

Egyptian Goose (*Alopochen aegyptiaca*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, December 2016

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<https://commons.wikimedia.org/w/index.php?curid=788401>. (November 2016).

1 Native Range and Status in the United States

Native Range

From Braun (2004):

“Egyptian Geese are found throughout Africa south of the Sahara, throughout the Nile River valley (Beazley 1974), and are a common resident in Kruger National Park, South Africa (Newman 1980).”

Status in the United States

From Pranty and Garrett (2011):

“In the ABA [American Birding Association] Area [including all U.S. states except Hawaii], eBird data suggest that populations are widespread and increasing in Florida, with smaller numbers in California, Texas, and other states.”

“Some flocks [in Florida] contain more than 50 individuals; the species is especially widespread in the southeastern peninsula. Although no statewide survey has been undertaken, at least many hundreds of Egyptian Geese occur [...].”

“In California, pairs and small groups are encountered in Los Angeles and Orange counties. [...] Scattered reports north to Humboldt and Tehama counties (eBird data) might pertain to local escapes or small, ephemeral populations. The California population, while perhaps growing, probably numbers only 100-200 individuals at the present time.”

“Egyptian Geese in the ABA Area are mostly limited to urban and suburban areas [...].”

Means of Introductions in the United States

From Braun (2004):

“The first documented sightings of this species in Martin County on Florida’s southeast coast were in 1993-94. Sightings of the species were reported to the Martin County Audubon Society (MCAS) in 1994, when two Egyptian Geese were seen on Hutchinson Island, a coastal barrier island connected to the mainland located east of Stuart. Because the birds were observed in a golf course resort and residential community and did not appear afraid of humans, it was assumed that the birds were either escapees from captivity or were pet birds that had been brought to the area. Speculation that the birds had dispersed from Miami Metrozoo when that facility was severely impacted by Hurricane Andrew during August 1992 was refuted by the curator, S. Conners (pers. comm.) who confirmed that none of the five captive Egyptian Geese at Metrozoo at the time of Hurricane Andrew escaped.”

From Smith and James (2012):

“In March of 1988, James was alerted by Joe and Vivian Stockton of a strange goose at the C. B. “Charlie” Craig State Fish Hatchery in Centerton [Arkansas]. He visited the hatchery on 26 March and found one Egyptian Goose that had a limp with its left leg. During the same time period, a goose was found at Devil’s Den State Park (Washington Co.) that limped and had a band on its leg. [...] The origin of these birds at Centerton is unknown, but on 22 November 1996 James talked to a Ken Whited in Centerton, who told of a “Shorty” Long who had a hobby of raising exotic waterfowl across the street from him. Upon Long’s death, his relatives may have released his captive birds. Whited stated that he had 2 Egyptian Geese at his place in 1987 and 1988. This story coincides nicely with the discovery of a bird at the fish hatchery in 1988.”

“James discovered a population of geese associated with the Wild Wilderness Drive-Through Safari in Gentry [Arkansas] in 1998, about 24 km southwest of Centerton. This 160 ha park has

free-ranging animals from around the world and several ponds. [...] According to the owner, Leon Wilmoth, the park first acquired some geese in the early 1980s, possibly 1981 or 1982, so they have been there about 30 years.”

From Pranty and Garrett (2011):

“Mentioned in passing by Owre (1973), Egyptian Geese in Florida were first noted as breeding in the Tampa Bay area in the mid-1980s, but breeding populations there were short lived.”

“Reports [in California] date back to the late 1970s, with breeding occurring in Orange County since 1980 (Gallagher 1997) and Los Angeles County since at least 1995.”

Remarks

From CABI (2016):

“*Alopochen aegyptiaca*, the Egyptian goose, is a monotypic species that occupies its own genus and has no close relatives extant. Its specific name has recently been corrected from *aegyptiacus* to *aegyptiaca* to comply with conventions on gender agreement (David and Gosselin, 2002).”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2016):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Tetrapoda
Class Aves
Order Anseriformes
Family Anatidae
Subfamily Tadorninae
Genus *Alopochen*
Species *Alopochen aegyptiaca* (Linnaeus, 1766)”

“Current Standing: valid”

Size, Weight, and Age Range

From Tattan (2004):

“Egyptian geese are anywhere from 63 to 73 cm in height and they can weigh from 1.5 to 2.3 kg. The wingspan is fairly large, measuring 38 cm, on average.”

“The lifespan of *Alopochen aegyptiacus* in the wild has not been documented. At the Woodland Park Zoo, an Egyptian goose lived for fourteen years. (Jensen, et al., 2002)”

Environment

From Tattan (2004):

“Egyptian geese will not populate densely wooded areas, though they can be found in meadows, grasslands, and agricultural fields. Most of their time is spent in rivers, streams, lakes, ponds and wetlands. They can be found as high as 4000 m. (Jensen, et al., 2002; McLachlan and Liversidge, 1940; Van[]Perlo, 1999)”

Climate/Range

From Tattan (2004):

“temperate; tropical [...]”

From CABI (2016):

“Latitude North (°N) 54
Latitude South (°S) 34”

Distribution Outside the United States

Native

From Braun (2004):

“Egyptian Geese are found throughout Africa south of the Sahara, throughout the Nile River valley (Beazley 1974), and are a common resident in Kruger National Park, South Africa (Newman 1980).”

From BirdLife International (2012):

“Angola (Angola); Botswana; Burkina Faso; Burundi; Cameroon; Central African Republic; Chad; Congo; Congo, The Democratic Republic of the; Djibouti; Egypt; Equatorial Guinea; Eritrea; Ethiopia; Gabon; Gambia; Guinea; Guinea-Bissau; Kenya; Lesotho; Malawi; Mali; Mauritania; Mozambique; Namibia; Niger; Nigeria; Rwanda; Senegal; Somalia; South Africa; South Sudan; Sudan; Swaziland; Tanzania, United Republic of; Tunisia; Uganda; Zambia; Zimbabwe”

Introduced

NOBANIS (2016) reports that *A. aegyptiaca* is established in Belgium (common; introduced 1984), Denmark (local), Germany (frequency not known; introduced prior to 1960), Netherlands (common; introduced 1967), Norway (frequency not known; introduced prior to 2000), and Poland (frequency not known).

NOBANIS (2016) reports that *A. aegyptiaca* is not established in Austria or Sweden. The species is rare in both of these countries.

From Gyimesi and Lensink (2010):

“In Israel, the introduced breeding population is estimated at 30-50 pairs (Banks *et al.* 2008).”

“In the United Arab Emirates the first breeding of free-living birds occurred in 1976. There were 50 pairs reported to breed in 1991, >50 pairs in 2000 (Blair *et al.* 2000), while by 2007 the population size reached 100-200 breeding pairs (Banks *et al.* 2008).”

“There are also Egyptian Geese breeding in the western part of Mauritius. Although exact numbers are missing, the population is known to increase there (Banks *et al.* 2008).”

“There are introduced birds reported from New Zealand and Australia (Long 1981), but no permanent populations succeeded to get established (Bomford 2006; WAZA website 2009).”

From BirdLife International (2012):

“Vagrant: Algeria; Benin; China; Côte d'Ivoire; Cyprus; France; Ghana; Hungary; Malta; Oman; Spain; Togo”

Means of Introduction Outside the United States

From CABI (2016):

“*A. aegyptiaca* was first imported to the UK in the late seventeenth century (Lever, 2005) and became a popular ornamental species on private estates (Lever, 2009). More recently, similar introductions have been made in Belgium and possibly Germany and other European countries. Birds also escaped from zoos and other collections in Belgium, the Netherlands, Israel, the United Arab Emirates, Mauritius and probably elsewhere. Within western Europe, burgeoning populations, especially in the Netherlands and Belgium, have spread naturally to Germany and France and have perhaps been responsible for sightings in Italy and Romania. The largest non-native population, numbering at least 4500 pairs in 1998–2000 (Banks *et al.*, 2008) is in the Netherlands, where breeding was first recorded as recently as 1967 (Lensink, 1999).”

“Accidental introduction of *A. aegyptiaca* will have occurred wherever the species is kept in captivity, as occasional individuals have escaped from wildfowl collections, or young hatched within the collection have been left unpinioned and dispersed away.”

“Intentional introductions of *A. aegyptiaca* have been made for ornamental reasons, but not for hunting as the species is regarded as poor quarry and not good eating. It is likely that the scale of intentional releases is now very small.”

From Gyimesi and Lensink (2012):

“The Egyptian Goose *Alopochen aegyptiaca* was introduced as an ornamental species to parks in the Netherlands during the 20th century because of its exotic plumage. Escaped birds started to breed in the wild in 1967, and the species has now colonised most of the country. From the 1980s onwards the birds spread further to Germany, then to Denmark, while escapes from parks in Brussels established viable populations there and in France.”

Short Description

From CABI (2016):

“*A. aegyptiaca* is a highly distinctive pale foxy-brown goose with long pink legs and a pinkish bill. There are variable dark reddish-brown patches around the eyes and another on the lower breast. In flight, the wings are broad and show extensive white across the covert area of the inner wing. Calls are loud and have a distinctive braying quality.”

Biology

From Tattan (2004):

“Egyptian geese are mainly herbivores, they eat young grass from grasslands or savannahs, grains (particularly wheat) from agricultural fields, and soft vegetation like leaves and other detritus. Many tend to forage away from the water in pastures or arable land. Part of their diet includes a wide variety of small insects, terrestrial worms and frogs that live in nearby ponds. (Mangnall and Crowe, 2002; Van Perlo, 1999)”

“The males are quite aggressive when mating. Each male performs a noisy and elaborate courtship display, emitting unusually loud honking noises. Under normal circumstances, Egyptian geese are reserved, quiet animals, but during mating season they are just the opposite. A male will act in this manner in order to attract a female. Since Egyptian geese are monogamous, one male and one female nest alone in dense vegetation, holes, or simply on the ground. (Newman, 1983; Priest, 1929)”

“At the age of two, *Alopochen aegyptiacus* reach sexual maturity. Nest locations are usually near water for safety and near grassland for feeding; the nests are made out of feathers and vegetation and are located in dense vegetation, holes, or simply on the ground. Pairs sometimes find nests on the ground or use deserted nests of other larger bird species (such as *Buteo buteo* (common buzzard) or *Pica pica* (black-billed magpie)), which can be located in trees or on high ledges. The male goose fertilizes the female internally. Five to twelve eggs are laid, and they are incubated for 28 to 30 days. The young fledge in 70 days. (Lensink, 1998; Priest, 1929; Van Perlo, 1999)”

“Incubation lasts from 28 to 30 days and is done by both parents. The father protects the eggs and chicks, while the mother guides them and keeps them close to her. The chicks are precocial. (Priest, 1929; Van Perlo, 1999)”

From CABI (2016):

“Pairs may nest at any season across much of the native African range but nesting is strongly seasonal in Europe (Kear, 2005). In the UK, most lay in March or April and are earlier nesters than other non-native geese; moult gatherings occur during July and August.”

“Many subpopulations in Africa have seasonal moult migrations after breeding and gather in hundreds or thousands at selected water bodies (Milstein, 1993). The species may become nomadic or dispersive in response to the drying of temporary pools and, conversely, seasonal rains cause local movements and range expansion, for example northwards into the Sahel region. Movements of more than 1000 km have been recorded (Underhill et al., 1999), and may be responsible for occasional appearances of the species in North Africa and the Mediterranean (Milstein, 1993).”

Human Uses

From Tattan (2004):

“*Alopochen aegyptiacus* are not hunted by many people because they live in such remote locations, but some farmers may shoot at them to scare them away from their agricultural fields. Egyptian Geese may also aid in decreasing pest populations around lakes or fields. (Mangnall and Crowe, 2002)”

Diseases

From Cumming et al. (2008):

“[...] an influenza virus of the H5N2 subtype was isolated from a wild Egyptian Goose (*Alopochen aegyptiaca*) in the Western Cape Province in 2004, 2 [weeks] prior to an outbreak in ostriches in the Eastern Cape (Sinclair et al. 2005).”

From Cumming et al. (2011):

“An H1N8 influenza virus was isolated from an Egyptian Goose *Alopochen aegyptiacus* caught at Barberspan (see Abolnik et al., 2010) [...]”

Infection with avian influenza viruses (e.g., H5N2, H1N8) is OIE-reportable.

From Adriaens (2011):

“*Fimbriaria fasciolaris* (Pallas, 1781) (parasite)”

Threat to Humans

From Gyimesi and Lensink (2012):

“[...] economic impacts including damage to agricultural crops (Conover 2002; Mangnall & Crowe 2002), social issues (e.g. defecating in recreational waters) and amenity effects (e.g. defecation in public areas) have all become matters of extensive public debate (Bomford 2003; Banks et al. 2008).”

From Rehfish et al. (2010):

“Egyptian Geese have also been shown to cause damage to cereal crops in their native range. In South Africa they caused localized damage to wheat and barley crops, with a mean yield loss of 65% (Mangnall & Crowe 2002).”

3 Impacts of Introductions

From CABI (2016):

“Hybridisation has occurred between *A. aegyptiaca* and the Orinoco goose *Neochen jubata* (*N. jubatus*) in captivity, and apparent hybrids with mallard (*Anas platyrhynchos*), ruddy shelduck (*Tadorna ferruginea*), Canada goose (*Branta canadensis*) and domestic geese have been observed in the wild.”

“Large groups of *A. aegyptiaca* may cause physical damage to habitats through grazing or trampling, and their droppings may cause eutrophication of still waters.”

“Non-native *A. aegyptiaca* share feeding habitats with mallards and other ducks, and with coots *Fulica atra*, and may compete with them for food or territories. Competition for nest sites with hole-nesting species such as the barn owl *Tyto alba* is also a possibility. On islands, such as Mauritius, Egyptian geese could pose a threat to native endemic flora and fauna.”

From Rehfish et al. (2010):

“Introduced Egyptian Geese exhibit dominant and aggressive behaviour towards other bird species and this may prevent native species, particularly smaller species such as ducks and Coot *Fulica atra*, from establishing territories where Egyptian Geese are present (Anselin & Devos 2007). In their native range, tree-nesting Egyptian Geese have been shown to reduce the productivity of Black Sparrowhawks *Accipiter melanoleucus* through aggressive nest usurpation (Curtis et al. 2007) and represented a bigger impact on productivity than other factors such as climate, habitat or nest-site characteristics. In Great Britain, Canada Geese and Egyptian Geese outcompete Ospreys *Pandion haliaetus* for artificial nesting platforms; Egyptian Geese also limit nesting opportunities for Barn Owl *Tyto alba* as they occupy nestboxes first during the breeding season (T. Appleton pers. comm.).”

“Egyptian Geese have also been found to cause habitat damage and in areas where large roosting groups are present eutrophication may be caused by faecal deposition (Anselin & Devos 2007).”

As justification to control Egyptian and Canada Geese in licence applications, it has been suggested that the species cause damage to the waterside vegetation used as breeding habitat by native species; however, the literature does not appear to provide any empirical evidence to corroborate this.”

From Gyimesi and Lensink (2010):

“The species often breeds in nests of Goshawks and Buzzards, which are eventually chased away by the geese themselves (van Dijk 2000). In addition, Egyptian Geese use in The Netherlands the same nesting sites as Shelducks and Mallards *Anas platyrhynchos* (Van den Bergh 1993; Lensink 1996). The breeding period of Egyptian Geese may start as early as February, and hence the geese could occupy existing nests of other species or generally the most suitable nesting sites before other species start breeding. Van Dijk (2000) reported that due to this phenomenon Goshawks were forced to adapt their breeding strategy. Goshawk pairs deciding to build a new nest seemed not to be affected but another pair that reclaimed the nest and laid the [sic] own eggs next to the geese clutch failed to keep the eggs sufficiently warm. Lensink & van den Berk (1996) compared the population development of Egyptian Goose and native species (i.e. great Crested Grebe *Podiceps cristatus*, Greylag Goose *Anser anser*, Shelduck, Gadwall *Anas strepera*, Buzzard and Kestrel) in the Ooypolder (approximately 20.000 ha) over the period 1975-1995. The results could only conclude that, parallel to the increase in Egyptian Goose numbers, the population of most native species also significantly increased, whereas the number of Kestrel pairs remained stable. A similar observation was reported from the dune areas (van Ommering & Verstrael 1987). Even though no obvious effects on native species are documented in the Netherlands, the presence of Egyptian Geese may still have a negatively [sic] influence: for instance by slowing down the population growth or preventing the establishment of native species. Especially that in South-Africa a sparrowhawk species was shown to raise a lower number of chicks due to usurpation of nests by Egyptian Geese (Curtis *et al.* 2007). Moreover, probably due to its extremely fierce territorial behavior (during pair formation and the beginning of the breeding season), there are reported cases of Egyptian Geese drowning other bird species: Common Shelducks, Magellan geese *Chloephaga picta*, Mallards, a Magpie, a Moorhen *Gallinula chloropus*, House Sparrows *Passer domesticus*, Starlings *Sturnus vulgaris* and Blackbirds *Turdus merula* (Eikhoudt 1973).”

4 Global Distribution

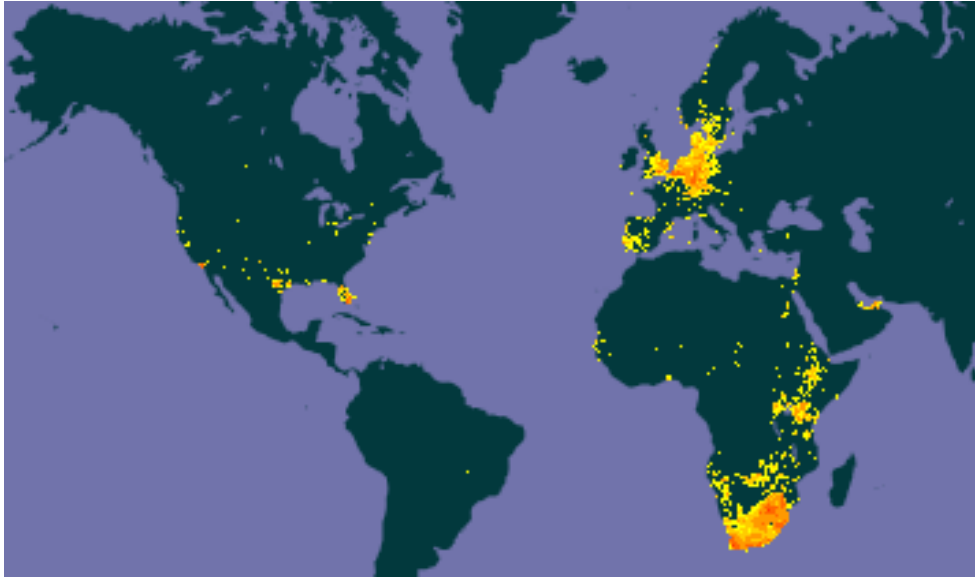


Figure 1. Known global established locations of *Alopochen aegyptiaca*. Map from GBIF (2016). Locations in South America, countries where the species is classified as “vagrant” (see Section 2: Distribution Outside the United States), and North America (outside Florida, California, Texas, and Arkansas) were omitted from climate matching analyses because these locations do not represent established populations.

5 Distribution Within the United States



Figure 2. Distribution of *Alopochen aegyptiaca* in the United States. Map from BISON (2016). Only locations in Florida, Texas, California, and Arkansas represent established populations.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean distance) is high across the southern U.S. and along the California coastline. Climate match is medium in the Mid-Atlantic region and in the eastern Great Lakes region west to Lake Michigan. Climate match is medium-low to low in northern New England, the North-Central region, the Pacific Northwest, and scattered locations throughout the Interior West. Climate 6 score indicates that the Continental U.S. is a high climate match. Climate 6 scores classified as “high” are those ≥ 1.03 ; the Climate 6 score for *Alopochen aegyptiaca* is 0.519.

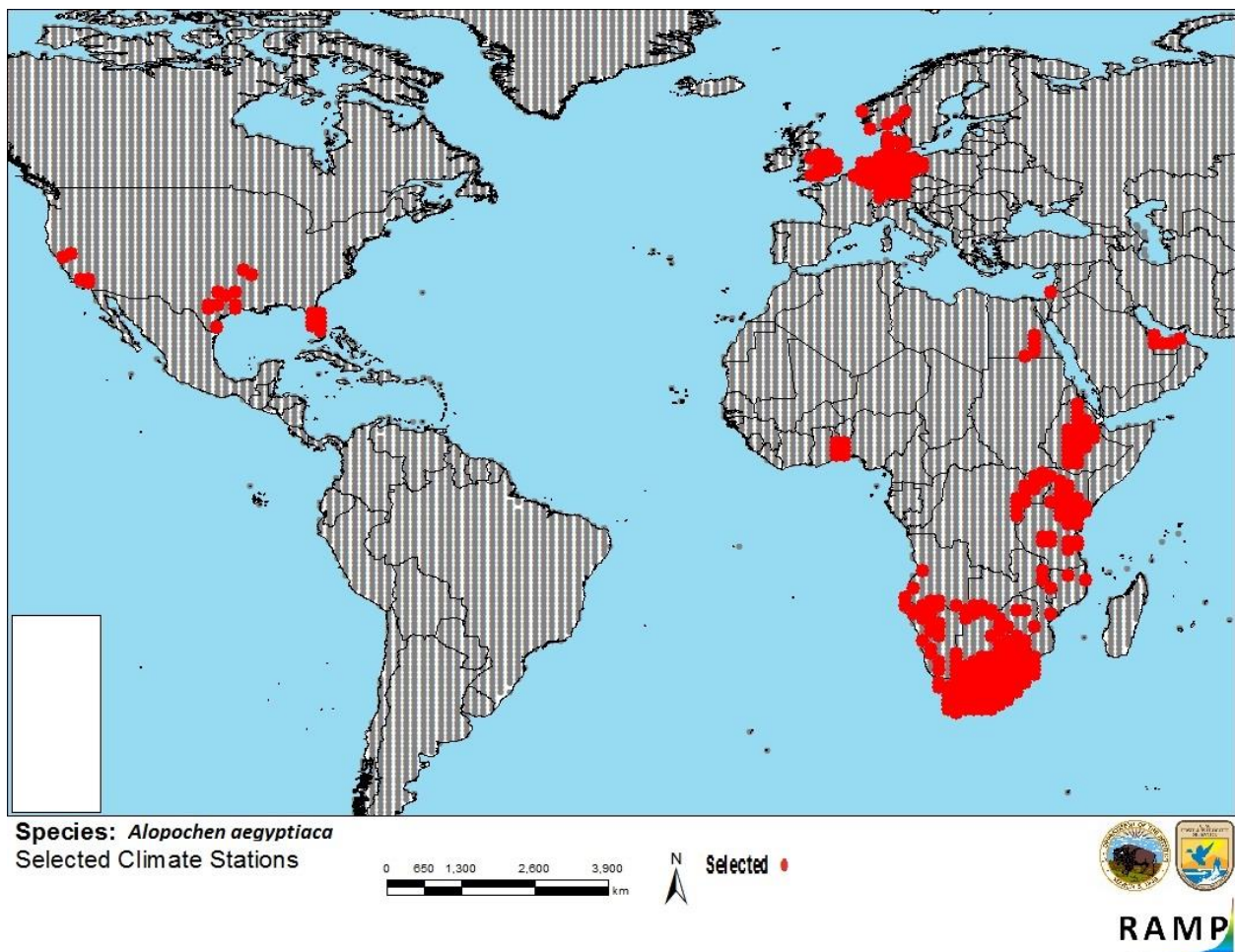


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Alopochen aegyptiaca* climate matching. Source locations from GBIF (2016). Locations in South America, countries where the species is classified as “vagrant” (see Section 2: Distribution Outside the United States), and North America (outside Florida, California, Texas, and Arkansas) were omitted from climate matching analyses because these locations do not represent established populations.

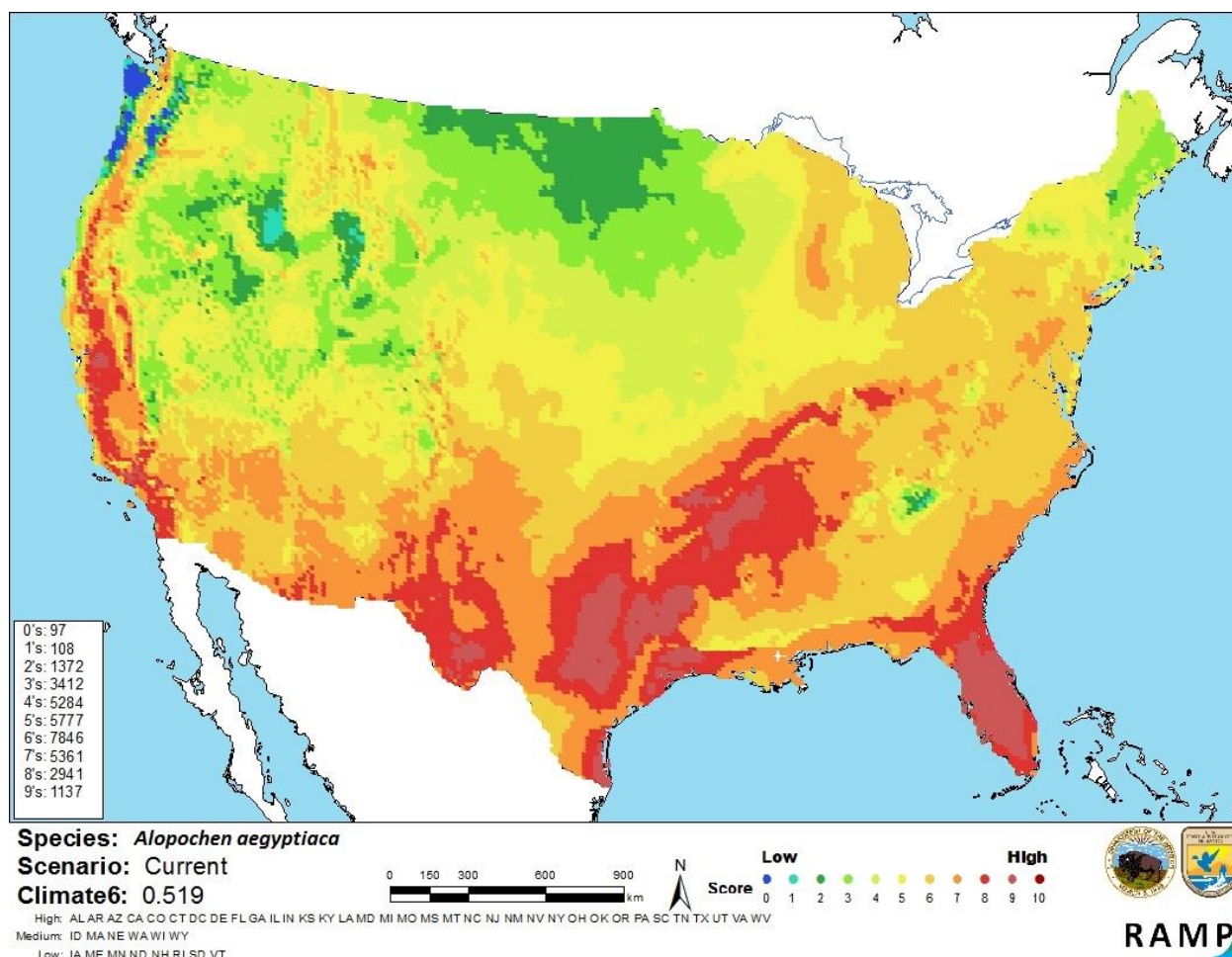


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Alopochen aegyptiaca* in the Continental United States based on source locations reported by GBIF (2016). 0= Lowest match, 10=Highest match. Climate match scores are tabulated on the left.

The “High”, “Medium”, and “Low” climate match categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

Ample information is available on the biology of *Alopochen aegyptiaca*, and despite the complicating issue of vagrancy, its distribution is well-described. Information is available on impacts of introduction, although for the introduced range, this information mostly comes from gray literature or personal observations. Within the native range, there is clear scientific evidence of detrimental impacts of *A. aegyptiaca*’s aggressiveness towards other birds, as well as its

impacts to humans through crop damage and as a disease vector. Certainty of this assessment is medium.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Alopochen aegyptiaca is a species of goose native to sub-Saharan Africa and the Nile Valley. It has become established across much of northern Europe and in scattered locations in North America and the Middle East, most often by escape from captivity. In the U.S., breeding populations are located in Florida, Arkansas, Texas, and California. *A. aegyptica* has been known to cause extensive crop damage and is susceptible to infection by avian influenza viruses that cause outbreaks in domestic avian populations. Multiple studies in South Africa demonstrate reduced reproductive success for other avian species due to competition for nest space and aggressive behavior on the part of *A. aegyptica*. Although not as well documented, in Europe *A. aegyptica* is reported to outcompete ospreys (*Pandion haliaetus*) and barn owls (*Tyto alba*) for nest sites, and to drown a number of native species. Climate match for *A. aegyptica* in the Continental U.S. is high, with highest match in the southern U.S. and California. Overall risk posed by *A. aegyptica* is high.

Assessment Elements

- **History of Invasiveness (Sec. 3): High**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information: Susceptible to avian influenza infection**
- **Overall Risk Assessment Category: High**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

Adriaens, P. 2011. *Alopochen aegyptiaca* (Linnaeus, 1766). World Register of Marine Species. Available: <http://marinespecies.org/aphia.php?p=taxdetails&id=416680>. (December 2016).

BirdLife International. 2012. *Alopochen aegyptiaca*. The IUCN Red List of Threatened Species 2012: e. T22679993A40146722. Available: <http://dx.doi.org/10.2305/IUCN.UK.20121.RLTS.T22679993A40146722.en>. (December 2016).

BISON. 2016. Biodiversity Information Serving Our Nation (BISON). U.S. Geological Survey. Available: <https://bison.usgs.gov/#home>. (December 2016).

Braun, D. G. 2004. First documented nesting in the wild of Egyptian Geese in Florida. Florida Field Naturalist 32(4):138-143.

- CABI. 2016. *Alopochen aegyptiaca* (Egyptian goose) [original text by J. Marchant]. Invasive Species Compendium. CAB International, Wallingford, UK. Available: <http://www.cabi.org/isc/datasheet/94205>. (December 2016).
- Cumming, G. S., P. A. R. Hockey, L. W. Bruinzeel, and M. A. Du Plessis. 2008. Wild bird movements and avian influenza risk mapping in southern Africa. *Ecology and Society* 13(2):26.
- Cumming, G. S., A. Caron, C. Abolnik, G. Cattoli, L. W. Bruinzeel, C. E. Burger, K. Cecchetti, N. Chiweshe, B. Mochotloane, G. L. Mutumi, and M. Ndlovu. 2011. The ecology of influenza A viruses in wild birds in southern Africa. *EcoHealth* 8:4-13.
- GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Alopochen aegyptiaca* (Linnaeus, 1766). Global Biodiversity Information Facility, Copenhagen. Available: <http://www.gbif.org/species/2498252>. (December 2016).
- Gyimesi, A., and R. Lensink. 2010. Risk analysis of the Egyptian Goose in The Netherlands. Bureau Waardenburg bv. Commissioned by the Ministry of Agriculture, Nature and Food Quality, Invasive Alien Species Team. Report 10-029.
- Gyimesi, A., and R. Lensink. 2012. Egyptian Goose *Alopochen aegyptiaca*: an introduced species spreading in and from the Netherlands. *Wildfowl* 62:128-145.
- ITIS (Integrated Taxonomic Information System). 2016. *Alopochen aegyptiaca* (Linnaeus, 1766). Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=175214#null. (December 2016).
- NOBANIS. 2016. *Alopochen aegyptiacus* (Anatidae, Birds). NOBANIS: European Network on Invasive Species. Available: <https://www.nobanis.org/species-info/?taxaId=714>. (December 2016).
- Pranty, B., and K. L. Garrett. 2011. Under the radar: “non-countable” exotic birds in the ABA area. *Birding* (September):46-58.
- Rehfishch, M. M., J. R. Allan, and G. E. Austin. 2010. The effect on the environment of Great Britain’s naturalized Greater Canada *Branta Canadensis* and Egyptian Geese *Alopochen aegyptiacus*. BOU Proceedings – The Impacts of Non-native Species. Available: <http://www.bou.org.uk/bouproc-net/non-natives/rehfishch-et-al.pdf>. (December 2016).
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. US Fish and Wildlife Service.

Smith, K. G., and D. A. James. 2012. History and current status of Egyptian Goose (*Alopochen aegyptiaca*) in northwestern Arkansas. *Journal of the Arkansas Academy of Science* 66:200-204.

Tattan, A. 2004. *Alopochen aegyptiaca*. Animal Diversity Web. Available: http://animaldiversity.org/accounts/Alopochen_aegyptiaca/. (December 2016).

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

Abolnik, C., G. H. Gerdes, M. Sinclair, B. W. Ganzevoort, J. P. Kitching, C. E. Burger, M. Romito, M. Dreyer, S. Swanepoel, G. S. Cumming, and A. J. Olivier. 2010. Phylogenetic analysis of influenza A viruses (H6N8, H1N8, H4N2, H9N2, H10N7) isolated from wild birds, ducks, and ostriches in South Africa from 2007 to 2009. *Avian Diseases* 54:313-322.

Anselin, A., and K. Devos. 2007. Review of the status of introduced non-native waterbirds and their effects in Flanders, Belgium. INBO.A.2007.115. Instituut voor Natuur - en Bosonderzoek, Brussels.

Banks, A. N., L. J. Wright, I. M. D. Maclean, C. Hann, and M. M. Rehfisch. 2008. Review of the status of introduced non-native waterbird species in the area of the African-Eurasian Waterbird Agreement: 2007 update. BTO research report 489. British Trust for Ornithology, Thetford, UK.

Blair, M. J., H. McKay, A. J. Musgrove, and M. M. Rehfisch. 2000. Review of the status of introduced non-native waterbird species in the agreement area of the African-Eurasian Waterbird Agreement. Research contract CR0219. British Trust for Ornithology, Thetford, UK.

Beazley, M. 1974. The world atlas of birds. Mitchell Beazley Publishers Limited, Hong Kong.

Bomford, M. 2003. Risk assessment for the import and keeping of exotic vertebrates in Australia. Bureau of Rural Sciences, Canberra, Australia.

Bomford, M. 2006. Risk assessment for the establishment of exotic vertebrates in Australia: recalibration and refinement of models. Bureau of Rural Sciences, Canberra, Australia.

Conover, M. 2002. Resolving human-wildlife conflicts – the science of wildlife damage management. Lewis Publishers, Boca Raton, Florida.

Curtis, O. E., P. A. R. Hockey, and A. Koeslag. 2007. Competition with Egyptian Geese *Alopochen aegyptiaca* overrides environmental factors in determining productivity of Black Sparrowhawks *Accipiter melanoleucus*. *Ibis* 149(3):502-508.

- David, N., and M. Gosselin. 2002. Gender agreement of avian species names. *Bulletin of the British Ornithologists' Club* 122(1):14-68.
- Eikhoudt, H. 1973. Nijlganzen *Alopochen aegyptiacus* (L) boven Friesland. *Vanellus* 26:202-205.
- Gallagher, S. R. 1997. Atlas of breeding birds—Orange County, California. Sea and Sage Audubon Press, Irvine, California.
- Jensen, D., B. Bohmke, M. Bluewater, and J. Bierlein. 2002. Animal fact sheets - Egyptian Goose (on-line). Woodland Park Zoo. Available: http://www.zoo.org/educate/fact_sheets/savana/egoose.htm. (March 2004).
- Kear, J. 2005. Ducks, geese and swans, volume 1. Oxford University Press, Oxford, UK.
- Lensink, R. 1996. De opkomst van exoten in de Nederlandse avifauna; verleden, heden en toekomst. *Limosa* 69:103-130.
- Lensink, R. 1998. Temporal and spatial expansion of the Egyptian goose *Alopochen aegyptiacus* in The Netherlands. *Journal of Biogeography* 25:251-263.
- Lensink, R. 1999. Aspects of the biology of Egyptian Goose *Alopochen aegyptiacus* colonizing the Netherlands. *Bird Study* 46:195-204.
- Lensink, R., and V. van den Berk. 1996. Rosse Stekelstaarteend en Nijlgans in Nederland, zijn deze uitheemse soorten een bedreiging? Werkdocument IKC Natuurbeheer W-106. Infomatie- en KennisCentrum Natuurbeheer, Wageningen, The Netherlands.
- Lever, C. 2005. Naturalised birds of the world. T & AD Poyser, London.
- Lever, C. 2009. The naturalized animals of Britain and Ireland. New Holland Publishers, London.
- Mangnall, M., and T. Crowe. 2002. Population dynamics and the physical and financial impacts to cereal crops of the Egyptian Goose *Alopochen aegyptiacus* on the Agulhas Plain, Western Cape, South Africa. *Agriculture, Ecosystems & Environment* 90(3):231-246.
- McLachlan, G., and R. Liversidge. 1940. Roberts birds of South Africa. John Voelcker Bird Book Fund, Cape Town, South Africa.
- Milstein, P. le S. 1993. A study of the Egyptian Goose *Alopochen aegyptiacus*. University of Pretoria, Pretoria, South Africa.
- Newman, K. 1980. Birds of southern Africa and Kruger National Park. MacMillan South African Publishers, Johannesburg, South Africa.

- Newman, K. 1983. Newman's birds of southern Africa. Southern Books, South Africa.
- Owre, O. T. 1973. A consideration of the exotic avifauna of southeastern Florida. Wilson Bulletin 85:491-500.
- Priest, C. 1929. A guide to the birds of southern Rhodesia and a record of their nesting habits. William Clowes and Sons Ltd, London.
- Sinclair, M., G. K. Bruckner, and J. J. Kotze. 2005. Avian influenza in ostriches: epidemiological investigation in the Western Cape Province of South Africa. Elsenburg Joernaal 2(4):2-4.
- Underhill, L. G., A. J. Tree, H. D. Oschadleus, and V. Parker. 1999. Review of ring recoveries of waterbirds in southern Africa. Review of ring recoveries of waterbirds in southern Africa. ADU, UCT, Cape Town, South Africa.
- Van den Bergh, A. B. 1993. De Nijlgans, een avifaunistische aanwinst of probleemvogel? Argus 18(2):7-10.
- van Dijk, J. 2000. Hoe groot is de invloed van Nijlganzen *Alopochen aegyptiacus* op het broedsucces van roofvogels. De Takkeling 8:218-220.
- van Ommering, G., and T. Verstrael. 1987. Vogels van Berkheide. Werkgroep Berkheide/Stichting Publikatiefonds Duinen, Leiden, The Netherlands.
- van Perlo, B. 1999. Birds of South Africa. Harper Collins, Italy.
- WAZA website. 2009. World Association of Zoos and Aquariums. Available: <http://www.waza.org/en/zoo/visit-the-zoo/ducks-geese-pelikanes-and-relatives/alopochen-aegyptiacus>.