Threatened Species Initiative – empowering conservation action using genomic resources

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Supplementary Information

We searched Title, Abstract, Keywords in Web of Science (WoS) and Scopus (January 2021) using two search strings. 1) "genom*" AND "conservation" AND "management" AND "endangered", and 2) "genom*" AND "conservation" AND "management" AND "threatened" between 1900 and 2020.

This resulted in a total of 405 papers (with 74 duplicates removed between search 1 and 2; WoS) and 435 papers (92 duplicates removed between search 1 and 2; Scopus).

Combining the results from both WoS and Scopus yielded a total of 498 papers after duplicates between the two search engines (N = 315) as well as those relating to livestock or domesticated species (sheep, cattle, dogs, horses, pigs; N = 27) were removed. Titles and abstracts of the remaining 498 papers were reviewed for key terms pertaining to the types of sequencing used in the studies, including AFLP, microsatellites, mtDNA, SNPs, whole-genomes and transcriptomes, or the types of studies, and the papers were grouped accordingly (Table S1).

Table S1: Number of publications categorised by the types of sequencing used in the studies, including AFLP, microsatellites, mtDNA, SNPs, whole-genomes and transcriptomes, or the types of studies.

Category	Number of papers
Microsatellite	60
Msats & NGS	43
SNPs	84
WGS	25
Other sequencing (AIMS, ISSR, RAPD, AFLP)	23
mitochondrial DNA/chloroplast DNA	51
Gene families	9
Cryobiology	20
Epigenetics	2
Hybridization	21
Management info only	9
Pedigree	7
Reviews	89
Taxonomy	11
Transcriptome	9
Other	35
TOTAL	**498**

Table S2: Genetic information can have a substantial impact on improving conservation outcomes by providing answers to some commonly asked management questions. Minimum sequencing needed is the type of sequencing required to answer the management question. RRS – reduced representation sequencing, WGR – whole genome resequencing, TC – target capture methods for specific genes.

Questions	**Taxa**	**Minimum sequencing needed**
To what extent is a species genetically at risk of, or adapting to climate change? What parts of the genome/s is/are responsible for local adaptation and therefore important to preserve?	Animals Plants	TC WGR
Will populations recover (or rebound) after a major catastrophic event (e.g. major bushfires)?	Animals Plants	RRS
How successful are landscape restoration programs in restoring genetic connectivity (or gene flow)?	Animals Plants	RRS
What is the population diversity and potential inbreeding effects in populations of reduced habitat or range?	Animals Plants	RRS
What is the current genetic diversity of captive (including germplasm / seed collections) or translocated populations relative to wild populations?	Animals Plants	RRS
What is the level of genetic divergence of isolated or disjunct populations? Should these be managed as separate management units?	Animals Plants	RRS
Will populations benefit from transferring new individuals from/into the population? If so, which population is the best option for transferring individuals with, and how can individuals be selected to better achieve the targeted outcomes?	Animals Plants	RRS
What is the reproductive contribution of released/translocated individuals?	Animals Plants	RRS
What are the best potential founder relationships for insurance populations and/or translocation programs?	Animals Plants	RRS
How can we best optimise the genetic diversity in ex-situ collections (e.g. zoo populations, seed banks, botanic garden collections)?	Animals Plants	RRS
What is the parentage information for captive, or intensively managed translocated wild populations? What are the pedigrees of unknown animals in group-housed populations? What is the reproductive skew (over-representation of genetic lines) that will impact long-term genetic diversity within a managed population (island, fenced, geographically isolated, captive etc.)?	Animals	RRS
What is the presence or extent of clonality? What is the risk for and extent of hybridisation? How can kinship be minimised, and diversity be maximised within translocated individuals?	Plants	RRS

Table S3: The 61 species currently (to August 2021) supported by TSI and their IUCN threat status (Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Least Concern (LC), Data Deficient (DD), the State or Territory involved in the program and the number of partners involved in the program.

Common Name	Scientific Name	Taxa	IUCN Status	State/ Territory	No. Partners
Kroombit Tinker Frog	*Taudactylus pleione*	Amphibian	CR	QLD	3
Northern corroboree frog	*Pseudophryne pengilleyi*	Amphibian	CR	NSW/ACT	9
Green and golden bell frog	*Ranoidea aurea*	Amphibian	EN	NSW	9
Stuttering Frog	*Mixophyes balbus*	Amphibian	VU	NSW	3
King Island scrubtit	*Acanthornis magna greeniana*	Bird	CR	TAS	4
Orange-bellied parrot	*Neophema chrysogaster*	Bird	CR	TAS/VIC	2
Regent Honeyeater	*Anthochaera phrygia*	Bird	CR	NSW/VIC	2
Swift parrot	*Lathamus discolor*	Bird	CR	TAS/ACT	3
Western ground parrot	*Pezoporus flaviventris*	Bird	CR	WA	3
Eastern bristlebird	*Dasyornis brachypterus*	Bird	EN	VIC/NSW/ QLD	3
Forty-spotted pardalote	*Pardalotus quadragintus*	Bird	EN	TAS	3
King Island brown thornbill	*Acanthiza pusilla archibaldi*	Bird	EN	TAS	4
Eastern ground parrot	*Pezoporus wallicus*	Bird	LC	SA	3
Murray crayfish	*Euastacus armatus*	Crustacean	DD	VIC	11
Apline Crayfish	*Euastacus crassus*	Crustacean	EN	ACT	9
Riek's crayfish	*Euastacus rieki*	Crustacean	EN	ACT	10
Clarence galaxiid	*Galaxias johnstoni*	Fish	EN	TAS	4
Swan galaxias	*Galaxias fontanus*	Fish	EN	TAS	3
Green sawfish	*Pristis zijsron*	Fish	VU	WA/NT/ QLD	2
Eastern chestnut mouse	*Pseudomys gracilicaudatus*	Mammal	DD	ACT	5
Hasting River mouse	*Pseudomys oralis*	Mammal	EN	NSW/QLD	4
Smoky Mouse	*Pseudomys fumeus*	Mammal	EN	NSW/VIC	3
Ghost Bat	*Macroderma gigas*	Mammal	VU	WA/NT/ QLD	3
New Holland mouse	*Pseudomys novaehollandiae*	Mammal	VU	NSW/VIC	5
Mountain Pygmy-possum	*Burramys parvus*	Marsupial	CR	VIC/NSW	3
Squirrel glider	*Petaurus norfolcensis*	Marsupial	DD	VIC	2
Western barred bandicoot (Shark Bay bandicoot)	*Perameles bougainville*	Marsupial	EN	WA	3
Eastern barred bandicoot	*Perameles gunnii*	Marsupial	EW	VIC	2
Brush-tailed Rock-wallaby	*Petrogale penicillata*	Marsupial	VU	NSW	5

Common Name	Scientific Name	Taxa	IUCN Status	State/ Territory	No. Partners
Chuditch	*Dasyurus geoffroii*	Marsupial	VU	WA	6
	Eucryphia wilkiei	Plant	CE	QLD	6
	Rhodamnia longisepala	Plant	CE	QLD	6
	Zieria alata	Plant	CE	QLD	6
Native guava	*Rhodomyrtus psidioides*	Plant	CR	NSW	3
Nightcap oak	*Eidothea hardeniana*	Plant	CR	NSW	4
Spiny daisy	*Acanthocladium dockeri*	Plant	CR	SA	5
Sorghum	*Sorghum macrospermum*	Plant	DD	NT	4
	Acrotriche baileyana	Plant	DD	QLD	6
	Cryptocarya bellendenkerana	Plant	DD	QLD	6
	Elaeocarpus linsmithii	Plant	DD	QLD	6
	Uromyrtus metrosideros	Plant	DD	QLD	6
	Micromyrtus delicata	Plant	E	QLD	6
Corrigin grevillea	*Grevillea scapigera*	Plant	EN	WA	3
Matchstick banksia	*Banksia cuneata*	Plant	EN	WA	6
Myrtle family	*Lenwebbia sp.*	Plant	EN	NSW	3
Prostrate flame flower	*Chorizema humile*	Plant	EN	WA	8
	Cinnamomum propinquum	Plant	V	QLD	6
	Dracophyllum sayeri	Plant	V	QLD	6
	Endiandra jonesii	Plant	V	QLD	6
	Flindersia oppositifolia	Plant	V	QLD	6
	Litsea granitica	Plant	V	QLD	6
	Polyscias bellendenkerensis	Plant	V	QLD	6
Silver daisy bush	*Olearia pannosa ssp. pannosa*	Plant	VU	NSW/SA	2
Spidery wattle	*Acacia araneosa*	Plant	VU	SA	2
Velvet daisy bush	*Olearia pannosa ssp. cardiophylla*	Plant	VU	NSW/SA	2
Baw baw frog	*Philoria frosti*	Reptile	CR	VIC	2
Bellinger River Snapping Turtle	*Myuchelys georgesi*	Reptile	CR	NSW	3
Manning River Helmeted Turtle	*Wollumbinia purvisi*	Reptile	DD	NSW	2
Corangamite water skink	*Eulamprus tympanum marnieae*	Reptile	EN	VIC	3
Blue-tailed skink	*Cryptoblepharus egeriae*	Reptile	EW	CI	6
Lister's gecko	*Lepidodactylus listeri*	Reptile	EW	CI	6