ASSOCIATION OF ZOOS & AQUARIUMS

Marsupial and Monotreme Taxon Advisory Group Regional Collection Plan 2023

Formal Citation: **Scherer, S. 2023. Marsupial and Monotreme TAG Regional Collection Plan. Fort Wayne Children's Zoo: Fort Wayne, Indiana.**

Publication Date: February 2024

Table of Contents

TAG Mission Statement

The mission of the Marsupial and Monotreme TAG is to promote the understanding of marsupials and monotremes, support the sustainable management of these populations in partnership with AZA facilities, provide a source for expertise and advance husbandry and well-being programs for these species, and support zoo and aquarium initiatives and field conservation related to these taxa.

TAG Operating Context

The Marsupial and Monotreme TAG is responsible for the management of a unique group of mammalian species that are only found in Australasia and the Americas. Unlike other mammalian species, marsupials and monotremes do not develop a true placenta. Marsupials have brief gestation periods, and the young develop outside of the uterus in pouches or skin folds. Monotremes lay eggs instead of bearing live young. The egg is deposited into a pouch or burrow and the young suckle milk from mammary ducts in the skin after hatching.

Within AZA, many of the Australasian marsupial and monotreme species saw significant growth in the 1980's when Australia themed areas became popular. Many of these species do well in walk-through enclosures and provide unique guest engagement opportunities. Although significant interest in some species remains, several programs have undergone a significant decline as interest in Australia themed areas has diminished. In addition, pandemic related lack of animal transfers greatly affected some programs. After the SSP reimagination process in 2023, six programs remained species survival plans and only one of these programs achieved Signature SSP status.

The unique reproductive physiology of these species creates some management challenges. First, lack of consistency in determining birth dates among facilities has resulted in inaccurate demographic data. Birth is when the animal leaves the birth canal and then crawls into the pouch. It is not the date first seen or when animal leaves the pouch. Since observing when a birth occurs can be challenging for many of these species, the TAG requests that institutions consult the program leader for advice if they are unsure of how to assign birth dates. Second, a significant portion of the pedigree is unknown for many of these species. If a sire and/or dam is uncertain, facilities should record and report all possible sires/dams and the likelihood of each being the parent. This is extremely important in continuing the genetic management of these species. Third, females often become sexually mature around weaning age which increases inbreeding risk and creates disposition challenges. The TAG would like to work with the Reproductive Management Center (RMC) in determining the feasibility of effective and reversible contraception practices for these species. Having this capability would aid greatly in the management of these species and improve holding capabilities. Diapause is an additional challenge and occurs in several species. To increase the accuracy of sire identification, an abstinence period of 6 – 12 months is often needed when swapping breeding males. This can significantly slow down population growth if breeding is limited to a few facilities with large groups of females. Finally, because pedigrees are lacking, a significant number of assumptions are required when conducting breeding recommendations. Some program leaders rely on the health of offspring to help guide their recommendations. If there is a low survivability of joeys from a male at a facility, the program leader will recommend that the male be switched out. If inbreeding is suspected, or offspring appear to have a potential genetic condition, they will often be excluded from the breeding population. The TAG would like to work with the Small Population Management Scientific Advisory Group (SPMAG) and Molecular SAG to evaluate the feasibility of using molecular data to determine kinship. This would assist greatly in improving the genetic health of these populations.

The kangaroo, wallaby and wallaroo species all face additional challenges. These species are often housed in guest walk-throughs and many facilities do not have adequate holding space for intact males. Facilities neutering males has resulted in population declines and sustainability issues. These species do well in bachelor groups and having more facilities willing to hold intact males would greatly improve the

sustainability of many of these programs. It is also crucial that facilities do not neuter males without consulting the program leader.

Parma wallabies and yellow-footed rock wallabies have undergone significant declines and no longer have enough animals to maintain sustainable breeding. However, there are facilities that are interested in becoming holders. Both species have robust populations within EAZA, and facilities have expressed interest in importing these species. Unless imports occur, these species will no longer be in AZA institutions within the next 10 years.

Queensland koalas are susceptible to Koala Retrovirus (KoRV) related diseases such as leukemia and lymphomas which can be a factor in reducing life expectancy. In addition, KoRV related disease in females carrying pouch young has been a cause for some joey loss in the first year due to dam illness and offspring being too young and compromised for hand rearing. Continued research is necessary to determine if the ability to analyze the KoRV genomic integration sites could help manage breeding selection to reduce disease prevalence. Another challenge in managing koalas is the eucalyptus supply for the United States is mainly controlled by two farms. Should any natural disaster impact either plantation, it would be greatly detrimental to catastrophic to US koala populations outside of the CA and FL zoos that are able to grow much of their own eucalyptus supply.

The Matschie's tree kangaroo has a longer birth interval than other marsupials. They typically only have one offspring every 24 months. The SSP is looking to incorporate breeding centers to maximize breeding opportunities and potentially provide mate choice options. These breeding centers would be in addition to the current breeding and housing facilities and would house a minimum of 1.2 animals and maximum of 2.2 breeding animals. In order to increase breeding success, it is crucial that facilities follow established pair management procedures. Placing pairs together before the females are reproductively and behaviorally mature, inadequate staff training for properly identifying estrous and copulatory behavior and leaving pairs together post copulation are known to reduce breeding success. In addition, obesity in both sexes can cause health and well-being issues as well as affect the reproductive success of females. The SSP has resources on proper diet and weight management and facilities who house these species should contact the SSP Coordinator or Tree Kangaroo Advisor for information.

The only managed monotreme species within the TAG is the short-beaked echidna. Short-beaked echidnas are very unique animals and have been notoriously difficult to breed under human care. First year survivorship is also very low for this species. From 2009 to 2018, no reproduction of this species occurred. However, there has been recent success and breeding and survivorship is improving through collaboration amongst AZA breeding facilities and ZAA (Australasia) institutions. Because of the recent breeding success, the program is looking to take on more holders.

Several species including koala, yellow-footed rock wallaby, wombat and Tasmanian devil are part of an Ambassador Agreement overseen by Australia's Department of Environment. Facilities must undergo an approval process through the Australian government before obtaining animals. This is required even if the animals are born and transferred within AZA institutions. For Tasmanian devils, only seven AZA facilities have been approved by the Australian government to hold this species. At this time, breeding is not allowed in North America and AZA facilities have had to rely on importing. Because of their relatively short life span, this can be a significant financial commitment for AZA facilities. Due to importations not being feasible during the pandemic, the population within AZA has dwindled to only three holders. Australia is currently working on an export of animals to North America in 2024.

For many of these species, there are some misconceptions about the prevalence and severity of certain medical conditions. This has resulted in reluctance from some facilities to add them to their collection. If facilities are considering these species, but hesitant to add them to their facility due to medical or management concerns, please reach out to the TAG Chair, Veterinary Advisors or Program Leader for information and guidance.

Finally, facilities committing the time for staff to collaborate with other facilities, closely monitor breeding, develop management techniques such as regular pouch checks, and advance overall expertise with

these species, will greatly improve breeding success, genetic health, and sustainability for all the species overseen by the TAG.

TAG Action Plan/Strategic Plan

TAG Action #1: Support sustainable management of marsupial and monotreme species.
The most important objective identified by the Marsupial and Monotreme TAG is improving the sustainability of its programs. Only one of these programs has secured Signature SSP status. Some tactics the TAG has identified to help accomplish this goal include:

- Collecting and distributing information on mixed species to help increase holding capabilities.
- Collecting information from facilities who successfully house bachelor mobs and developing guidelines to increase fertile male holding capabilities and improve sustainability.
- Working with the RMC on the feasibility of developing effective and reversible contraception procedures to prevent inbreeding and increase holding capabilities.
- Working with SPMAG and Molecular SAG in determining the feasibility of collecting and testing DNA samples and/or identifying other methods for improving the genetic health of these programs.

TAG Action #2. Promote conservation concerns and actions to members.
The TAG will work to provide support and encourage participation in the Tree Kangaroo of Papua New Guinea SAFE program. The TAG can facilitate this by consulting SAFE leaders and determining how best the TAG can support the program. In addition, the TAG will work to identify opportunities for AZA facilities to support in situ work and related conservation efforts for marsupials and monotremes species within the TAG's purview. Some projects may not target these species specifically but instead work to secure the native habitats where these species are found.

TAG Action #3: Provide leadership and guidance for the management of marsupial and monotreme species and promote excellence in husbandry, wellbeing, and management practices.
Over the next 5 years, the TAG will facilitate the production of animal care manuals including Matschie's tree kangaroo, macropod, short-beaked echidna, and Queensland koala. In addition, the TAG plans to create and publish a white paper that provides information addressing some common concerns for holding macropod species. Finally, since so many of these species are housed in walk-through enclosures, and some are also used in ambassador animal programs, the TAG will identify priority species for the development of Ambassador Animal Guidelines.

TAG Action #4: Facilitate inter-regional cooperation between zoological institutions that hold marsupials and monotremes.

The TAG recognizes the importance of relationships between facilities across AZA, as well as with EAZA and ZAA (Australasia) institutions to maintain sustainable populations and excellence in husbandry and welfare. The TAG will continue to foster these relationships through annual communication with the EAZA and ZAA TAG counterparts and encourage program leader communication with EAZA and ZAA colleagues. In addition, The TAG, EAZA and ZAA would like to reach a point where all three of these regions are involved in each other's regional planning exercises so that it is a more integrated process.

TAG Operational Structure & Succession Plan

The Marsupial and Monotreme TAG normally consists of a Chair, Vice Chair, Secretary and Treasurer and has a minimum of 9 Steering Committee members. However, the Secretary position was vacant at the time of publication. Steering Committee members serve a minimum term of 3 years with no term limit and are elected from the Institutional Representatives list. Ideally, there will always be at least six people on the committee from previous year to ensure consistency. When vacancies open, elections are held by the TAG Secretary. In the years when the Secretary is up for election the Vice Chair will run the election.

There is currently relatively low interest in serving as a TAG officer or Steering Committee member, so those positions do not have term limits. When interest increases in the future, terms may be limited, and appointments staggered as appropriate.

Steering committee responsibilities include taking part in decision making and TAG operations, assisting with the development of the Regional Collection Plan, oversight of program management, and other administrative duties as needed. Members are required to have access to electronic communication and are encouraged to attend one meeting of the TAG each year. Officers are elected from the Steering Committee and by the Steering Committee (except TAG Chair who is appointed by APMC and serve unlimited terms for as long as they sit on the Committee.) Advisors to the TAG include veterinary care, population biologist, tree kangaroo and registrar. Advisors are non-voting participants in TAG operations unless they also serve as Steering Committee members.

Table 1: Current TAG officers, steering committee, advisors, program leaders, and species monitors

Name	Position	Facility	Email	Phone
Shelley Scherer	Chair	Fort Wayne Children's Zoo	shelley.scherer@kidszoo.org	(260) 427-6800 (700)
Joseph T. Svoke	Vice Chair	Zoo Miami	joseph.svoke@miamidade.gov	(248) 762-9721
Vacant	Secretary	----	---	---
Sarah Colman	Treasurer	Saginaw Children's Zoo	scolman@saginawzoo.com	(989) 759-1408
Jay Tetzloff	Steering Committee	Blank Park Zoo	jrtetzloff@blankparkzoo.org	(515) 974-2567
John Clark	Steering Committee	St. Louis Zoo	clark@stlzoo.org	(314) 646-4705
Chantal Routhier	Steering Committee	Zoo de Granby	crouthier@zoodegranby.com	(450) 372-9113 (2257)
Jim Haigwood	Steering Committee	San Diego Zoo Safari Park	jhaigwood@sdzwa.org	(760) 705-6543
Mark Wanner	Steering Committee	Brookfield Zoo	mark.wanner@czs.org	(798) 688-8446
Kristen Wieners	Steering Committee	Santa Barbara Zoological Gardens	kwieners@sbzoo.org	(262) 206-5245
Heather Down	Steering Committee	The Living Desert Zoo and Gardens	hdown@livingdesert.org	(760) 799-2588
Dr. Joseph Smith	Veterinary Advisor	The Wilds	jsmith@thewilds.org	(740) 638-5030 (2007)
Dr. Cora Singleton	Veterinary Advisor	San Diego Zoo	csingleton@sdzwa.org	(619) 231-1515 (3935)
Dr. Karin Schwartz	Registrar Advisor	Roger Williams Park Zoo	kschwartz@rwpzoo.org	(414) 467-6476
Jacque Blessington	Tree Kangaroo Advisor	Lakeside Nature Center	jacsprat65@aol.com	(816) 405-6125
Dan Maloney	Advisor	Louisville Zoo	dan.maloney@louisvilleky.gov	(904) 757-4463 (212)
Steve Sarro	Advisor	-----		

Jay Tetzloff	APM Committee Liaison	Blank Park Zoo	jrtetzloff@blankparkzoo.org	(515) 974-2567
Andrea Putnam	SPMAG Advisor	Andrea Putnam, LLC	asputnam@gmail.com	(619)787-5487
Joseph T. Svoke	Western Grey Kangaroo SSP Coordinator	Zoo Miami	joseph.svoke@miamidade.gov	(248) 762-9721
Vacant	Red Kangaroo SSP Coordinator			
Kathy Russell	Matschie's Tree Kangaroo SSP Coordinator	Santa Fe College Teaching Zoo	kathy.russell@sfcollege.edu	(352) 395-5605
Val Hautekeete	Bennett's Wallaby SSP Coordinator	Blank Park Zoo	vmhautekeete@blankparkzoo.org	(515) 231-9830
Jay Tetzloff	Tammar Wallaby SSP Coordinator	Blank Park Zoo	jrtetzloff@blankparkzoo.org	(515) 974-2567
Beth Carlyle-Askew	Common Wallaroo SSP Coordinator	Woodland Park Zoo	beth.carlyle-askew@zoo.org	(206) 548-2670
Andrea Delegal	Brush-Tailed Bettong Studbook Keeper	Los Angeles Zoo and Botanical Gardens	andrea.delegal@lacity.org	(818) 621-2247
Jim Haigwood	Short-Beaked Echidna Studbook Keeper	San Diego Zoo Safari Park	jhaigwood@sdzwa.org	(760) 705-6543
Shelley Scherer	Eastern Grey Kangaroo Studbook Keeper	Fort Wayne Children's Zoo	shelley.scherer@kidszoo.org	(260) 427-6800 (700)
Lindsey King	Queensland Koala Studbook Keeper	San Diego Zoo	lking@sdzwa.org	(610) 955-3793
Joni Hartman	Parma Wallaby Studbook Keeper	Kansas City Zoo	jhartman@fotzkc.org	(816) 595-1323
Heather Down	Yellow-footed Rock Wallaby Studbook Keeper	The Living Desert Zoo and Gardens	hdown@livingdesert.org	(760) 799-2588
Jason Photiades	Southern Hairy-nosed Wombat Studbook Keeper	Brookfield Zoo	jason.photiades@CZS.org	(708) 688-8466
Jason Montgomery	Grey Short-tailed Opossum Species Monitor	Santa Fe College Teaching Zoo	jason.montgomery@sfcollege.edu	(352) 395-5257

TAG Taxa

All marsupials and monotremes fall under the purview of the Marsupial & Monotreme TAG. However, the vast majority of these species have never been held in human care, nor are they likely to be obtained from the wild. Since limited space availability demands thoughtful prioritization, the Marsupial and Monotreme TAG has focused on those marsupial and monotreme species either currently held in AZA facilities or AZA facilities are interested in adding them to their collection.

Table 2: Species within TAG purview

Common Name	Scientific Name	Common Name	Scientific Name
Brush-tailed Bettong	*Bettongia penicillata*	Striped Possum	*Dactylopsila trivirgata*
Ground Cuscus	*Phalanger gymnotis*	Virginia Opossum	*Didelphis virginiana*
Sulawesi Bear Cuscus	*Ailurops ursinus*	Platypus	*Ornithorhynchus anatinus*
Tasmanian Devil	*Sarcophilus harrisii*	Quokka	*Setonix brachyurus*
Short-beaked Echidna	*Tachyglossus aculeatus*	Agile Wallaby	*Notamacropus agilis*
Feather-tailed Glider	*Acrobates pygmaeus*	Bennett's Wallaby	*Notamacropus rufogriseus*
Sugar Glider	*Petaurus breviceps*	Parma/White-fronted Wallaby	*Notamacropus parma*
Eastern Grey Kangaroo	*Macropus giganteus*	Swamp Wallaby	*Wallabia bicolor*
Red Kangaroo	*Osphranter rufus*	Tammar Wallaby	*Notamacropus eugenii*
Western Grey Kangaroo	*Macropus fuliginosus*	Yellow-footed Rock Wallaby	*Petrogale xanthopus xanthopus*
Matschie's Tree Kangaroo	*Dendrolagus matschiei*	Common Wallaroo	*Osphranter robustus*
Northern/Queensland Koala	*Phascolarctos cinereus adustus*	Common Wombat	*Vombatus ursinus*
Grey Short-tailed Opossum	*Monodelphis domestica*	Southern Hairy-nosed Wombat	*Lasiorhinus latifrons*

Capacity and Commitment Assessment

A space assessment survey was conducted from January to March 2023 using Google Forms. The survey was distributed to AZA institutions with a designated IR for the TAG. A total of 96 facilities received the survey and 86 institutions completed the survey (89.5%). The ten institutions that did not respond after multiple requests were excluded. Population goals were determined by analyzing current and projected space, comparing trends from 2011 and 2018 regional collection plans, and evaluating information from the most recent breeding and transfer plans and the SSP assessments.

Table *3*: Species Capacity & Commitment Assessment Table.

Common Name (Scientific Name optional)	Current Pop. Size from Studbook	5-Year CPT (Grow, Decline, Stable)	TAG Goal (Grow, Decline, Keep Stable)	Justification (If goal differs from trend or population size reported by facilities)	Prev. RCP Pop. Size (2018)	Prev. RCP Projected Space (2018)	Prev. RCP Pop. Size (2011)	Prev. RCP Projected Space (2011)
Brush-tailed Bettong (*Bettongia penicillata*)	53 (28.25.0)	Decline	Keep Stable	There is sufficient space and interest in this species and facilities expressed interest in importing.	66	100	NA	NA
Short-beaked Echidna (*Tachyglossus aculeatus*)	35 (13.17.5)	Grow	Grow	N/A	30	32	28	56
Common Wallaroo (*Osphranter robustus*)	57 (27.30.0)	Decline	Keep Stable	There is sufficient space and interest in this species.	72	100	46	64
Eastern Grey Kangaroo (*Macropus giganteus*)	33 (13.18.2)	Decline	Keep Stable	There is sufficient space and interest in this species.	34	100	126	149
Red Kangaroo (Osphranter rufus)	312 (109.199.4)	Decline	Keep Stable	The TAG requested that this population decrease per the last RCP to make space for other kangaroo species. This program has now reached that target and should remain stable.	487	300	NA	NA
Western Grey Kangaroo (*Macropus fuliginosus*)	92 (28.57.7)	Grow	Grow	N/A	71	100	145	184

Matschie's Tree Kangaroo (*Dendrolagus matschiei*)	40 (18.21.1)	Decline	Grow	This program is adding holders and working with Port Moresby Nature Park in Papua New Guinea to bring in founders.	49	75	48	82
Northern/Queensland Koala (*Phascolarctos cinereus adustus*)	52 (26.25.1)	Stable	Keep Stable	N/A	46	75	74	70
Bennett's Wallaby (*Notamacropus rufogriseus*)	253 (145.104.4)	Decline	Keep Stable	There is sufficient space and interest in this species.	316	320	261	278
Parma Wallaby (*Notamacropus parma*)	12 (7.5)	Decline	Grow	There is sufficient space and interest in this species.	25	50	144	126
Tammar Wallaby (*Notamacropus eugenii*)	44 (18.26.0)	Decline	Grow	There is sufficient space and interest in this species and import is scheduled for February 2024.	54	75	47	75
Yellow-footed Rock Wallaby (*Petrogale xanthopus Xanthopus*)	17 (5.12)	Decline	Keep Stable	There is sufficient space and interest in this species and facilities expressed interest in importing.	83 AZA/ EAZA	125 AZA/ EAZA	27 AZA	75
Southern Hairy-nosed Wombat (*Lasiorhinus latifons*)	10 (5.5)	Stable	Grow	There is sufficient space and interest in this species and facilities expressed interest in importing.	9	15	NA	NA
Grey Short-tailed Opossum (Monodelphis domestica)	10 (7.3)	Decline	Decline	N/A	24	60	NA	NA

SSP Assessment Process

The TAG used the standardized AZA SSP Assessment Process to identify appropriate SSP designations for the species under its purview. This process is presented and described in Appendix B. Assessments were completed by the Marsupial and Monotreme TAG program leaders from May 31, 2022, to July 22, 2022. The SSP assessment forms were then analyzed by the Marsupial and Monotreme Steering Committee and Animal Population Management Committee (APMC) members to determine the new designation for each program (Table 5).

Table 4: Species within TAG purview found at 15 or more AZA facilities that the TAG is not recommending for more formal management.

Common Name (Scientific Name)	Justification
Virginia Opossum *(Didelphis virginiana)*	The Virginia Opossum is the only marsupial native to North America and is a popular species within AZA for ambassador animal programming. It is ethically obtainable from rehabilitators and does not require TAG resources for management at this time. However, the TAG will continue to monitor this species and evaluate the need for management in the future.

SSP Assessment Results

Table *5*: SSP Assessment Results Summary Table

Species	Genetics	Demography	Space & Interest	Husbandry	Designation
Western Grey Kangaroo	+	+	+	+	Signature SSP
Tammar Wallaby	+	-	Neutral	Neutral	Provisional SSP
Common Wallaroo	Neutral	-	Neutral	Neutral	Provisional SSP
Matschie's Tree Kangaroo	Neutral	-	Neutral	Neutral	Provisional SSP
Bennett's Wallaby	+	-	+	Neutral	Provisional SSP
Brush-tailed Bettong	Neutral	-	+	+	Studbook
Red Kangaroo	Neutral	-	+	+	Provisional SSP
Short-beaked Echidna	Neutral	+	+	+	Studbook
Queensland Koala	+	-	+	+	Studbook
Parma Wallaby	+	-	+	Neutral	Studbook

Animal Programs Summary

Table 6: Animal Programs Summary Table

Common Name (Scientific Name)	Program designation	Current Pop. Size	# Participating AZA facilities	5 Year Lambda	Date of most recent BTP
Brush-tailed Bettong (*Bettongia penicillata*)	AZA Studbook	53	13	0.893	28 December 2022
Short-beaked Echidna (*Tachyglossus aculeatus*)	AZA Studbook	35	13	1.036	23 March 2022
Eastern Grey Kangaroo (*Macropus giganteus*)	AZA Studbook	33	6	0.980	7 June 2021
Red Kangaroo (Osphranter rufus)	Provisional SSP	312	59	0.949	7 April 2022
Western Grey Kangaroo (*Macropus fuliginosus*)	Signature SSP	92	16	1.014	26 May 2021
Matschie's Tree Kangaroo (*Dendrolagus matschiei*)	Provisional SSP	40	19	0.941	14 May 2021
Northern/Queensland Koala (*Phascolarctos cinereus adustus*)	AZA Studbook	52	9	0.989	5 November 2021
Bennett's Wallaby (*Notamacropus rufogriseus*)	Provisional SSP	253	41	0.982	1 July 2022
Parma Wallaby (*Notamacropus parma*)	AZA Studbook	12	4	0.726	20 February 2020
Tammar Wallaby (*Notamacropus eugenii*)	Provisional SSP	44	12	0.955	5 June 2023
Yellow-footed Rock Wallaby (*Petrogale xanthopus Xanthopus*)	AZA Studbook	17	4	0.818	14 September 2020
Common Wallaroo (*Osphranter robustus*)	Provisional SSP	57	15	0.983	13 March 2023
Southern Hairy-nosed Wombat (*Lasiorhinus latifons*)	AZA Studbook	10	6	----	---

SSP Roles and SMAART Goals

Table 7: SSP Role and Goals Table

Common Name (Scientific Name)	**Red Kangaroo (*Osphranter rufus)***
Program Designation	Provisional SSP
Program Role	Display/Education
SMAART Goal #1	To improve the genetics of this population, identify at least three sources for obtaining potential founders by 1 June 2024.
SMAART Goal #2	Develop a Macropod ACM with other macropod program leaders and colleagues to improve the management, sustainability, and wellbeing of these species. The Macropod program leaders will identify an ACM coordinator, review the outline, and assign sections and timelines by 1 April 2024. Macropod program leaders will then complete assigned sections, meet set deadlines, attend quarterly check in meetings and have the first draft of the ACM submitted by 1 April 2025.
SMAART Goal #3	Recruit at least two holding institutions to house a group of intact males by 1 June 2025. The number of viable males in this population is low and having more holding capabilities for intact males is crucial for improving the sustainability of this program.

Common Name (Scientific Name)	**Western Grey Kangaroo (*Macropus fuliginosus*)**
Program Designation	Signature SSP
Program Role	Display/Education
SMAART Goal #1	Address potential space capacity issues with continued breeding success by surveying current and potential holders to prioritize breeding mobs within the SSP. Survey to be completed by 31 October 2024, and relaying outcomes by 31 December 2024.
SMAART Goal #2	Develop a Macropod ACM with other macropod program leaders and colleagues to improve the management, sustainability, and wellbeing of these species. The Macropod program leaders will identify an ACM coordinator, review the outline, and assign sections and timelines by 1 April 1 2024. Macropod program leaders will then complete assigned sections, meet set deadlines, attend quarterly check in meetings and have the first draft of the ACM submitted by 1 April 2025.
SMAART Goal #3	Create a White Paper to address questions and provide facts about various health and management issues in kangaroos, such as toxoplasmosis. This will aid facilities when developing Institutional Collection Plans and hopefully improve holding capabilities for these species. Surveys have already been collected from holders. The next step will be to identify the primary questions to focus on with the TAG Chair by 1 June 2024, with a first draft of the document being completed by 31 December 2024.

Common Name (Scientific Name)	**Matschie's Tree Kangaroo (*Dendrolagus matschiei*)**
Program Designation	Provisional SSP
Program Role	Maintain a sustainable captive population of the endangered Matschie's tree kangaroo that will be used to contribute to our in-situ and ex-situ knowledge of this genus and to educate and inspire conservation action in our guests. Actively participate in field conservation and collaborate internationally to preserve this genus.
SMAART Goal #1	Identify new or current AZA facilities to provide 4 additional spaces to hold and/or breed Matschie's tree kangaroos by the end of December 2028.
SMAART Goal #2	Utilize recent information from in situ and ex situ nutritional research to continue to develop and implement a standardized diet for Matschie's tree kangaroos in human care which will promote optimal health, welfare, and reproductive success. Provide institutional support for implementation of the new diet recommendations by July 2024.
SMAART Goal #3	Complete the next phase of edits of the Tree Kangaroo Animal Care Manual and submit for review to AZA by August 2024; complete review/approval process for publication of ACM by January 2025.

Common Name (Scientific Name)	**Bennett's Wallaby (*Notamacropus rufogriseus*)**
Program Designation	Provisional SSP
Program Role	Display/Education
SMAART Goal #1	Meet demography goals of 58 births per year by reaching out and coordinating with holding institutions to make sure animals are being introduced and/or moved for breeding. Communicate with holding facilities twice per year by 31 Dec 2026.
SMAART Goal #2	Develop a Macropod ACM with other macropod program leaders and colleagues to improve the management, sustainability, and wellbeing of these species. The Macropod program leaders will identify an ACM coordinator, review the outline, and assign sections and timelines by 1 April 2024. Macropod program leaders will then complete assigned sections, meet set deadlines, attend quarterly check in meetings and have the first draft of the ACM submitted by 1 April 2025.
SMAART Goal #3	To improve sustainability and holding capabilities for intact males, recruit at least two holding facilities to house a group of intact males by 1 June 2025.

Common Name (Scientific Name)	**Tammar Wallaby (Notamacropus *eugenii*)**
Program Designation	Provisional SSP
Program Role	Display/Education
SMAART Goal #1	Develop a Macropod ACM with other macropod program leaders and colleagues to improve the management, sustainability, and wellbeing of these species. The Macropod program leaders will identify an ACM coordinator, review the outline, and assign sections and timelines by 1 April 2024. Macropod program leaders will then complete assigned sections, meet set deadlines, attend quarterly check in meetings and have the first draft of the ACM submitted by 1 April 2025.

SMAART Goal #2	Increase number of holding institutions by April 2024 to at least 16 by increasing population and developing mixed species list.
SMAART Goal #3	Organize an import of additional individuals from Australia or New Zealand by 1 April 2024.

Common Name (Scientific Name)	**Common Wallaroo (*Osphranter robustus*)**
Program Designation	Provisional SSP
Program Role	Display/Education
SMAART Goal #1	Have all recommended transfers from breeding and transfer plan completed by March 2024. Communicate with holders quarterly until the next planning session in 2026 to confirm progress of recommendations and identify interim recommendations.
SMAART Goal #2	Develop a Macropod ACM with other macropod program leaders and colleagues to improve the management, sustainability, and wellbeing of these species. The Macropod program leaders will identify an ACM coordinator, review the outline, and assign sections and timelines by 1 April 2024. Macropod program leaders will then complete assigned sections, meet set deadlines, attend quarterly check in meetings and have the first draft of the ACM submitted by 1 April 2025.
SMAART Goal #3	Increase the number of AZA facilities holding Wallaroo by two by the end of 2025. There is space in current facilities to hold more animals especially females. SSP Coordinator is monitoring a current bachelor group and starting another to see if this is a feasible option with the extra males.

Program Management Update

Table 8: Management Update Table

Common Name (Scientific Name)	Current RCP Program Designation	2018 RCP Program Designation	2011 RCP Program Designation
Brush-tailed Bettong (*Bettongia penicillata*)	Studbook	Yellow	Yellow
Short-beaked Echidna (*Tachyglossus aculeatus*)	Studbook	Red	Studbook
Eastern Grey Kangaroo (*Macropus giganteus*)	Studbook	Red	Red
Red Kangaroo (Osphranter rufus)	Provisional	Yellow	Yellow
Western Grey Kangaroo (*Macropus fuliginosus*)	Signature	Yellow	Yellow
Matschie's Tree Kangaroo (*Dendrolagus matschiei*)	Provisional	Red	Yellow
Northern/Queensland Koala (*Phascolarctos cinereus adustus*)	Studbook	Red	Studbook

Bennett's Wallaby (*Notamacropus rufogriseus*)	Provisional	Yellow	Yellow
Parma Wallaby (*Notamacropus parma*)	Studbook	Red	Yellow
Tammar Wallaby (*Notamacropus* eugenii)	Provisional	Yellow	Studbook
Yellow-footed Rock Wallaby (Petrogale xanthopus Xanthopus)	Studbook	Yellow	Yellow
Common Wallaroo (*Osphranter robustus*)	Provisional	Yellow	Yellow
Southern Hairy-nosed Wombat (*Lasiorhinus latifons*)	Studbook	Candidate	Studbook

Additional Animal Populations within TAG Purview

Table 9: Additional Animal Programs Summary Table

Common Name (Scientific Name)	Current Pop. Size	# Participating AZA facilities	Population Type	Growth Trend
Feather-tailed Glider (*Acrobates pygmaeus*)	67	4	TAG-Monitored	Increasing
Sugar Glider (*Petaurus breviceps*)	25	8	TAG-Monitored	Stable
Virginia Opossum (*Didelphis virginiana*)	84	49	TAG-Monitored	Increasing
Short-tailed Opossum *(Monodelphis domestica*)	10	3	TAG-Monitored	Decreasing
Common Wombat (Vombatus ursinus)	3	2	TAG-Monitored	Decreasing

Optional RCP Elements

Studbook and TAG-monitored Species Goals

Table #10: Studbook and TAG-monitored species goals

Common Name (Scientific Name)	**Brush-tailed Bettong (*Bettongia penicillate*)**
SMAART Goal #1	Have a minimum of 7 births per year over the next five years to at least maintain population size ($\lambda = 1$).

SMAART Goal #2	Recruit at least two more new holders by 31 December 2024.
SMAART Goal #3	Identify at least two sources of founder animals to import by 31 December 2025.

Common Name (Scientific Name)	**Short-beaked Echidna (*Tachyglossus aculeatus*)**
SMAART Goal #1	Provide opportunities for two nulliparous female echidnas to be in breeding situations by 1 June 2024.
SMAART Goal #2	Reach out to all EAZA holders by 31 December 2024. Through 31 December 2026, check in with these facilities at least once a year.
SMAART Goal #3	Collect blood samples and determine sexes of all short-beaked echidnas believed to be T. a. lawessii through genetic testing by 1 January 2025.

Common Name (Scientific Name)	**Eastern Grey Kangaroo (*Macropus giganteus*)**
SMAART Goal #1	Have a minimum of four births per year over the next five years to maintain population size and meet the needs of current holders.
SMAART Goal #2	Develop a Macropod ACM with other macropod program leaders and colleagues to improve the management, sustainability, and wellbeing of these species. The Macropod program leaders will identify an ACM coordinator, review the outline, and assign sections and timelines by 1 April 2024. Macropod program leaders will then complete assigned sections, meet set deadlines, attend quarterly check in meetings and have the first draft of the ACM submitted by 1 April 2025.
SMAART Goal #3	Coordinate a meeting at least annually with the Western Grey Kangaroo and Red Kangaroo SSP Coordinators to discuss challenges and goals so that all three programs can work together cohesively and meet facilities and programs' needs.

Common Name (Scientific Name)	**Northern/Queensland Koala (Phascolarctos cinereus adustus)**
SMAART Goal #1	Increase the number of holding institutions by two by 31 December 2026.
SMAART Goal #2	Identify sources of founder animals to import by the 31 December 2024.
SMAART Goal #3	Revisit hosting Koala Husbandry Workshop in San Diego in 2024 following the cancellation of 2020 event.

Common Name (Scientific Name)	**Parma Wallaby (Notamacropus parma)**
SMAART Goal #1	Develop a Macropod ACM with other macropod program leaders and colleagues to improve the management, sustainability, and wellbeing of these species. The Macropod program leaders will identify an ACM coordinator, review the outline, and assign sections and timelines by 1 April 2024. Macropod program leaders will then complete assigned sections, meet set deadlines, attend quarterly check in meetings and have the first draft of the ACM submitted by 1 April 2025.
SMAART Goal #2	Investigate potential in-situ projects that could meet enhancement requirements for import permits. Contact at least 3 Australian organizations by

	30 June 2024 to see if they have projects they are supporting or have suggestions.
SMAART Goal #3	Analyze the 12 living animals to see realistically which are potential breeders. Recommend pairings based on best available genetic diversity by 30 June 2024.

Common Name (Scientific Name)	**Yellow-footed Rock Wallaby (*Petrogale xanthopus xanthopus*)**
SMAART Goal #1	Work with population biologist and perform a population analysis by June 2024 to ensure availability of animals for current holders over the next three years and identify an ideal ratio of animals to import. Essential Action 1: Communicate with existing holders to determine if there is a possibility to increase holding capacity through either breeding or transferring in more animals.
SMAART Goal #2	Determine three sources for potential imports by December 2024. Essential Action: Foster a relationship with EAZA and the Australian Department of Agriculture, Water and the Environment to inquire on and pursue opportunities for importing new animals into the American population.
SMAART Goal #3	Design and implement a strategy for raising awareness to American facilities about Yellow-footed rock wallabies by March 2024. Essential Action: Create a plan for social media marketing, advertise the species on appropriate AZA list serves and forums, and share successes in training and guest engagement of the species in animal training forums.

Acknowledgements

Thank you to everyone who assisted in the development and review of this document. Thank you also to all the TAG Steering Committee members, SSP Coordinators and Studbook Keepers for volunteering their time to improving the marsupial and monotreme programs. Your dedication to these species is vital in keeping these programs afloat.

And finally, thank you to the Fort Wayne Children's Zoo for supporting me in my role as TAG chair.

Cover Graphic Credit: Shelley Scherer, Fort Wayne Children's Zoo

Appendix A. APM Committee RCP Review Checklist

This checklist **must** be completed by the TAG and submitted to the AZA Conservation & Science Department with their RCP draft for review.

**** Please note that this checklist must be submitted with the RCP to the AZA Conservation & Science Department (conservation@aza.org) and the APM Committee Vice Chair of TAGs.*
**** Please write the page numbers in the "pg #" column where each required element may be found in the submitted RCP.*
**** This template is available in a Word form at https://www.aza.org/templates-and-applications*

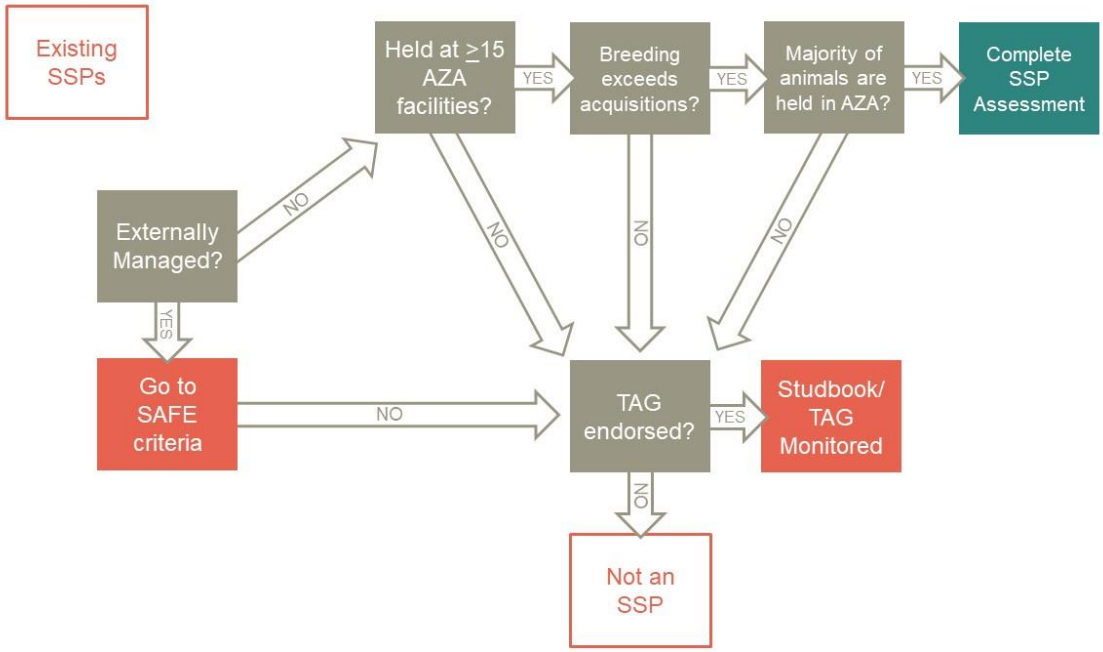
TAG: Marsupial and Monotreme Reviewer:_____

	pg #	Yes	No	Comments
Required Elements				
Table of contents & page numbers *(p. 41)*		X		
TAG mission *(p. 41)*	3	X		
TAG operating context description	3	X		
TAG action or strategic plan description	5	X		
TAG operating structure description and succession plan description	5	X		
Full Contact Information List	6	X		
TAG Taxa Description	8	X		
TAG Taxa Table	8	X		
Capacity Assessment description	8	X		
Capacity Assessment results table	9	X		
SSP Assessment description	11	X		
SSP Assessment results table	11	X		
Animal Program Summary Table	12	X		
Advised Population Size (APS) description and table (if relevant)			X	
Animal Program Roles, Goals, and Essential Actions Table *(p.50-51)*	13	X		
Management Update Table	15	X		
Additional Animal Population Summary Table	16	X		
Optional RCP Elements				
Species Fact Sheets			X	
Conservation status of TAG taxa (narrative or table form, source cited)			X	
Species replacement tables			X	
TAG-monitored Species Goals	16	X		
AZA/Board-approved positions, white papers, and guidelines relevant to TAG taxa specifically *(p. 54)*			X	

APM Committee Reviewer Comments:

Appendix B. Overview of AZA SSP Assessment Process

The following flowchart illustrates the SSP assessment process. Existing SSPs begin with the question regarding whether the program is externally managed (i.e. by a government agency) or not.

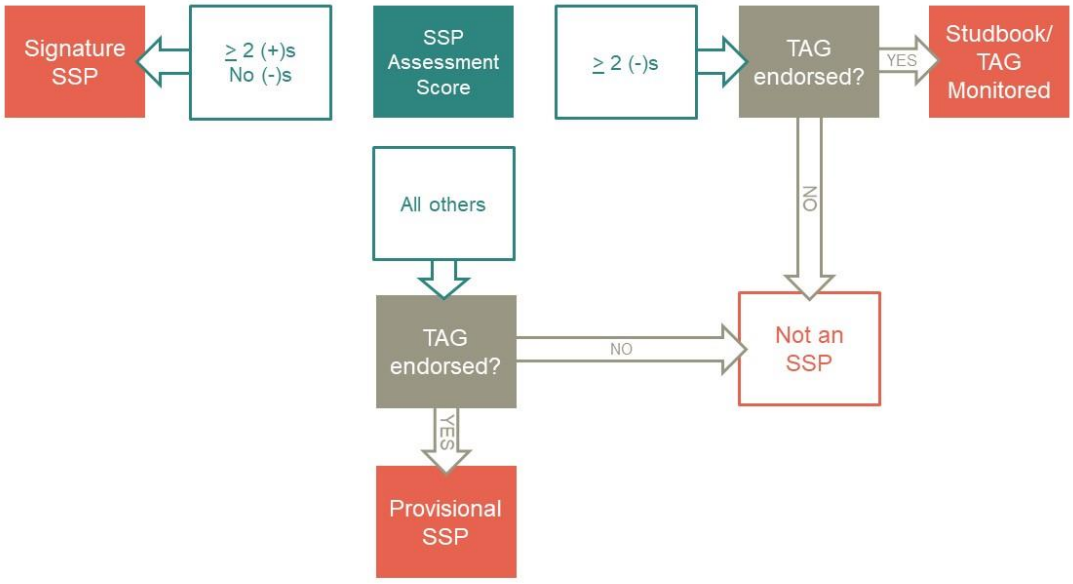


The SSP assessment worksheet can be accessed from the AZA Animal Programs Resources website (https://www.aza.org/animal-programs-resources). The scoring method applied to completed worksheets is shown below. TAGs will develop a consensus worksheet and score during RCP preparation and vet this with their APM liaison. A final, agreed-upon score and subsequent SSP-type designation will be presented in the draft regional collection plan for review by the

Evaluation Criteria for TAGs to review completed SSP Assessment forms.

Result	Genetics
+	If Mean Kinship answer is E
+	If Mean Kinship answer is D or C and potential founders exist in AZA population AZA or can be obtained
+	Genetic management strategy is not mean-kinship based and/or a robust demographic management strategy is in place even if gene diversity and mean-kinship cannot be calculated
Neutral	If Mean Kinship answer is D or C and potential founders do not exist in AZA population AZA or cannot be obtained
Neutral	If Mean Kinship answer is B or A and potential founders exist in AZA or can be obtained
-	If Mean Kinship answer is B or A and potential founders do not exist and/or unavailable
Result	**Demography**
+	Lambda is positive and due to breeding
+	Lambda is stable or decreasing as part of management goal
Neutral	Lambda is stable when goal is to grow
-	Lambda is negative when goal is to grow
Result	**Space/Interest**
+	Number of facilities have remained the same or increased and space is equal to TPS
+	Number of facilities have decreased less than 20% and current and/or Future space is equal to TPS
Neutral	Number of facilities have remained the same and current and/or Future space is well below TPS
Neutral	Number of facilities have decreased by less than 20% and current and/or Future space is well below TPS
-	Number of facilities have decreased more than 20% and current and/or Future space is well below TPS
Result	**Husbandry**
+	Goal number of births/hatches were achieved
Neutral	Births occurred, but goal was not met because of situations not related to husbandry
Neutral	Number of births/hatches were more than half of goal but did not meet goal due to husbandry related issues
-	Number of births/hatches were less than half of goal due to husbandry related issues
-	Any major husbandry issues expressed which effect MLE, first year mortality, or breeding success which are not currently being explored or researched

Designation of SSP-type follows the flowchart below.


Signature SSP
≥ 2 (+)s
No (-)s
SSP Assessment Score
≥ 2 (-)s
TAG endorsed?
YES
Studbook/ TAG Monitored
NO
All others
TAG endorsed?
NO
Not an SSP
YES
Provisional SSP