



National Incursion Prevention and Response

Incursion Data Summary

2016-2017

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Department of the Environment and Energy



Department of Primary Industries and Regional Development



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Background

560 records of 620 vertebrate (excluding fish) incursion incidents were provided by the Commonwealth, state and territory governments for the years 2016 and 2017. The 2016 data was curated by Talia Wittmann (University of Adelaide) and 2017 data by Michelle Christy (National Incursion Prevention and Response Facilitator). Data curation methods followed IPAC Vertebrate Detections Project Report (September 2017).

The information presented below is a general summary of that information, broken down into three categories:

- 1. Native species incursions into new areas;
- 2. Incursions of non-native species known to have an established population in Australia; and
- 3. Non-established (new) incursions in Australia of a non-native species.

Incursion incidents included in the summary are only those reported through jurisdictional biosecurity agencies.

The majority of the analysis focuses on non-native, non-established incursions into Australia (henceforth referred to as "new incursions"). Graphs, tables and text will indicate which set/s of data is used. Analyses of pre- or post-border detections are intentionally excluded at the request of some jurisdictions. However, where appropriate, these detections are discussed for select species. Note that fish data was not collected and therefore not included in the summary.

Where possible, information regarding the type of detection is included. These fall into three primary categories:

-) At Large at liberty; escaped or not yet captured
-) Captive kept in captivity or confined, such as in zoos, aviaries, terrariums and aquariums. Majority of captive incidents result from the illegal pet trade.
- Stowaway accidently or unintentionally transported through the transportation network (e.g., sea vessels, aircraft, or other vehicles, humans or other animals) either directly or via cargo, or commodities.

Data are divided into four classes for analysis; amphibians, reptiles, birds, and mammals. Where possible species names are included and provide an indication of the particular orders, families or species detected.

Note that most data presented are the number of recorded incursion incidents of identifiable species and does not include any assessment of the potential establishment risk of the species detected. It is also not possible to determine whether or not each incursion event of the same species is the same individual/population. Where known, information is provided in the text.

The information presented here is only as good as the quality of the data provided. Differences between years or jurisdictions may reflect differences in effort, manpower, and/or emphasis or expertise. Limited interpretation of the accompanying notes has been undertaken to improve the ability to analyse the data, however, it needs to be understood that the data contain incorrect identifications, missing and ambiguous data. Nevertheless, the findings presented in this summary are sufficiently general or with enough data points so as to be informative to governments.

This document is a summary. Please refer to the data if you require more in-depth information.

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General Points

-) Of the 620 recorded incursion incidents (native, established and non-native), 305 occurred in 2016 and 315 in 2018 (Table 1). Of these, 8 could not be identified and have subsequently been removed from further analysis. Note that differences between years may reflect differences in effort, manpower, and/or emphasis or expertise.
- Reptiles account for almost half the incursion incidents (53%; Table 2 and Figure 1).
-) At least 147 identifiable native individuals were detected in 78 incursion incidents (13%). These have been removed from further analysis.
-) Where international origins of incursions could be traced, incidents were relatively frequent from Asia:
 - o Indonesia 23 incidents (18 smuggling), primarily snakes and turtles
 - o Thailand 11 incidents (8 stowaways), all but one were reptiles or amphibians
 - Europe (UK, Italy, Spain and Sweden) 9 incidents (7 smuggling), 2 mammals and 7 snakes
 - China (includes Hong Kong and Taiwan) 8 incidents (5 smuggling, 3 stowaway),
 5 reptiles and amphibians (ABST, snakes and turtle)
 - Vietnam 5 incidents, all stowaway geckos except one *Duttaphrynus melanostictus* (Asian black-spined toad)
 - 23 incidents of *Hemidactylus frenatus* (common house gecko) from multiple locations - Vietnam, Indonesia, Solomon Islands, United States, Malaysia, Papua New Guinea, Taiwan and Fiji.
 - Other countries (incidental incidents less than 3) are India (all stowaways), Fiji, Israel, Japan, Africa, PNG, Nauru and USA.

Table 1. Number of reported incursion incidents per year from 2016 to 2017. Only incursion incidents of known dates are included. Data includes native, established non-native and new non-native incursions.

Year	Incursion Incidents
2016	305
2017	315
Total	620



Table 2. Total number of incursion incidents reported between 2016 and 2017 of four taxa groups; reptiles, amphibians, birds, and mammals. Data includes native, established non-native and new non-native incursions. Of these, 8 could not be identified and have subsequently been removed from further analysis.

Group	Incidents	Percentage
Reptiles	327	53%
Birds	145	23%
Amphibians	93	15%
Mammals	47	8%
Unknown	8	1%
TOTAL	620	



Figure 1. Incursions incidents of identifiable reptiles, amphibians, birds and mammals between 2016 and 2017. Data includes native, established non-native and new non-native incursions. n = 610.



Reptiles

-) A total of 41 identifiable, non-native reptile species were detected in 242 incursion incidents (
- Table 3), representing two Orders; Squamata (scaled reptiles 12 families) and Testudine (turtles and tortoises 5 families).
-) The majority of reptile detections occurred post-border (55%, n = 132 post-border detections).
-) Of the 41 reptile species, the common house gecko (*Hemidactylus frenatus*) is considered established in Australia. The flat-tailed house gecko (*Hemidactylus platyurus*) is established on Cocos (Keeling) Island but not the Australian mainland.
-) Geckos accounted for over a third of reptile detections (over 38%; Figure 2), with 91 incursion instances of at least 9 non-native species.
 - More than 86% of the 91 gecko incursion incidents (identified to species) were common house geckos (*Hemidactylus*) (Figure 3). Most incidents involved one individual, although 12 were multiple individuals up to 10 in one incident (total 104 individuals).
 - Over 78% of *Hemidactylus* were stowaways detected at the border. The high stowaway rate indicates strong propagule pressure for this species.
-) Snakes accounted for 38% (n = 91) of the total number of reptile incursion incidents (Figure 2 and Figure 4).
 - Of the 91 snake incursions (identified to species), 62 (68%) were the Colubrid, eastern corn snake (*Pantherophis guttatus*), totalling about 178 individuals.
 - Eighteen (20%) of these incidences were corn snakes illegally held in captivity; 43 (47%) were detected at large.
 - All the Boidaes were *Boa constrictor* (n = 14). The *Boa constrictors* were either captive (n = 9), smuggled (n = 4), or stowaways (n = 1)
- J Turtles and tortoises (Testudine) accounted for 20% (n = 50) of the total number of reptile incursion incidents (Figure 2).
 - The 298 individuals represent five families; Chelydridae (common snapping turtle), Emydidae (red-eared slider turtle, pond slider), Geoemydidae (turtles), Podocnemididae (side-necked turtle), and Testudinidae (Figure 5)
 - More than 63% (n = 31) of the 50 turtle/tortoises incursion incidents (identified to species) were red-eared slider turtle (REST; *Trachemys scripta elegans*).
 - REST accounted for 78% of 297 individual turtle and tortoises detected (n = 232).
 - REST were primarily detected at large (n = 25 incursion incidents, 236 individuals) while 6 incidents were of 18 REST detected in captivity. All incidents were post border detections.
 - Most REST incidents involved one individual, although 11 incidents were multiple individuals, up to about 100 in two incidents.



Table 3. Incursion incidents of non-native reptiles (by Order) between 2016 and 2017; Squamata (scaled reptiles - 12 families) and Testudine (turtles and tortoises - 5 families). Data does not include native species incursions.

	Family	Incidents	Percentage
Order Squ	iamata		
Geckos	Gekkonidae (gecko)	89	36.9%
	Eublepharidae (common leopard gecko)	1	0.4%
	Phyllodactylidae (geckos)	1	0.4%
Snakes	Colubridae (eastern corn snake, other colubrids)	69	28.6%
	Pythonidae (pythons)	11	4.6%
	Boidae (boa constrictor, pacific boa)	9	3.7%
	Viperidae (vipers)	2	0.8%
Lizards	Chamaeleonidae (chameleon)	3	1.2%
	Scinidae (skinks)	3	1.2%
	Agamidae (dragons)	1	0.4%
	Varanidae (monitors)	2	0.8%
	Iguanidae (iguanas)	1	0.4%
	Subtotal	192	79.7%
Order Tes	tudine		
Turtle	Emydidae (red-eared slider turtle, pond slider)	34	14.0%
	Geoemydidae (turtles)	5	2.1%
	Chelydridae (common snapping turtle)	3	1.2%
	Podocnemididae (side-necked turtles)	1	0.4%
Tortoises	Testudinidae (tortoises)	7	2.9%
	Subtotal	50	20.7%
	TOTAL	242	





Figure 2. Incursions incidents of non-native reptile species between 2016 and 2017, broken down into four groups (in order or frequency); geckos, snakes, turtle/tortoises, and other lizards. Data does not include native species incursions. n = 762 individuals.



Figure 3. Incursions incidents of non-native gecko species between 2016 and 2017. Note this figure only includes incursion incidents where identification to species was possible. "Other" are geckos from genus Lepidodactylus (mourning), Phelsuma (day), Eublepharis (leopard), and Tarentola (Moorish). Data does not include native species incursions. n = 106.





Figure 4. Incursions incidents of non-native snake species between 2016 and 2017. Note this figure only includes incursion incidents where identification to species was possible. Data does not include native species incursions. n = 49.



Figure 5. Incursions incidents of non-native turtle/tortoise species between 2016 and 2017. Note this figure only includes incursion incidents where identification to species was possible. Data does not include native species incursions. n = 297 individuals.



Amphibians

-) A total of 11 non-native amphibian species were detected in 70 incursion incidents, representing two orders (Anura and Caudata) and five families; Bufonidae, Hylidae, Hyperoliidae, Microhylidae, Salamandridae, and Rhacophoroidae (
- J



- / Table 4).
-) Three species of Bufonidae (true toads; cane, Asian black spined and European green) accounted for the majority of incidents (80%, n = 56 incidents of about 78 individuals)
- Cane toads had the highest recorded number of detections at 40 (more than 59 individuals). Note that these records primarily constitute a range expansion since the species is well established in Australia. However, there were three incidents of cane toads transported to Australia from overseas.
-) The majority of amphibian detections occurred post-border (71%, n = 50 post-border incidents of about 72 individuals).
- Non-native, non-established amphibians accounted for 27 (39%) incidents involving 32 individuals (Figure 6). These included:
 - Asian black-spined toad (*Duttaphrynus melanostictus*; 15 incidents, 18 individuals).
 - Asian painted bullfrog (Kaloula pulchra; 2 incidents, 2 individuals)
 - African reed frog (Hyperolius kivuensis; 1 incident, 1 individual)
 - Cuban treefrog (Osteopilus septentrionalis; 1 incident, 2 individuals)
 - Grey foam nest tree frog (*Chiromantis xerampelina*; 1 incident, 2 individuals)
 - o common tree frog (Polypedates leucomystax; 1 incident, 1 individual)
 - Chinese whipping frog (*Rhacophorus chenfui*; 1 incident, 1 individual)
 - European green toad (*Pseudepidalea viridis*; 1 incident, 1 individual)
 - o flower pot toad (*kaloula baleata*; 1 incident, 1 individual)
 - Javan chorus frog (Microhyla achatina; 1 incident, 1 individual)
 - Unknown species (2 incidents, 2 individuals)
- All amphibians detected pre-border were accidental stowaways, usually in shipping containers, pallets or in personal luggage.



Table 4. New incursions incidents of non-native amphibians (by Family) between 2016 and 2017. Data does not include native species.

Family	Туре	Species	Incidents	Percentage
Order Anura				
Bufonidae	True toads	Cane, Asian black-spined, green	56	80.0%
Hylidae	Tree frogs	Cuban tree, Javan chorus	2	2.9%
Hyperoliidae	Sedge frogs	African reed	1	1.4%
Microhylidae	Narrow mouthed frogs	Flower pot, Asian painted	3	4.3%
Rhacophoroidae	Shrub frogs	Chinese whipping, common, grey foam nest tree	3	44.3%
Unknown			4	5.7%
Order Caudata				
Salamandridae	Salamanders/newts	unknown	1	1.4%
		TOTAL	70	



Figure 6. Incursion incidents of non-native amphibian species (by Family) between 2016 and 2017, broken down by the top four families represented. "Other" includes Hyperoliidae, Salamandridae and unidentified anurans. Data does not include native or established non-native species. n = 27 incidents.



Birds

- A total of 19 identified non-native bird species (about 261 individuals) were detected in 111 incursion incidents, representing five Orders (Table 5);
 - Psittaciformes (51 incidents of 84 individuals),
 - Passeriformes (43 incidents of 102 individuals),
 - Columbiformes (9 incidents of 12 individuals),
 - Galliformes (7 incidents of 61 individuals), and
 - Anseriformes (1 incident of two individuals).
-) Of the 111 incursion incidents, 100 were detections at large (249 individuals), 6 captive (7 individuals), 3 stowaway (3 individuals), and two known to be smuggled (2 individuals).
-) The majority of non-native bird detections occurred post-border (97%, n = 108 postborder detections, 258 individuals).
- Seventeen species (103 incidents of 253 individuals) were detected at large, two were captive (3 incidents of 3 individuals) and two (2 incidents of 2 individuals) were smuggled. Smuggled and captive species were all parrots or parakeets (smuggled Blue fronted Amazon and rose-ringed parakeet, captive Alexandrine Parakeet and green-cheeked conure.
-) Rose-ringed parakeet (*Psittacula krameri*) had the highest recorded number of incursion incidents (44) and the highest recorded number of individuals (74).
-) An additional 9 species (genus *Passer* grouped) known to be established in some areas of Australia were detected:
 - Red-whiskered bulbul (*Pycnonotus jocosus*; 19 incidents, about 34 individuals)
 - House sparrow, common blackbird, Eurasian tree sparrow, common starling (Passer spp.; 14 incidents, about 58 individuals)
 - California Quail; *Callipepla californica*; 4 incidents, about 47 individuals)
 - African collared dove (*Streptopelia roseogrisea*; 4 incidents, 7 individuals)
 - o Common myna (Acridotheres tristis; 3 incidents, 3 individuals)
 - Barbary Dove (*Streptopelia decaocto*; 2 incidents, 2 individuals)
 - Common pigeon (*Columba livia*; 1 incident, 1 individual)
 - Chukar partridge (*Alectoris chukar*; 1 incident, 11 individuals)
 - Muscovy duck (Cairina moschata; 1 incident, 1 individual)

Non-Native and not known to be established in Australia. Note, some are known aviculture species but not yet known to be established at large.

-) Sixteen incursion incidents (21 individuals) of 10 species (and one unknown) not known to be established in Australia were recorded (Figure 7);
 - House crow (Corvus splendens; 3 incidents, 3 individuals)
 - Alexandrine parakeet (Psittacula eupatria; 3 incidents, 3 individuals)
 - Green-cheeked parakeet (*Pyrrhura molinae*; 2 incidents, 2 individuals)



- Eurasian Magpie (*Pica pica*; 2 incidents, 2 individuals)
- Peach faced lovebirds (*Agapornis roseicollis*; 1 incident, 4 individuals)
- Helmeted Guinea fowl (*Numida meleagris*; 1 incident, 2 individuals)
- Blue fronted Amazon (Amazona aestiva; 1 incident, 1 individual)
- Nicobar Pigeon (*Caloenas nicobarica*; 1 incident, 1 individual)
- Pink-headed imperial pigeon (Ducula rosacea; 1 incident, 1 individual)
- Crimson-bellied parakeet (pyrrhura perlata; 1 incidents, 1 individual)
- Unknown species (2 incidents, 2 individuals)
-) Of these, 12 incidents (16 individuals) were detected at large, three (3 individuals) were captive, one (one individual) was a stowaway and one (one individual) was smuggled into Australia

Table 5. Incidents	of non-native birds	detected between	2016 and 2017	(by Order).
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Order	Common Groups	Incidents	Percentage
Psittaciformes	Parrots and Parakeets	51	46%
Passeriformes	Perching birds	43	39%
Columbiformes	Doves and Pigeons	9	8%
Galliformes	Fowls and Quails	7	6%
Anseriformes	Ducks and Geese	1	1%

TOTAL

111



Figure 7. Incursion incidents of non-native birds (by Order) between 2016 and 2017. Data does not include native or established non-native species. n = 17 incidents.



Mammals

A total of 17 non-native mammal species were detected in 62 incursion incidents (over 76 individuals), representing seven Orders; Artiodactyla (even-toed ungulates), Carnivora (carnivores), Chiroptera (bats), Erinaceomorpha (hedgehogs), Eulipotyphla (shrews and moles), Primates (primates), and Rodentia (rodents) (Table 8).

-) The majority of non-native mammal detections occurred pre-border (64%, n = 40 preborder detections).
-) When considering only new incursions into Australia, a total of eight identifiable nonnative mammal species were detected in 8 incursion incidents (about 18 individuals), representing six Orders mentioned above (Table 7).

Table 6. Incursion incidents of non-native mammals between 2016 and 2017, broken down into seven groups (in order or frequency) rodents, carnivores, ungulates, primates, hedgehogs, shrews, and bats. Data includes new and established non-natives.

Order	Species Included	Incidents	Percentage
Rodentia	Rats, mice, squirrels, chinchilla,	39	63%
Carnivora	Ferret, racoon polecat, wolf, fox, cat	8	13%
Artiodactyla	Water buffalo*	3	5%
Primates	Common marmoset, unknown (2 incidents)	3	4%
Erinaceomorpha	Four-toed (African pigmy) hedgehog	1	2%
Eulipotyphla	Asian house shrew	1	2%
Chiroptera	Thick-thumbed bat unknown (2 incidents)	3	5%
Unknown		4	5%
	TOTAL	62	

* Known to be illegally kept.

Table 7. New incursion incidents of non-native mammals between 2016 and 2017. Data does not include unknown, native or species known to be established in Australia.

Order	Species Included	Incidents	Percentage
Rodentia	Chinchilla, garden dormouse	2	25%
Carnivora	Racoon, grey wolf	2	25%
Primates	Common marmoset	1	12.5%
Erinaceomorpha	Four-toed (African pigmy) hedgehog	1	12.5%
Eulipotyphla	Asian house shrew	1	12.5%
Chiroptera	Thick-thumbed bat	1	12.5%
	TOTAL	8	

