

Example Common Marmoset family: Welfare: 24/7 across the lifespan

Workshop 1

Goal: To complete the table in relation to ONE specific animal/specific group of animals you and the group are familiar with.

Questions concern the natural adaptations of the species, and how well the individual/group in captivity match these. Please think about details. For example, if you are answering a question regarding locomotion, try to think about all the ways an animal might move. A bird does not fly in only one way, but there are many aspects to flying such as swooping, gliding, diving, turning. Other factors such as distance and height the birds naturally fly in, together with their field of view, and the environment they land on are also important. Describing the details allows us to highlight what natural adaptations and capacities animals have and how this compares to the current environment of the individual/group.

Outcome: a list of areas where there is a mismatch that MAY require additional intervention to promote welfare.

Workshop 2

Using an adapted version of the Animal Welfare principles and criteria formulated by Welfare Quality® complete the table providing evidence you are meeting welfare principles (e.g. what evidence/provision), and if not what steps are being taken to address it? An example might be that you are thinking of land use, try to consider the different complexities like substrates, levels, resting, sleeping and or hiding places, shades and/or transition into water if this is applicable to the species. This can also be related to details on foraging behaviour or social interaction. Describing the details allows us to consider the current environment of the individual/group and how this compares to what we think animals need and want. Think about ALL individuals in the group, and across all seasons, events etc..

Outcome: a list of areas where you feel that the evidence/provision is lacking (noting age/seasonal differences).

Workshop 3

Outcome: a list, in order of priority, of up to three actions to take forward, together with the rationale for action.

Basic assumptions

- To optimise welfare, and ensure “fit for purpose” (e.g. specific requirements as research model, zoo exhibit, candidate for reintroduction, companion animal, farm animal etc.).
- Consider the birth to death experience, to take into consideration age profile, seasonal changes, climatic and routine/work changes (e.g. training shows, visitor numbers, study requirements).
- Consideration of primarily individual animal welfare but also the need to consider effect other members in group, care staff, visitors (veterinary care etc.).

Complete the following table in relation to ONE specific animal/specific group of animals that you are responsible for the welfare of/care for.

Workshop 1 Species:

Species: Common marmoset (*Callithrix jacchus*), living in a zoo environment as described by Savastano, G., Hanson, A., & McCann, C. (2003). The development of an operant conditioning training program for New World primates at the Bronx Zoo. *Journal of Applied Animal Welfare Science*, 6(3),247-261.

Specific role of animal (i.e. what is required of the animal, research, exhibit): **Zoo display animal**

	Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
	NATURAL HABITAT NATURAL HABITAT NATURAL HABITAT NATURAL HABITAT NATURAL HABITAT NATURAL HABITAT		
1.1 Climate - inc. seasonality (temperature, weather, altitude).	Hot/warm, humid (tropical) and coastal forest, as well as dry arid climates. Approx. 12/12hr day/night across all seasons. Temperatures range between 19 - 26 degrees. Dry season length varies between 5-10 months. Little seasonal variation in temperature and day length (dawn approx. 6am, dark by 6pm).	Temperatures can fluctuate considerably between indoor and outdoor areas, with outdoors being more seasonally variable. Daylight length varies along the seasons. Internal illumination on 12/12hr light/dark cycle without gradual fading.	X
1.2 Habitat type/substrates most used (e.g. forest, desert etc. considering outdoor & indoor).	Variety of different forest types, arid, tropical, riverine, semi desert and shrubs. Use of parks, clusters of trees, and secondary forest near human habitation.	Outdoor housing provides elevated sites, opportunities for climbing, leaping, running, playing, locomoting arboreally and terrestrially, with mulch on the floor. Indoorspace smaller than outdoor area but includes various furniture to accommodate climbing and locomotion.	X
1.3 Natural sleeping sites (e.g. type, height, nesting materials etc.).	Varied, and dependent on a range of factors especially access to feeding trees (at dusk and for the following morning). They sleep at a range of heights from 6m-28+m, in dense and vegetation covered sleeping sites, as well as exposed tree fork with large branches, where the group may huddle as a "ball". They may also use tree holes, or abandoned bird nests. Entry to the sleeping sites varies from about 16.30hrs, with departure around 5.00am; there is variation depending on season. During the day they may rest on branches large enough to sit together and/or be sprawled out during resting bouts.	Nestbox is available. Furniture such as natural branches can provide resting and sleeping sites. Maximum height 3 meters.	X

		Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
	ACTIVITY	ACTIVITY	ACTIVITY	ACTIVITY
	1.4 Diurnal, nocturnal, crepuscular.	Diurnal, with distinct periods of activity. Dawn and dusk have particular behaviour patterns in relation to entering and exiting the sleeping site.	Diurnal. Variable dawn or dusk, lights are on/off on a 12/12 light cycle.	
	1.5 Natural activity patterns (e.g. rest afternoons).	Foraging early in the morning after exiting sleeping site and late afternoon, including gnawing for gum. Periods of inactivity throughout the day, spent resting and socializing. Retreat to sleeping sites approx. 1 hour before sunset (12-13 hours in the sleeping site).	Unless food is provided through e.g. gumfeeders, timers, animals might wait for access to food until caregivers arrive in the morning. Activity patterns such as feeding, resting and socializing can be interrupted by husbandry or public activities. Pre-sleep behaviour sometimes observed by care staff when doing last cleaning, visual check and closing down for the day, but sleep not routinely observed.	
	1.6 Locomotion (e.g. swim, ground dweller, forest etc.).	Arboreal but will come to ground to forage, or move between trees. Alert on ground and flee vertically if alarmed.	Indoor and outdoor area furniture and ground substrates such as mulch provide a variety of opportunities for arboreal and terrestrial locomotion.	
	1.7 Locomotor patterns (e.g. quadrupedal, glider, vertical clinging and leaping).	Quadrupedal. Climbing, leaping, running, vertical clinging and leaping, and hanging upside down. Leap long distances - from branch-to-branch, tree-to -tree, and tree to ground.	Indoor and outdoor area size, furniture, enrichment and ground substrates such a mulch provide opportunities such as leaping, running, seeking cover, playing, clinging, and hanging upside down. Will stand on legs when reaching, holding onto mesh and in training sessions. Leaping distances shortened.	

		Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
	DIET DIET	DIET DIET DIET DIET DIET DIET DIET DIET	DIET DIET DIET DIET DIET DIET DIET DIET	DIET DIET
1.8 Type of food (e.g. fruit, insects, fish).		Diverse, dependent on region and season. Described as primarily exudativore-insectivores. Gum, sap, latex, and resin. Insects, fruits, seeds, flowers, fungi, nectar, snails, lizards, tree frogs, bird eggs, nestlings, and infant mammals.	Live insects, often scattered to increase foraging time and let prey hide. Fruit and vegetable often processed (cut up, peeled etc.), seeds, nuts, and gum.	
1.9 Foraging style/method of catching prey.		Forage in and from the trees, on forest floor, in shrubs, and silently stalk and pounce on insects and other animals.	Food offered in feeding cups, placed on branches or in puzzle feeders, gum feeders, scattered on the floor, insects to stalk and pounce. Food sometimes offered directly from human care staff hand.	
1.10 Frequency of eating (e.g. constant grazers, eat and fast) and temporal patterning.		Activity mostly in early morning and late afternoon, foraging for insects and other animal prey, fruit feeding and gnawing for exudates.	Twice daily.	X
1.11 Predictability of food (e.g. always available, unpredictable prey etc.).		Variable, diverse diet dependent on season and geographical area. Exudate access is predictable in location and temporally (i.e. always present).	Temporally predictable feeding times, but food not always available.	
1.12 Specific adaptations for foraging (e.g. gut adaptation, long tongue etc.).		Claw-like nails to grip and help with tree climbing, incisor morphology for gnawing at trees to get gum to exude, and gut specialization for digestion of gums.	-	

		Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
	SOCIAL SOCIAL	SOCIAL SOCIAL SOCIAL SOCIAL SOCIAL	SOCIAL SOCIAL SOCIAL SOCIAL SOCIAL	SOCIAL SOCIAL
1.13 Social structure (e.g. monogamous, polygynous, multi-male, multi-female).		Variable but monogamous breeding pairs appear most stable. Occasionally there is polygyny with multiple male matings and two females will breed, often consecutively. Infanticide may occur. Extended family, including parents, offspring and/or siblings may be containing several males and females.	Family.	
1.14 Male: female ratio per group (e.g. 1 male: 10 females).		Multiple males: females.	1:4.	
1.15 Average/range of group size (e.g. average ~20, range 6-30).		9-15.	5.	
1.16 Dominance hierarchy (e.g. males dominate females, both sexes have separate hierarchies, matrilineal, or egalitarian).		Breeding pair dominant; males defer to females.	Breeding pair dominant.	
1.17 Breeding considerations: (e.g. separation around birth, length of infant care, infant care learnt, litter size?).		<p>Breeding male and female tend to share dominance. Between two breeding females, one is more dominant. Can stay into adult life with group,</p> <p>Gestation period is 5 months, mostly twins. Inter-birth interval 5 months in the wild.</p> <p>Infant care learnt from other group members and non-breeders are actively involved in care.</p> <p>Breeding pairs need other group members to raise the offspring. Most litters are twins.</p>	<p>Dominant breeding pair and family.</p> <p>Infant care learnt from other group members and actively involved in care. Inter-birth intervals shorter in captivity and females may give birth to offspring twice a year. Larger litters are frequent, resulting in higher mortality of offspring.</p>	X
1.18 Other social considerations (e.g. breeding seasonality, fission-fusion).		Evidence of seasonality in the wild may be associated with breeding to avoid rearing in dry season).		

	Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
	MAJOR LIFE EVENTS	MAJOR LIFE EVENTS	MAJOR LIFE EVENTS
1.19 Age at weaning (provide weaning age from parental feeding, AND from other group care).	<p>Weaning from milk around 10-12 weeks.</p> <p>Infant care continues past weaning from milk and lessens with arrival of next infant when the juvenile helps with the new infant. Development of strong social bonds.</p>	<p>Weaning age from milk around 6-8 weeks.</p> <p>Cooperative infant care provided by biological parents, and other members of the group.</p>	
1.20 Do they emigrate/have individuals immigrate into the group? Is one sex more likely to emigrate than the other? Average age of emigration/immigration?	<p>Females and males can stay together in extended families. Both sexes immigrate and emigrate depending on vacancies in a group. Ages of immigration and emigration vary considerably - some offspring inherit the breeding position.</p>	<p>Kept in family group, with no opportunities to emigrate or for immigration.</p>	X
1.21 Age at sexual maturity (male/female).	<p>Males and females - 24 months but do not breed until dominant, often at three years or older.</p>	<p>Males can breed at 12 months in captivity and females at 18 months but not advised as they have insufficient experience in care for offspring, which is learnt, and required for successful breeding.</p>	
1.22 Lifespan (e.g. average 3 years).	<p>An average of about 12 years in the wild.</p>	<p>They can live up to 20 years in captivity.</p>	X
1.23 Migration (e.g. fly south for warmer weather, migrate over Serengeti for improved foraging).	-	-	

		Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
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	1.24 Main sense? (e.g. echolocation, vision, olfaction).	Binocular vision, with overlapping visual fields is the main sensory modality. Auditory, olfaction, taste and touch important (e.g. hiding, communication, foraging and food handling, fine movements, grooming, etc.).	Most senses not specifically considered in enrichment, training and environmental design programs. Food is often cut in small pieces or processed otherwise reducing opportunities to handle / process food, or use species specific adaptations.	X
	1.25 Specific adaptations? Main sense used for what? (e.g. in crabs hairs can detect vibration to assist with prey capture; elephants can hear infrasound (low frequencies) used in communication).	Specialised scent organs for communication - provides information on sex, reproductive status etc.	Specialised scent organs. Scent marking occurs at a higher frequency in captivity than in the wild, where it is primarily on gnaws in trees.	X
	1.26 Type of vision (e.g. mono-chromatic, tetrachromatic, think also at type(s) of light provided at your facility).	All males are dichromatic. Females have either trichromatic vision, or dichromatic vision like the males.	All males are dichromatic. Females have either trichromatic vision, or dichromatic vision like the males.	

		Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
	<i>WIDER ECOSYSTEM</i>	<i>WIDER ECOSYSTEM</i>	<i>WIDER ECOSYSTEM</i>	<i>WIDER ECOSYSTEM</i>
1.27 Main cause of mortality (e.g. predation, disease, reproductive problems).		Predation by snakes, birds and other mammals.	Old age, wasting syndrome, euthanasia when terminally ill and quality of life is low.	X
1.28 Associations with other species? (e.g. capuchin monkeys form stable and long term association with squirrel monkeys).		Sympatric with other non-human primates though do not form polyspecific associations.	Sometimes housed with other species, mostly housed in extended family groups.	

		Wild in nature/ancestor if domesticated	Your specific individual/group	Mismatch (mark X)
	<i>HUMAN PRESENCE</i>	<i>HUMAN PRESENCE</i>	<i>HUMAN PRESENCE</i>	<i>HUMAN PRESENCE</i>
	1.29 Proximity to humans (e.g. avoids humans; urban species).	May live in neighbourhoods close to humans and urban parks and secondary forests.	Close contact, included hand feeding, cleaning, sometimes direct contact through handling, capture, restraint for husbandry checks or transport. When animals are housed close to the public, visual and auditory as well as physical proximity can be frequent.	X
	1.30 Frequency/duration of human presence (e.g. may not apply to wild, but note pattern in captivity, e.g. human presence 8am-6pm, with husbandry activity 3/day, total about 1 hour).	Little to no contact with humans even if they live in proximity.	Frequency and duration can vary depending on amount of visitors between opening hours zoo, as well as the routine of the caregivers with regards to e.g. feeding, cleaning, enrichment provisions.	X
	1.31 Reason for human interactions(e.g. may not apply to wild, for captivity: PRT, cleaning, dosing, vet care).	-	Husbandry procedures, cleaning, veterinary care, enrichment distribution, zoo visitors.	X
	1.32 Any other relevant info.	-	Can habituate to people but needs time and patience, positive interactions through PRT.	

END OF TASK 1 Outcome: clear list of areas where there is a mismatch that MAY require additional intervention to promote welfare.

Go through your “Mismatch” column and highlight any that are priorities for intervention.

Workshop 2

Complete the table, using an adapted version of the Animal Welfare principles and criteria formulated by Welfare Quality®

(<http://www.welfarequality.net/everyone/43395/7/0/22>). Colour codes refer back to Workshop 1.

	Welfare Principles		Welfare Criteria	Evidence that meeting criteria (e.g. what provision), and if not what steps are being taken to address it? Think about ALL individuals in the group, and across all seasons, events etc.	Mark with an X if concern for lack of evidence.	Note any age/seasonal differences (e.g. point 2 - different foraging opportunities dependent on strength and/or cognitive development).
	Good feeding: Are the animals properly fed and supplied with water? (See Task 1, Diet).	1	Absence of prolonged hunger (i.e. mimic natural feeding intervals). Other end of the spectrum should also be considered, i.e. obesity.	Animals are provided with food twice daily and have access to various feeders in the outdoor and indoor areas, including overnight.	X Currently do not give access to (fresh) food in the early morning before caregivers arrive.	Food provision and presentation adapted to various ages and physical needs.
		2	Access to appropriate food and species-typical foraging opportunities (i.e. they should have a nutritionally suitable and appropriate diet & delivery).	Pine-bark mulch substrate over a concrete floor to encourage foraging. Food related enrichment is provided in the form of puzzle feeders, foraging boxes, and gum-arabic feeder. Vitamin D3 supplements given and other nutritional requirements met.	X Insects not fed. Marmosets stalk and pounce to catch insects, and eat other animal protein. What other foraging opportunities could be provided besides feeders, such as cricket dispensers.	
		3	Absence of prolonged thirst (i.e. they should have a sufficient and accessible water supply).	Water is available ad lib in water bottles in indoor enclosures.	X Water bottles could also be present in outdoor areas.	

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	Good housing: Are the animals properly housed? (See Task 1, Natural Habitat).	4	Animals should have comfort when they are (socially) resting, i.e. physically comfortable and relaxed (e.g. not always vigilant) when resting and sleeping. (Also refer to Activity).	Enclosure is furnished with natural branches, vegetation which can serve as hiding places, has natural and artificial vines, a nestbox.	<p>X Size of branches for sprawling and socially resting and sleeping could be wide: Hammocks?</p> <p>X Variety of heights is limited.</p> <p>X Few areas away from the public and or care-givers.</p> <p>X Vigilance in relation to human care staff activities - should staff consider the timing.</p> <p>X Quality/quantity of sleep not routinely monitored.</p> <p>X Do we have appropriate photoperiod conditions to promote good quality sleep?</p> <p>X Rest or sleep may be disrupted when staff are cleaning, feeding or providing enrichment.</p>	<p>Effect of climate on outdoor resting and sleeping areas, e.g. wind, rain, sun exposure.</p> <p>Environment adapted to various ages e.g. older animals provided with stable furniture, quiet place for older animals to retreat, youngster to rest.</p>
		5	Animals should have thermal comfort, i.e. they should neither be too hot nor too cold, and have thermal zones to choose from. (Also refer to Activity).	Outdoor and indoor areas available.	<p>X Do not provide options for marmosets to choose temperature. Could provide heat lamps, both indoor and outdoor.</p> <p>X Do not currently monitor humidity.</p> <p>X Need to consider provision of sunning and shaded areas and protection from wind and rain.</p>	<p>Effect of climate on choice of thermal zones?</p> <p>Environment adapted to various ages e.g. older and younger animals provided with sheltering furniture.</p>

		6	Animals should have enough space to be able to move around freely in relation to natural locomotion (e.g. leap distance, orientation of substrates etc.), and in context of indoor-outdoor space restrictions. (Also refer to Activity).	Indoor and outdoor areas with space to engage in leaping, climbing, running, playing and other natural locomotion. Fixed and flexible furniture.	X What are locomotion opportunities/constraints when closed inside during cold / wet months?	Environment adapted to various ages e.g. older animals provided with stable furniture, space for youngster to play.
		7	Animals should have perceived control (i.e. complex enclosure giving them choice over what and when they do things). (Also refer to Activity, and Diet).	Fairly complex environment with provisions of environmental enrichment. Positive and collaborative human-marmoset relationships.	X Could improve the complexity and variety of enrichment? X Limited choice of location to retreat & approach from human presence?	Effects on choice and control due to climate induced restrictions, e.g. space for locomotion.

	Welfare Principles		Welfare Criteria	Evidence that meeting criteria (e.g. what provision), and if not what steps are being taken to address it? Think about ALL individuals in the group, and across all seasons, events etc	Mark with an X if concern for lack of evidence.	Note any age/seasonal differences (e.g. point 11 – adapting existing positive reinforcement training programs to suit behavioural changes in the breeding season).
	Good health; Are the animals healthy? (See Task 1, Human Presence).	8	Animals should be free of major injuries, e.g. skin damage and locomotory disorders. (Also refer to Wider Ecosystem).	Injuries from escape attempts during capture from care staff are reduced through the use of PRT for a variety of husbandry behaviours such as e.g. hand feeding, syringe feeding, targeting, scale and crate training. Preventive approach Enclosure checked daily for e.g. sharp edges, necessary repairs, and frayed ropes.	-	Increased and/or specified preventive health care for elderly animals.
		9	Animals should be free from disease i.e. appropriate standards of hygiene and care.	Preventive health care and monitoring. Spot and intensive cleaning on regular basis. Mulch substrate is removed and the enclosures disinfected weekly. Monitoring and preventive health care.	X May over-clean given the importance of scent marking and olfactory communication for marmosets?	Greater care and attention with young, weaker and elderly animals.
		10	Animals should not suffer pain induced by inappropriate management, handling, catching, or transport.	PRT used to have animals voluntarily collaborate with caregivers. Transport crate training provided should marmosets need to be moved.	-	Greater care and attention with young, weaker and elderly animals.
		11	Animals should be treated well in all situations (i.e. care staff should promote good human-animal relationships, with the animal's perspective as the focus).	See above.	-	Greater care and attention with young, weaker and elderly animals. Transfer of knowledge and care specifications when animals are moved to other facilities to ensure similar quality of care.

	Welfare Principles		Welfare Criteria	Evidence that meeting criteria (e.g. what provision), and if not what steps are being taken to address it? Think about ALL individuals in the group, and across all seasons, events etc	Mark with an X if concern for lack of evidence.	Note any age/seasonal differences (e.g. point 13 - complexity of indoor and/or den areas for animals who need to be housed indoors for extensive periods of time due to the weather).
	Appropriate behaviour: Does the behaviour of the animals reflect optimized emotional states? (See Task 1, Social).	12	Animals should be able to express normal, non-harmful, social behaviours (e.g. grooming). (Also refer to Major Life Events).	Family group housed, spacious to accommodate multiple marmosets to enable allo-grooming, sitting in contact, sleeping. Opportunities for play with conspecific. Space for individuals to forage on the floor or on branches together.	X Spaces to retreat from the public, to e.g. relax, groom?	Options when animals can't stay in their former social group?
		13	Animals should be able to express other normal behaviours, i.e. it should be possible to express species-specific natural behaviours, e.g. burrowing, exploring, scent-marking. (Also refer to Sensory Systems, and Activity).	Fairly complex environment with provisions of environmental enrichment. In and outdoor areas with space to engage in leaping, climbing, running, playing and other natural locomotion. Fixed and flexible furniture.	X Frequency of scent-marking is higher than wild. X Opportunities to hide from the public during opening hours are limited. X Insufficient variety of the environmental enrichment program, changes to physical environment.	Effect of climate on housing, housing conditions and access to the outdoors? Environment adapted to various ages e.g. older animals provided with stable furniture, space for youngster to play.
		14	Negative emotions such as fear, distress, frustration or boredom/apathy should be avoided whereas positive emotions such as security or contentment should be promoted. (Refer to all natural behaviour categories).	Complexity of environment with positive opportunities for play, rest and exploration. Open access between indoor and outdoor areas to reduce possible fear and increase feelings of safety. Training with PTR to facilitate positive relationship with caregivers.	-	Adapted environment and program content for young and older animals as well as animals with special needs.

Task 3

Using the mismatch column in Task 1 and final column in Task 2, list, in order of priority, up to three actions to take forward to management.

Action – provide brief description.	Rationale for action (i.e. specific intended welfare benefits).	Next steps – take to who for further discussion.	Financial/other implications.	Target timeline for change
Example: Task 1 - 1.3 nesting materials.	There are currently no large surfaces where the whole group can rest high up. Comfort and security whilst resting/sleeping is critical to good welfare.	Discuss with Section leader, having formulated some plans about where new sleeping sites might be located, and with what materials.	Likely less than Euro 100 + time.	Add to list, prioritise for better weather so animals can be locked outdoors.
1. Task 1 - 1.2 Habitat type and 1.29 Proximity to humans and Task 2 - Express normal behaviours (13).	Parts of the exhibit are glass windows that do not serve as a useable part of the exhibit. Increasing useable surface areas increases behavioural and locomotory opportunities. Providing netting provides hiding opportunities, while maintaining visibility for the public. A construction of frame in front of the windows which allows for climbing, sitting, viewing while being partly obscured by e.g. vegetation / military-like netting offering security and areas to move away if the animals wants to be out of sight.	Discuss with section leader and technical department to approve design and types of materials needed and ensure safety. Ensure management is happy with balance between animal opportunities and visitor visibility.	Likely less than Euro 100 + time.	Add to list, prioritise for better weather so animals can be locked outdoors.
2. Task 1 - 1.3 Resting and sleeping and Task 2 - Comfort (4).	Different types as well as large surfaces where the whole group can rest together and high up are important for comfort and security whilst resting/sleeping is critical to good welfare.	Discuss with section leader types of sleeping and resting places as well as location for indoor and outdoor areas. Check with technical department and section leader on possible materials and safety.	Likely less than Euro 50 + time.	Add to list, prioritise for better weather so animals can be locked outdoors.
3. Task 1 - 1.1 Climate and Task 2 - Thermal comfort (5).	Staying warm in colder month, as well as increased opportunities to stay outdoors are important for thermal comfort and behavioural opportunities. Provisions of sheltered areas outside with resting, grooming and elevated viewing points, through the use of heating lamps, denser vegetation and windbreaks/rain shelter in the outdoor area, and close to tunnel to the inside to increase use of space.	Discuss with section leader possible modifications to outdoor area, including the incorporation of heat lamps, sheltered and protected areas. Check with technical department and section leader on possible materials and safety. Design protocol to check temperature, following guidelines on minimum temperature, types of light.	Likely less than Euro 250 + time.	Add to list, prioritise for better weather so animals can be locked outdoors. Set dates late summer to make sure to be ready before cold spells arrive.

