

Supplementary document S1. Threatened turtle species (n = 138) listed by superfamilies kept in ZIMS institutions; ↓ – decreasing, ↑ – increasing, ? – unknown. Number of individuals: M: male, F: female, U: undetermined. Species names with an asterisk resemble species that are kept only as single individual or in groups of the same sex per institution, so that breeding success can be excluded in the current constellation.

Superfamily Species	IUCN status	Pop. Trend	Number of individuals (M/F/U)	Number of institutions	Breeding success
Cheloidea					
<i>Acanthochelys pallidipectoris</i> *	EN	↓	2 (0/2/0)	1	0
<i>Chelodina mccordi</i>	CR	↓	405 (78/89/238)	50	58
<i>Elseya albagula</i>	EN	?	3 (1/1/1)	1	0
<i>Elseya branderhorsti</i>	VU	?	27 (5/11/11)	6	0
<i>Elusor macrurus</i>	EN	?	33 (13/7/13)	8	0
<i>Mesoclemmys dahli</i> *	CR	?	1 (1/0/0)	1	0
<i>Mesoclemmys zuliae</i> *	VU	?	1 (0/0/1)	1	0
<i>Myuchelys bellii</i> *	EN	?	2 (0/0/2)	1	0
<i>Myuchelys georgesi</i>	CR	?	185 (24/15/146)	3	60
<i>Pseudemys dura umbrina</i>	CR	?	289 (32/40/217)	3	63
Chelonioidae					
<i>Caretta caretta</i>	VU	↓	313 (19/29/265)	26	0
<i>Chelonia mydas</i>	EN	↓	956 (41/32/883)	40	0
<i>Dermochelys coriacea</i> *	VU	↓	2 (0/0/2)	1	0
<i>Eretmochelys imbricata</i>	CR	↓	54 (6/5/43)	11	0
<i>Lepidochelys kempi</i>	CR	↓	148 (9/12/127)	13	0
<i>Lepidochelys olivacea</i> *	VU	?	4 (0/1/3)	3	0
Chelydroidea					
<i>Dermatemys mawii</i>	CR	↓	6 (1/1/4)	5	0
<i>Kinosternon dunni</i>	VU	?	2 (1/0/1)	1	0
<i>Macrochelys temminckii</i>	VU	?	322 (101/73/148)	135	0
Pelomedusoidea					
<i>Erymnochelys madagascariensis</i>	CR	↓	42 (17/9/16)	12	0
<i>Peltocephalus dumerilianus</i> *	VU	?	10 (0/0/10)	5	0
<i>Pelusios broadleyi</i> *	EN	?	2 (2/0/0)	1	0
<i>Podocnemis erythrocephala</i>	VU	?	25 (13/7/5)	8	0
<i>Podocnemis expansa</i>	CR	?	230 (79/67/84)	36	0
<i>Podocnemis lewyana</i>	CR	?	43 (20/9/14)	2	0
<i>Podocnemis sextuberculata</i> *	VU	?	1 (0/0/1)	1	0
<i>Podocnemis unifilis</i>	VU	?	559 (215/97/247)	72	27
Testudinoidea					
<i>Actinemys marmorata</i>	VU	?	191 (42/23/126)	22	38
<i>Actinemys pallida</i>	VU	?	37 (25/10/2)	4	0
<i>Aldabrachelys gigantea</i>	VU	?	82 (30/28/24)	19	0
<i>Astrochelys radiata</i>	CR	↓	1.492 (479/455/558)	173	62
<i>Astrochelys yniphora</i>	CR	↓	714 (121/192/401)	12	0
<i>Centrochelys sulcata</i>	EN	↓	2.436 (697/523/1.216)	370	107
<i>Chelonoidis chilensis</i>	VU	?	182 (58/44/80)	16	0
<i>Chelonoidis denticulatus</i>	VU	?	452 (109/170/173)	105	19
<i>Chelonoidis niger</i>	VU	?	130 (48/51/31)	43	0
<i>Chersobius boulengeri</i> *	EN	↓	4 (0/1/3)	2	0
<i>Chersobius signatus</i>	EN	↓	8 (4/2/2)	3	1
<i>Clemmys guttata</i>	EN	↓	339 (100/124/115)	71	6
<i>Cuora amboinensis</i>	EN	↓	551 (77/91/383)	52	74

Superfamily Species	IUCN status	Pop. Trend	Number of individuals (M/F/U)	Number of institutions	Breeding success
<i>Cuora aurocapitata</i>	CR	?	65 (12/17/36)	5	11
<i>Cuora bourreti</i>	CR	↓	83 (14/20/49)	14	9
<i>Cuora cyclornata</i>	CR	?	29 (1/3/25)	4	0
<i>Cuora flavomarginata</i>	EN	?	135 (52/52/31)	33	0
<i>Cuora galbinifrons</i>	CR	↓	88 (20/36/32)	24	6
<i>Cuora mccordi</i>	CR	?	132 (25/34/73)	18	19
<i>Cuora mouhotii</i>	EN	↓	60 (14/20/26)	17	1
<i>Cuora pani</i>	CR	?	60 (13/13/34)	14	4
<i>Cuora picturata</i>	CR	↓	43 (8/7/28)	5	1
<i>Cuora trifasciata</i>	CR	↓	238 (41/59/138)	29	0
<i>Cuora zhoui</i>	CR	?	41 (2/16/23)	5	6
<i>Cyclemys atripons*</i>	EN	↓	4 (3/1/0)	2	0
<i>Cyclemys oldhamii</i>	EN	↓	20 (7/10/3)	5	0
<i>Cyclemys pulchristriata</i>	EN	↓	10 (2/4/4)	2	0
<i>Emydoidea blandingii</i>	EN	↓	317 (141/152/24)	28	60
<i>Geochelone elegans</i>	VU	↓	738 (257/263/218)	97	15
<i>Geochelone platynota</i>	CR	↑	270 (93/68/109)	35	63
<i>Geoclemys hamiltonii</i>	EN	↓	349 (74/151/124)	34	4
<i>Glyptemys insculpta</i>	EN	↓	222 (29/43/150)	37	7
<i>Glyptemys muhlenbergii</i>	CR	?	80 (14/10/56)	10	40
<i>Gopherus agassizii</i>	CR	↓	158 (66/49/43)	61	7
<i>Gopherus flavomarginatus</i>	CR	↓	37 (6/5/26)	4	8
<i>Gopherus morafkai</i>	VU	?	23 (8/4/11)	9	0
<i>Gopherus polyphemus</i>	VU	?	155 (50/42/63)	48	0
<i>Graptemys barbouri</i>	VU	↓	37 (6/17/14)	9	1
<i>Graptemys caglei*</i>	EN	↓	7 (2/1/4)	2	1
<i>Graptemys flavimaculata</i>	VU	↓	59 (23/21/15)	9	0
<i>Graptemys gibbonsi</i>	EN	↓	34 (4/1/29)	4	0
<i>Graptemys oculifera</i>	VU	?	7 (3/3/1)	3	0
<i>Graptemys pearlensis</i>	EN	↓	7 (2/5/0)	2	0
<i>Hardella thurjii</i>	EN	↓	14 (9/3/2)	5	0
<i>Heosemys annandalii</i>	CR	↓	228 (67/71/90)	22	5
<i>Heosemys depressa</i>	CR	↓	29 (8/12/9)	7	0
<i>Heosemys grandis</i>	CR	↓	418 (91/98/229)	37	39
<i>Heosemys spinosa</i>	EN	↓	160 (47/44/69)	36	4
<i>Indotestudo elongata</i>	CR	↓	910 (206/214/490)	53	81
<i>Indotestudo forstenii</i>	CR	↓	80 (34/32/14)	13	3
<i>Indotestudo travancorica</i>	VU	?	34 (4/14/16)	2	0
<i>Kinixys erosa</i>	EN	?	41 (10/18/13)	16	3
<i>Kinixys homeana</i>	CR	↓	126 (35/31/60)	25	10
<i>Kinixys lobatsiana*</i>	VU	↓	5 (0/1/4)	2	0
<i>Kinixys natalensis*</i>	VU	↓	6 (0/0/6)	3	0
<i>Kinixys nogueyi</i>	VU	?	22 (6/6/10)	9	7
<i>Kinixys spekii</i>	VU	?	15 (5/2/8)	7	0
<i>Kinixys zombensis*</i>	VU	?	1 (0/0/1)	1	0
<i>Leucocephalon yuwonoi</i>	CR	↓	91 (30/29/32)	13	3
<i>Malaclemys terrapin</i>	VU	↓	535 (36/193/306)	39	129
<i>Malacochersus tornieri</i>	CR	↓	669 (235/234/200)	153	17
<i>Mauremys annamensis</i>	CR	↓	221 (62/76/83)	41	6
<i>Mauremys mutica</i>	CR	↓	177 (20/12/145)	17	0

Superfamily Species	IUCN status	Pop. Trend	Number of individuals (M/F/U)	Number of institutions	Breeding success
<i>Mauremys nigricans</i>	EN	?	37 (7/9/21)	8	0
<i>Mauremys reevesii</i>	EN	?	174 (26/25/123)	46	0
<i>Mauremys sinensis</i>	CR	↓	313 (51/76/186)	45	0
<i>Melanochelys tricarinata</i>	EN	↓	135 (43/22/70)	7	4
<i>Morenia ocellata*</i>	EN	↓	1 (0/0/1)	1	0
<i>Notochelys platynota</i>	VU	↓	10 (6/3/1)	5	0
<i>Orlitia borneensis</i>	CR	↓	146 (50/57/39)	40	3
<i>Pangshura sylhetensis*</i>	CR	↓	1 (0/1/0)	1	0
<i>Pangshura tecta</i>	VU	↓	137 (5/6/126)	9	5
<i>Platysternon megacephalum</i>	CR	↓	48 (8/13/27)	13	15
<i>Sacalia bealei</i>	EN	?	36 (7/9/20)	6	1
<i>Sacalia quadriocellata</i>	CR	↓	72 (16/15/41)	12	3
<i>Siebenrockiella crassicolis</i>	EN	↓	120 (28/33/59)	24	1
<i>Siebenrockiella leytensis</i>	CR	↓	7 (4/3/0)	2	0
<i>Terrapene carolina</i>	VU	↓	363 (75/78/210)	86	39
<i>Terrapene coahuila</i>	EN	↓	66 (19/28/19)	17	1
<i>Terrapene mexicana</i>	VU	?	89 (21/37/31)	6	4
<i>Terrapene triunguis</i>	VU	?	194 (58/80/56)	85	3
<i>Terrapene yucatanana</i>	VU	?	12 (4/3/5)	3	2
<i>Trachemys callirostris</i>	VU	?	137 (15/56/66)	9	0
<i>Trachemys decorata*</i>	VU	?	7 (1/0/6)	3	0
<i>Trachemys gaigeae*</i>	VU	?	3 (0/3/0)	2	0
<i>Trachemys ornata*</i>	VU	↓	39 (0/6/33)	4	0
<i>Trachemys terrapen</i>	VU	?	15 (2/13/0)	1	0
<i>Manouria emys</i>	CR	↓	90 (7/18/65)	14	0
<i>Manouria impressa</i>	EN	↓	26 (7/13/6)	11	2
<i>Pyxis arachnoides</i>	CR	↓	76 (16/16/44)	18	7
<i>Pyxis planicauda</i>	CR	↓	135 (61/43/31)	21	5
<i>Testudo graeca</i>	VU	?	730 (146/162/422)	132	23
<i>Testudo horsfieldii</i>	VU	?	629 (140/178/311)	145	0
<i>Testudo kleinmanni</i>	CR	↓	504 (125/110/269)	70	19
<i>Batagur affinis</i>	CR	↓	222 (23/66/133)	9	0
<i>Batagur baska</i>	CR	↓	484 (36/51/397)	11	0
<i>Batagur borneoensis</i>	CR	↓	193 (55/36/102)	28	11
<i>Batagur kachuga</i>	CR	↓	192 (3/7/182)	3	0
<i>Batagur trivittata</i>	CR	↓	42 (9/12/21)	1	0
Trionychoidea					
<i>Amyda cartilaginea</i>	VU	?	33 (2/4/27)	10	0
<i>Carettochelys insculpta</i>	EN	↓	269 (122/42/105)	93	0
<i>Chitra chitra</i>	CR	↓	5 (2/3/0)	3	0
<i>Chitra indica</i>	EN	?	3 (1/2/0)	1	0
<i>Cycloderma aubryi</i>	VU	↓	4 (2/2/0)	1	0
<i>Nilssonina gangetica*</i>	EN	↓	3 (1/0/2)	3	0
<i>Nilssonina hurum*</i>	EN	↓	2 (1/1/0)	2	0
<i>Nilssonina leithii*</i>	CR	↓	1 (0/0/1)	1	0
<i>Pelochelys bibroni*</i>	VU	?	14 (0/0/14)	1	0
<i>Pelochelys cantorii*</i>	CR	↓	5 (1/0/4)	3	0
<i>Pelodiscus sinensis</i>	VU	↓	107 (23/19/65)	51	0
<i>Trionyx triunguis</i>	VU	↓	28 (6/3/19)	10	0

Supplementary document S2. The 25+ (50) most threatened turtle species ranked by the Turtle Conservation Coalition (2018), their IUCN threat status, the ZIMS region where they are native to, the number of individuals in ZIMS institutions and the number of ZIMS institutions where they are kept. Colour code: Green: represented by > 99 sexed individuals and > 9 institutions; yellow: represented either by > 99 sexed individuals and < 10 institutions or represented by < 100 sexed individuals and > 9 institutions; and red: represented by < 100 sexed individuals and < 10 institutions. An asterisk behind a species name represents a species that is only kept as single individual or in same-sex groups per institution.

Rank	Species	IUCN status	ZIMS region	Number of individuals	Number of institutions
1	<i>Rafetus swinhoei</i>	CR	Asia	0	0
2	<i>Astrochelys yniphora</i>	CR	Africa	714 (121/192/401)	12
3	<i>Cuora yunnanensis</i>	CR	Asia	0	0
4	<i>Batagur baska</i>	CR	Asia	484 (36/51/397)	11
5	<i>Batagur trivittata</i>	CR	Asia	42 (9/12/21)	1
6	<i>Cuora zhoui</i>	CR	Asia	41 (2/16/23)	5
7	<i>Cuora mccordi</i>	CR	Asia	88 (20/36/32)	24
8	<i>Psammobates geometricus</i>	CR	Africa	0	0
9	<i>Cuora aurocapitata</i>	CR	Asia	65 (12/17/36)	5
10	<i>Mesoclemmys dahli*</i>	CR	South America	1 (1/0/0)	1
11	<i>Cyclanorbis elegans</i>	CR	Africa	0	0
12	<i>Cuora trifasciata</i>	CR	Asia	238 (41/59/138)	29
13	<i>Geochelone platynota</i>	CR	Asia	270 (93/68/109)	35
14	<i>Chelodina mccordi</i>	CR	Asia	405 (78/89/238)	50
15	<i>Chitra chitra</i>	CR	Asia	5 (2/3/0)	3
16	<i>Myuchelys georgesi</i>	CR	Oceania	185 (24/15/146)	3
17	<i>Mauremys annamensis</i>	CR	Asia	221 (62/76/83)	41
18	<i>Dermatemys mawii</i>	CR	North America	6 (1/1/4)	5
19	<i>Erymnochelys madagascariensis</i>	CR	Africa	42 (17/9/16)	12
20	<i>Batagur affinis</i>	CR	Asia	222 (23/66/133)	9
21	<i>Batagur kachuga</i>	CR	Asia	192 (3/7/182)	3
22	<i>Leucocephalon yuwonoi</i>	CR	Asia	91 (30/29/32)	13
23	<i>Pseudemydura umbrina</i>	CR	Oceania	289 (32/40/217)	3
24	<i>Ranacephala hogei</i>	CR	South America	0	0
25	<i>Siebenrockiella leytensis</i>	CR	Asia	7 (4/3/0)	2
26	<i>Podocnemis lewyana</i>	CR	South America	43 (20/9/14)	2
27	<i>Batagur borneoensis</i>	CR	Asia	193 (55/36/102)	28
28	<i>Sternotherus depressus</i>	CR	North America	NA (ZTL only)	NA (ZTL only)
29	<i>Cuora pani</i>	CR	Asia	60 (13/13/34)	14
30	<i>Testudo kleinmanni</i>	CR	Africa	504 (125/110/269)	70
31	<i>Heosemys depressa</i>	CR	Asia	29 (8/12/9)	7
32	<i>Cuora picturata</i>	CR	Asia	43 (8/7/28)	5
33	<i>Pyxis planicauda</i>	CR	Africa	135 (61/43/31)	21
34	<i>Chitra vandijki</i>	CR	Asia	0	0
35	<i>Mauremys nigricans</i>	EN	Asia	37 (7/9/21)	8
36	<i>Chitra indica</i>	EN	Asia	3 (1/2/0)	1
37	<i>Terrapene coahuila</i>	EN	North America	66 (19/28/19)	17
38	<i>Astrochelys radiata</i>	CR	Africa	1.492 (479/455/558)	173
39	<i>Cuora bourreti</i>	CR	Asia	83 (14/20/49)	14
40	<i>Cuora galbinifrons</i>	CR	Asia	88 (20/36/32)	24
41	<i>Pyxis arachnoides</i>	CR	Africa	76 (16/16/44)	18
42	<i>Gopherus flavomarginatus</i>	CR	North America	37 (6/5/26)	4
43	<i>Glyptemys muhlenbergii</i>	CR	North America	80 (14/10/56)	10
44	<i>Chersobius solus</i>	VU	Africa	0	0
45	<i>Nilssonina formosa</i>	CR	Asia	NA (ZTL only)	NA (ZTL only)
46	<i>Nilssonina nigricans</i>	CR	Asia	NA (ZTL only)	NA (ZTL only)
47	<i>Pelochelys cantorii*</i>	CR	Asia	5 (1/0/4)	3
48	<i>Malacochersus tornieri</i>	CR	Africa	669 (235/234/200)	153
49	<i>Gopherus agassizii</i>	CR	North America	158 (66/49/43)	61
50	<i>Cuora cyclornata</i>	CR	Asia	29 (1/3/25)	4