p. 67 (pdf 75): "Every animal should have sufficient space to move about at will, adequate access to feed and water, a comfortable resting site, and the opportunity to remain reasonably dry and clean…. The area required is affected by type and slope of floor or soil surface, amount of rainfall, amount of sunshine, season, group size, and method of feeding."

"Open feedlot pens need to be sloped to promote drainage away from feed bunks, waterers, pen dividers, and resting areas. Space allocations are related directly to slope."

"The area requirements for cattle are greatly influenced by group size. One animal housed separately in a pen requires the greatest amount of floor area on a per-animal basis. As group size increases, the amount of area required per individual decreases. When an animal is housed individually, the minimum pen width and length should be at least equal to the length of the animal from nose tip to tail head when the animal is standing in a normal erect posture."

p.68 (pdf, p. 76): "Hornless cattle require less space in the feedlot and at the feed bunk."

p. 69 (pdf, p. 77): "Some research and teaching situations require that beef cattle be housed under intensive laboratory conditions. Cattle may be kept in metabolism stalls, stanchions, respiration chambers, or environmental chambers. Housing cattle in such facilities should be avoided unless required by the experimental protocol (e.g., complete urine or fecal collection, frequent sampling, or environmental control) and then should be for the minimum amount of time necessary to accomplish the teaching or research objective."

p. 70 (pdf, p. 78): "Pens, stalls, and stanchions should be large enough to allow cattle to stand up or lie down without difficulty and should be long enough to allow cattle to maintain a normal standing position."

"The length of time that cattle may remain in stanchions, metabolism stalls, or environmental chambers before removal to a pen or outside lot for additional exercise should be no longer than that necessary for conducting the study. Opportunities for regular exercise should be considered if they do not disrupt the experimental protocol…."

ETS 123:

p. 70: “Where cattle are housed indoors, a bedded area sufficient to allow all of the animals to lie simultaneously will be provided.

If individual open-ended cubicles are provided as the bedded area, this area may be reduced in size, but the total number of cubicles should exceed animal numbers by 5% to reduce competition and permit all animals to lie simultaneously.”

p.71: “Cubicle length is primarily determined by the weight of the animals. Cubicle width will vary, depending on the type of division used, but must be sufficient to allow the animals to lie comfortably without undue pressure being exerted by the divisions on vulnerable parts of the body.”

DAIRY CATTLE

p. 74: “Physical accommodations for dairy cattle should provide a relatively dry area for the animals to lie down in and be comfortable (Cook et al., 2005) and should be conducive to cows lying for as many hours of the day as they desire.”

p. 75: “The length of individual stalls should be a little longer than the length of the animal, defined as the distance between the pin bones and the front of the shoulders … or between the pin bones and the brisket….The width of free stalls should be twice the hip width.”

“Dairy cows prefer larger, more comfortable stalls….”

p. 77: “One free stall is recommended for each lactating cow.”

p. 78: “Space should be adequate for feed and water.”

“The recommended linear [feeder] space per cow at the feed bunk…should allow every animal uninterrupted feeding.”

HORSES

Ag Guide:

p. 90: “Dimensions of indoor occupancy should be sufficient for a horse to make normal postural adjustments at will, unless the approved protocol requires otherwise. A reasonable area allowance in m^2 for a single horse is 2 to 2.5 times the height of the horse (at the withers) squared…, which permits essential movements, including lying down in sterna or lateral recumbency.”
“Box stalls should be large enough to permit the horse to lie down, stand up, turn around, and roll.”

p. 91: “…minimum ceiling height should be at least 0.3 m (1 ft) higher than the horse’s ears when the head is held at its highest level….”

p. 92: "In general, horse pastures, paddocks, and corrals should provide a reasonably comfortable environment, including sunshade, windbreak, a firm surface upon which to rest, sufficient area for normal postural adjustments, and an enclosure that confines the horses safety and is free of trash, holes, and other dangerous objects but avoids unnecessary physical restraint. These outdoor accommodations also should provide for the biological needs of the animals (e.g., feed and water, exercise, reproduction if appropriate, and freedom to avoid contact with excreta)."

"The minimum area per horse in an outdoor pen should be suitable for normal postural changes, but a larger area per horse is suggested, especially for groups of horses. Continuous long-term maintenance of horses in the minimal area should be discouraged because it does not allow for sufficient exercise…."

"In wet or muddy conditions, dry areas should be available to allow horses to lie down. Tight spaces and sharp corners or projections should be avoided in the pens to reduce injury and the chance of dominant animals trapping subordinates."

"...shelters should be provided in very hot, very cold, or wet environments."

ETS 123:

p.78: "The total space requirement for indoor enclosures will depend on whether animals also have daily access to additional areas for grazing and/or other forms of exercise. The figures below assume that such additional areas will be provided. If not, then space allowances should be increased significantly."

p.79: "The height of indoor enclosures should allow animals to rear to their full height to safeguard the welfare of the animals."

SHEEP AND GOATS

Ag Guide:

p. 129: "The space required per animal depends on the intent of the research and teaching, type and slope of floor or ground surface, weather conditions and exposure, and group size. Floor or ground area requirements vary considerably among locations, depending on conditions, husbandry, and management."

p. 134: "One method to reduce injury among newly grouped males is to severely restrict the space allocation for each animal for a few days to limit the distance available when rams run toward each other to butt heads. After rams appear to have established a social hierarchy, the space allocation per animal can be increased to provide sufficient space."

"Sufficient space and multiple feeders should be provided to prevent individuals from dominating feed and water supplies."

"Ewes and does should not lamb or kid in claiming pens because the pens are typically too small to allow the animals to move about freely during labor and parturition, become wet and very difficult to keep clean, and become sources of disease. Restricting the periparturient female's movements may increase the chances that a ewe or doe will step or lie on her offspring. Ewes and does should lamb or kid in a relatively large and open area that can be observed easily and, if necessary, then moved with their offspring into claiming pens to ensure bonding."

p. 138: "The activity of sheep and goats maintained in intensive laboratory environments is restricted, and animals in these environments should be observed at least daily. The period of time that sheep and goats may be maintained in these environments before removal to a larger space for additional exercise should be based on professional judgment and experience. The IACUC should carefully evaluate studies that require sheep and goats to be housed in intensive laboratory environments; particular attention should be given to the duration that activity is restricted. Opportunities for regular exercise should be provided if exercise does not affect the experimental protocol."

p. 139: "Lairage facilities should be designed and managed so that they prevent injuries, and animals can receive proper care and remain safe between delivery and slaughter. Several factors should be considered in relation to animal welfare… (Weeks, 2008). Those factors include stocking rates and space per animal; …shelter to protect animals during extreme weather conditions; well-drained lying areas that can be cleaned thoroughly between groups of animals; … design that allows animals to be handled calmly and quietly to avoid unnecessary preslaughter stress…."

ETS 123:

p.72: "Sufficient raised areas of appropriate size and quantity to prevent dominant animals impeding access should be provided for goats."

SWINE

Ag Guide:

p. 145: "A wide variety of options is available for housing sows during farrowing and lactation ranging from conventional stalls to outdoor paddocks…. Farrowing systems should meet the performance standards of minimizing preweaning piglet mortality, providing thermal comfort for sow and piglets…, providing a sanitary environment for sows and piglet, and accommodating normal sow and piglet behaviors where possible."

"To reduce piglet injury and protect animal care personnel from overly aggressive periparturient

sows, indoor sows may be confined in farrowing stalls or free stalls from d 109 of gestation until the piglets are weaned. The length of the stall should be based on the body length of the sow. Sows should be able to rest comfortably in the farrowing stall without the need for their heads to rest on a feeder due to inadequate length of the stall."

p. 146: "Until weaning, piglets should be provided with an area that is warm, dry, draft-free, and zone heated, and piglets should be protected from being crushed or injured by the sow."

p. 147: "The general nature of pig growth is rapid early growth followed by a leveling-off growth rate. Groups of pigs have different space requirements than individually housed pigs. The bodies of pigs require a certain amount of space called the *occupied space,* and the space in the pen that remains is the *free space*. The amount of space a pig occupies depends on posture and behavior. The amount of unused or free space increases with increase in group size…. Space needs for pigs in outdoor lots should be based on local performance standards, not on hard-and-fast numbers."

p. 148 (footnote): "Pigs given adequate floor space will lie comfortably without needing to raise their heads while resting or constrict their bodies as they exercise normal postural adjustments."

For small group sizes (2 to 4 pigs), pens should be longer than the body length of the largest pig in the pen.

p. 149: "…all sow housing systems should attempt to minimize sow aggression and competition especially at mixing and during feeding; provide sow protection from environmental extremes and hazards;... and allow sows to express normal behaviors."

"Sows should be in a pen or stall that allows them to lay down without parts of their body (not including their limbs) extending into the neighboring stall. Standing sows and gilts should not be forcibly in contact with the sides, ends, or top of the stall…, and sows housed in individual stalls should be able to lay down in full recumbency without their heads lying upon a raised feeding trough."

p. 150: "Floor space allowance will vary with group size. Space for accessing necessary resources, opportunity to avoid or escape from potential aggressors, and avoidance of chronic physiological stress are essential for the well-being of low-ranking sows in group housing. Space should be adequate to avoid physical injury."

Guide:

p. 66: "For larger animals (e.g. particularly swine) it is important that the configuration of the space allow the animals to turn around and move freely (Becker et al. 1989; Bracke et al. 2002)"

ETS 123:

p.74: “Because of this difference in body size at maturity, recommendations for farm pigs cannot always be extrapolated on a simple weight basis. Recommendations in this document apply to both types of pig, with specific requirements of mini-pigs annotated where necessary.”

p.75: “Pigs show spatial separation of different behaviours such as lying, feeding and excretion. Enclosures should therefore allow for the establishment of separate functional areas by providing either plentiful space or appropriate subdivision of the enclosure area.”

AVIAN SPECIES

Guide:

p. 64, Chickens, pigeons and quail: “Cage height should be sufficient for the animals to stand erect with their feet on the cage floor. Singly housed birds may require more space per animal than recommended for pair- or group-housed birds.

ETS 123:

p.82: “Birds should be housed in enclosures which facilitate and encourage a range of desirable natural behaviours, including social behaviour, exercise and foraging.”

Domestic fowl:

p.85: “Perch heights should be adjusted in response to the birds’ behaviour by seeing how easily birds can get on and off perches and move between them. All birds should be able to perch at the same time ….

“Fowl are highly motivated to perform ‘comfort behaviour’ such as wing flapping, feather ruffling and leg stretching, which help to maintain strong leg bones. Birds should therefore be housed in floor enclosures large enough to permit all of these behaviours whenever possible.”

“If fowl need to be caged for scientific purposes, they should be housed in enclosures designed to address behavioural requirements.”

Domestic turkey:

p.87: “Turkeys should be provided with perches placed at a height where birds on the ground are not able easily to peck and tug at the feathers of perching birds.”

Ducks and geese:

p.89: “Ducks and geese should be housed on solid floors and have sufficient space to permit foraging, walking, running and wing flapping.”

Pigeons:

p.91: “Pigeons should be allowed an area sufficient for flight wherever possible, with a separate perching area for each bird along at least one wall of the enclosure.”

“Larger, enriched enclosures with shelving, perches and toys should be used wherever possible rather than ‘standard’ pigeon enclosures.”

“Enclosures should be long and narrow (for example 2 m by 1 m) rather than square to allow birds to perform short flights.”

Zebra finch:

p.92: “Enclosures should be long and narrow (for example, 2 m by 1 m) to enable birds to perform short flights.”

Ag Guide:

Poultry

p. 111: “Chickens, turkeys, broilers, and ducks should have sufficient freedom of movement to be able to turn around, get up, lie down, and groom themselves (Brambell, 1965).”

p. 112: “…cage height should allow birds to stand comfortably without hitting their heads on the top of the cages.”

p. 113-114: “In terms of space use, there is no scientific evidence to suggest that social restriction on use of space occurs in large groups of broilers (Estévez et al., 1997), even in mature broiler breeders (Leone and Estévez, 2008). Although less active than layer strains, meat chickens will use more space when available to them (Leone and Estévez, 2007). Use of space can be improved by providing rectangular rather than square pens for the same available area (E. H. Leone and I. Estévez; personal communication). Although broiler chickens can be maintained in cages, it is best for their health and welfare to use floor pens provided with some type of litter such as wood shavings.”

p. 114: “Because of a relative absence of research on well-being indicators for turkeys and ducks, recommendations are based on professional judgment and experience.
Generally, area allowances are assumed to be adequate when productivity of the individual birds is optimal and conditions that are likely to produce injury and disease are minimal.”

AMPHIBIAN SPECIES

ETS 123:

p.95: Aquatic amphibians: "…long, narrow enclosures should be avoided since they may restrict locomotor activity and social behaviour such as feeding frenzies."

FISH

ETS 123:

p.107: "Fish should have sufficient water volume for normal swimming."

"Enclosures should be of an appropriate shape to accommodate the behavioural needs and preferences of the particular experimental fish species; for example, circular enclosures are most appropriate for salmonids."