

# NEW YORK TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM

Scientific name: Sus linneaus, Sus scrofa linneaus  
 Common names: European wild boar, Eurasian boar  
 Native distribution: Eurasia  
 Date assessed: 1/22/2013  
 Assessors: E. Schwartznerg  
 Reviewers: \_\_\_\_\_  
 Date Approved: \_\_\_\_\_ Form version date: 3 January 2013

**New York Invasiveness Rank:** Very High (Relative Maximum Score >80.00)

<b>Distribution and Invasiveness Rank</b> ( <i>Obtain from PRISM invasiveness ranking form</i> )		
Status of this species in each PRISM:	Current Distribution	PRISM Invasiveness Rank
1 Adirondack Park Invasive Program	Not Assessed	Not Assessed
2 Capital/Mohawk	Not Assessed	Not Assessed
3 Catskill Regional Invasive Species Partnership	Not Assessed	Not Assessed
4 Finger Lakes	Not Assessed	Not Assessed
5 Long Island Invasive Species Management Area	Not Assessed	Not Assessed
6 Lower Hudson	Not Assessed	Not Assessed
7 Saint Lawrence/Eastern Lake Ontario	Not Assessed	Not Assessed
8 Western New York	Not Assessed	Not Assessed

<b>Invasiveness Ranking Summary</b> (see details under appropriate sub-section)		Total (Total Answered*) Possible	Total
1	Ecological impact	30 ( <u>30</u> )	27
2	Biological characteristic and dispersal ability	30 ( <u>30</u> )	22
3	Ecological amplitude and distribution	30 ( <u>30</u> )	27
4	Difficulty of control	10 ( <u>10</u> )	7
	Outcome score	100 ( <u>100</u> ) <sup>b</sup>	83 <sup>a</sup>
	Relative maximum score †		83.00
	New York Invasiveness Rank §	Very High (Relative Maximum Score >80.00)	

\* For questions answered “unknown” do not include point value in “Total Answered Points Possible.” If “Total Answered Points Possible” is less than 70.00 points, then the overall invasive rank should be listed as “Unknown.”

† Calculated as 100(a/b) to two decimal places.

§ Very High >80.00; High 70.00–80.00; Moderate 50.00–69.99; Low 40.00–49.99; Insignificant <40.00

### A. DISTRIBUTION (KNOWN/POTENTIAL): Summarized from individual PRISM forms

A1.1. Has this species been documented in NY? (reliable source; voucher not required)		
<input checked="" type="checkbox"/>	Yes – continue to A1.2	
<input type="checkbox"/>	No – continue to A2.1; Yes <input type="checkbox"/> NA; Yes <input type="checkbox"/> USA	
A1.2. In which PRISMs is it known (see inset map)?		
<input checked="" type="checkbox"/>	Adirondack Park Invasive Program	
<input checked="" type="checkbox"/>	Capital/Mohawk	
<input checked="" type="checkbox"/>	Catskill Regional Invasive Species Partnership	
<input checked="" type="checkbox"/>	Finger Lakes	
<input type="checkbox"/>	Long Island Invasive Species Management Area	
<input type="checkbox"/>	Lower Hudson	
<input checked="" type="checkbox"/>	Saint Lawrence/Eastern Lake Ontario	

# NEW YORK

## TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM

<input checked="" type="checkbox"/>	Western New York
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Documentation:  
Sources of information:  
iMapInvasives, 2013; TNYISC, 2013. Additional unidentified swine observed in Lower Hudson PRISM (DEC personal correspondence).

- A2.0. Is this species listed on the Federal Injurious Fish and Wildlife list?  
 Yes – the species will automatically be listed as Prohibited, no further assessment required  
 No – continue to A2.1

A2.1. What is the likelihood that this species will occur and persist given the climate in the following PRISMs? (obtain from PRISM invasiveness ranking form and/ or Climatch score)

- Not Assessed      Adirondack Park Invasive Program
- Not Assessed      Capital/Mohawk
- Not Assessed      Catskill Regional Invasive Species Partnership
- Not Assessed      Finger Lakes
- Not Assessed      Long Island Invasive Species Management Area
- Not Assessed      Lower Hudson
- Not Assessed      Saint Lawrence/Eastern Lake Ontario
- Not Assessed      Western New York

Documentation:  
Sources of information (e.g.: distribution models, literature, expert opinions):

***If the species does not occur and is not likely to survive and reproduce within any of the PRISMs, then stop here as there is no need to assess the species.***

A2.2. What is the current distribution of the species in each PRISM? (obtain rank from PRISM invasiveness ranking forms)

	Distribution
Adirondack Park Invasive Program	Not Assessed
Capital/Mohawk	Not Assessed
Catskill Regional Invasive Species Partnership	Not Assessed
Finger Lakes	Not Assessed
Long Island Invasive Species Management Area	Not Assessed
Lower Hudson	Not Assessed
Saint Lawrence/Eastern Lake Ontario	Not Assessed
Western New York	Not Assessed

Documentation:  
Sources of information:

A2.3. Describe the potential or known suitable habitats within New York. Natural habitats include all habitats not under active human management. Managed habitats are indicated with an asterisk.

- |  |   |   |
|--|---|---|
| <p>Aquatic Habitats</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Marine</li> <li><input type="checkbox"/> Salt/ brackish waters</li> <li><input type="checkbox"/> Freshwater tidal</li> <li><input checked="" type="checkbox"/> Rivers/streams</li> <li><input checked="" type="checkbox"/> Natural lakes and ponds</li> <li><input checked="" type="checkbox"/> Vernal pools</li> <li><input type="checkbox"/> Reservoirs/impoundments*</li> </ul> | <p>Wetland Habitats</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Salt/brackish marshes</li> <li><input checked="" type="checkbox"/> Freshwater marshes</li> <li><input type="checkbox"/> Peatlands</li> <li><input checked="" type="checkbox"/> Shrub swamps</li> <li><input checked="" type="checkbox"/> Forested wetlands/riparian</li> <li><input checked="" type="checkbox"/> Ditches*</li> <li><input type="checkbox"/> Beaches/or coastal dunes</li> </ul> | <p>Upland Habitats</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Cultivated*</li> <li><input checked="" type="checkbox"/> Grasslands/old fields</li> <li><input checked="" type="checkbox"/> Shrublands</li> <li><input checked="" type="checkbox"/> Forests/woodlands</li> <li><input type="checkbox"/> Alpine</li> <li><input checked="" type="checkbox"/> Roadsides*</li> <li><input type="checkbox"/> Cultural*</li> </ul> |
|--|---|---|

Other potential or known suitable habitats within New York:  
Areas that remain moist through the year are very suitable to feral swine.

Documentation:  
Sources of information:

**NEW YORK  
TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

Graves, 1984.

**B. INVASIVENESS RANKING**

*1. ECOLOGICAL IMPACT*

1.1. Impact on Ecosystem Processes and System-wide Parameters (e.g., energy cycle, nutrient and mineral dynamics, light availability, or geomorphological changes (erosion and sedimentation rates).

- A. No perceivable impact on ecosystem processes based on research studies, or the absence of impact information if a species is widespread (>10 occurrences in minimally managed areas), has been well-studied (>10 reports/publications), and has been present in the northeast for >100 years 0
- B. Influences ecosystem processes to a minor degree, has a perceivable but mild influence 3
- C. Significant alteration of ecosystem processes 7
- D. Major, possibly irreversible, alteration or disruption of ecosystem processes 10
- U. Unknown

Score 7

**Documentation:**

Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)

Affect soil disturbance, erosion, and siltation in streams. Also hamper regeneration of native species (Dukes and Mooney, 2004). Alter soil and nutritive properties of soil (Campbell and Long, 2009). Scored as 7 because most disturbances are related to geomorphological changes and seem likely to be reversible with time.

Sources of information:

Campbell and Long, 2009; Dukes and Mooney, 2004.

1.2. Impact on Natural Habitat

- A. No perceived impact; causes no apparent change in native habitat 0
- B. Influences natural habitat (e.g., reduces the stem density and height of one or more native species in core habitat) 3
- C. Significantly alters natural habitat (e.g., produces a notable reduction in the population size of one or more native species in core habitat) 7
- D. Causes major alteration in natural habitat (e.g., results in the extirpation of one or more native species, or changes the community composition in core habitat towards species exotic to the natural community) 10
- U. Unknown

Score 10

**Documentation:**

Identify type of impact or alteration:

Cause significant disruption to natural and agricultural habitat through rooting, wallowing, fouling water, carrying disease, and feeding on other animals (Timmons, et al., 2012; TNYISC, 2013). Reduce recruitment and growth of saplings (Campbell and Long, 2009 and references therein).

Sources of information:

Campbell and Long, 2009; Timmons, et al., 2012; TNYISC, 2013; USDA, 2013.

1.3. Impact on other species or species groups, including cumulative impact of this species on other organisms in the community it invades (e.g., interferes with native predator/ prey dynamics; hybridizes with a native species; hosts a non-native disease which impacts a native species)

- A. Negligible perceived impact 0
- B. Minor impact (e.g. 1 species, <20% population decline) 3
- C. Moderate impact (e.g. 2-3 species and/ or 20-29% population decline of any 1 species) 7

**NEW YORK**  
**TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

- D. Severe impact on other species or species groups (e.g. >3 species and/ or ≥30% population decline of any 1 species) 10
- U. Unknown

Score 

10
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**Documentation:**  
Identify type of impact or alteration:  
Affect persistence of snake-necked turtles in Australia (Fordham et al., 2006). Implicated in quail nest predation (Rollins and Carrol, 2001), some predation on blackcap nests (Schaefer, 2004). Indirect negative affect (extirpation) of three island fox subspecies in the California Channel Islands (Roemer et al., 2001). Feral swine are also hosts of several diseases of native animals, livestock and humans (Witmer et al., 2003) including foot and mouth disease (Dexter, 2003).  
Sources of information:  
Fordham et al., 2006; Rollins and Carrol, 2001; Roemer et al., 2001; Schaefer, 2004; Witmer et al., 2003.

Total Possible 

30
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Section One Total 

27
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**2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY**

**2.1. Mode and rate of reproduction**

- A. No reproduction (e.g. sterile with no sexual or asexual reproduction) 0
- B. Limited reproduction (e.g. intrinsic rate of increase <10%/ year) 1
- C. Moderate reproduction (e.g. intrinsic rate of increase between 10-30%/ year) 2
- D. Abundant reproduction (e.g. intrinsic rate of increase >30%/ year) 4
- U. Unknown

Score 

4
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**Documentation:**  
Describe key reproductive characteristics:  
High rate of reproduction. Gestation time is 115 days, breeding can occur throughout the year. Females are sexually mature at one year and can triple their population in one year (TNYISC, 2013). Average reproductive output is 6 offspring per year (Taylor et al., 1998).  
Sources of information:  
Taylor et al., 1998; TNYISC, 2013.

**2.2. Migratory behavior**

- A. Always migratory in its native range 0
- B. Non-migratory or facultative migrant in its native range 2
- U. Unknown

Score 

2
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**Documentation:**  
Describe migratory behavior:  
Non-migratory  
Sources of information:  
Kurz and Marchinton, 1972.

**2.3. Biological potential for colonization by long-distance dispersal/ movement.**

- A. No long-distance dispersal/ movement mechanisms 0
- A. Adaptations exist for long-distance dispersal, but studies report that most individuals (90%) establish territories within 10 miles of parent or within a distance twice the home range of the parent, and tend not to cross major barriers such as rivers and major roads 1
- B. Adaptations exist for long-distance dispersal, movement and evidence that offspring often disperse greater than 10 miles of parent or greater than twice the home range of parent and will cross major barriers such as river and major roads 2

**NEW YORK**  
**TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

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U. Unknown

Score

**Documentation:**

Identify dispersal mechanisms:

No known mechanisms. Home range area mean <1000 acres.

Sources of information:

Kurz and Marchinton, 1972.

2.4. Practical potential to be spread by human activities, both directly and indirectly (possible vectors include: commercial sales, deliberate stocking, translocation, rehabilitation, pest control industry, agricultural escapes, pet abandonment and release, etc.)

- A. Does not occur 0
- B. Low (human dispersal to new areas occurs almost exclusively by direct means and is infrequent or inefficient) 1
- C. Moderate (human dispersal to new areas occurs by direct and indirect means to a moderate extent) 2
- D. High (opportunities for human dispersal to new areas by direct and indirect means are numerous, frequent, and successful) 4
- U. Unknown

Score

**Documentation:**

Identify dispersal mechanisms:

A major concern for feral swine management is deliberate translocation and stocking by individuals for hunting.

Sources of information:

MDNR, 2013; NYSDEC, 2013a; NYSDEC, 2013b.

2.5. Non-living chemical and physical characteristics that increase competitive advantage (e.g., tolerance to various extremes, pH, temperature, fill vacant niche, charismatic species)

- A. Possesses no characteristics that increase competitive advantage 0
- B. Possesses one characteristic that increases competitive advantage 4
- C. Possesses two or more characteristics that increase competitive advantage 8
- U. Unknown

Score

**Documentation:**

Evidence of competitive ability:

Charismatic species. Examples of intentional release from traps (MDNR, 2013).

Sources of information:

MDNR, 2013.

2.6. Biological characteristics that increase competitive advantage (e.g., high fecundity, generalist, highly evolved defense mechanisms, behavioral adaptations)

- A. Possesses no characteristics that increase competitive advantage 0
- B. Possesses one characteristic that increases competitive advantage 4
- C. Possesses two or more characteristics that increase competitive advantage 8
- U. Unknown

Score

**Documentation:**

Evidence of competitive ability:

Feral hogs are described as "smart animals, [and] have keen senses of smell and hearing". Their intelligence is a major issue for feral hog management (University of Florida News,

**NEW YORK  
TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

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2012).

Sources of information:

MCD, 2013; University of Florida News, 2012.

2.7. Other species in the family and/ or genus invasive in New York or elsewhere?

- |    |         |   |
|----|---------|---|
| A. | No      | 0 |
| B. | Yes     | 2 |
| U. | Unknown |   |

Score 0

**Documentation:**

Identify species:

Sus domesticus is the domesticated pig. Internet searches yielded no evidence of other invasive Genus or Family members.

Total Possible	30
Section Two Total	22

**3. ECOLOGICAL AMPLITUDE AND DISTRIBUTION**

3.1. Current introduced distribution of established populations in the northern latitudes of USA and southern latitude of Canada (e.g., between 35 and 55 degrees)

- |    |   |   |
|----|---|---|
| A. | Not known from the northern US or southern Canada   | 0 |
| B. | Established as a non-native in 1 northern USA state and/or southern Canadian province   | 1 |
| C. | Established as a non-native in 2 or 3 northern USA states and/or southern Canadian provinces  | 2 |
| D. | Established as a non-native in 4 or more northern USA states and/or southern Canadian provinces, and/or categorized as a problem species (e.g., “Invasive”) in 1 northern state or southern Canadian province | 3 |
| U. | Unknown   |   |

Score 3

**Documentation:**

Identify states and provinces:

NY, NH, NJ, PA, OH, MI.

Sources of information:

- See known introduced range at [www.usda.gov](http://www.usda.gov), and update with information from states and Canadian provinces.

NFSMP, 2013.

3.2. Current introduced distribution of established populations of the species in natural areas in the eight New York State PRISMs (Partnerships for Regional Invasive Species Management)

- |    |                                   |   |
|----|-----------------------------------|---|
| A. | Established in none of the PRISMs | 0 |
| B. | Established in 1 PRISM            | 1 |
| C. | Established in 2 or 3 PRISMs      | 3 |
| D. | Established in 4 or more PRISMs   | 5 |
| U. | Unknown                           |   |

Score 5

**Documentation:**

Describe distribution:

In all PRISMS except LIISMA and Lower Hudson.

Sources of information:

iMapInvasives, 2013; TNYISC, 2013.

**NEW YORK  
TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

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3.3. Number of known, or potential (each individual possessed by a vendor or consumer is a potential release), individual releases and/ or release events (propagule pressure)

- A. None 0
- B. Few releases (e.g., <10 annually) 2
- C. Regular, small scale releases (e.g., 10-99 annually) 4
- D. Multiple, large scale (e.g., ≥100 annually) 6
- U. Unknown

Score 4

**Documentation:**

Describe known or potential releases:

Released for game hunting and maintained on hunting reserves.

Sources of information:

MDNR, 2013.

3.4. Current introduced population density in northern USA and/ or southern Canada.

- A. No known populations established 0
- B. Low to moderate population density (e.g., ≤1/4 or < to 1/2 native population density) 1
- C. High or irruptive population density (e.g., ≥1/2 native population density) 2
- U. Unknown

Score 1

**Documentation:**

Describe population density:

Reported in Texas at density of 2.45 hogs per square mile (Texas A&M, 2013). Most reports of feral swine in New York consist of one or two animals and they are scattered throughout the state (DEC personal correspondence).

Sources of information:

DEC, personal correspondence; Texas A&M, 2013.

3.5. Number of habitats the species may invade

- A. Not known to invade any natural habitats 0
- B. Known to occur in 2/ 3 habitats, with at least 1/ 2 natural habitat(s) 2
- C. Known to occur in 4 or more habitats, with at least 3 natural habitats 3
- U. Unknown

Score 3

**Documentation:**

Identify type of habitats where it occurs and degree/type of impacts:

Forested wetland, marshes, cultivated cropland, grasslands, old fields, shrublands, and forests.

Sources of information:

Graves, 1984.

3.6. Role of anthropogenic (human related) features in establishment (e.g. buildings, roads, agricultural fields, etc)

- A. Requires anthropogenic disturbances to establish 0
- B. May occasionally establish in undisturbed areas but can readily establish in areas with natural or anthropogenic disturbances 2
- C. Can establish independent of any known natural or anthropogenic disturbances 3
- U. Unknown

**NEW YORK  
TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

Score

**Documentation:**

Identify anthropogenic features:

Sources of information:

3.7. Climate in native range (e.g., med. to high,  $\geq 5$ , Climatch score; within 35 to 55 degree latitude; etc.)

- A. Native range does not include climates similar to New York 0
- B. Native range possibly includes climates similar to portions of New York 4
- C. Native range includes climates similar to those in New York 8
- U. Unknown

Score

**Documentation:**

Describe known climate similarities: High similarity. Climatch scores of 100% >5.

Sources of information:

ADAFF, 2013.

Total Possible	30
Section Three Total	27

**4. DIFFICULTY OF CONTROL**

4.1. Re-establishment potential, nearby propagule source, known vectors of re-introduction in vicinity (e.g. biological supplies, pets, game farms, zoos, shooting preserves, connecting corridors, mechanized transportation)

- A. No known vectors/ propagule source for re-establishment following removal 0
- B. Possible re-establishment from 1 vector/ propagule source following removal 1
- C. Likely to re-establish from 2-3 vectors/ propagule sources following removal 2
- D. Strong potential for re-establishment from 4 or more vectors/ propagule sources following removal 3
- U. Unknown

Score

**Documentation:**

Identify source/ vectors:

Shooting preserve unintentional release/escape (USDA, 2010) and unofficial intentional release by individuals (MDNR, 2013).

Sources of information:

MDNR, 2013; USDA, 2010.

4.2. Status of monitoring and/ or management protocols for species

- A. Standardized protocols appropriate to New York State are available 0
- B. Scientific protocols are available from other countries, regions or states 1
- C. No known protocols exist 2
- U. Unknown

Score

**Documentation:**

Describe protocols:

Protocols well developed for several other states (USDA, 2010).

Sources of information:

MWC, 2013; USDA, 2010.

4.3. Status of monitoring and/ or management resources (e.g. tools, manpower,



**NEW YORK  
TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

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travel, traps, lures, ID keys, taxonomic specialists, etc.)

- A. Established resources are available including commercial and/ or research tools 0
- B. Monitoring resources may be available (e.g. partnerships, NGOs, etc) 1
- C. No known monitoring resources are available 2
- U. Unknown

Score 

0
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**Documentation:**  
 Describe resources:  
 Molecular analysis of populations to test for local extirpation success and reintroduction (Hampton, 2004). monitoring resources available in New York State (iMapInvasives, 2013; USDA, 2010).  
 Sources of information:  
 Hampton, 2004; iMapInvasives, 2013; MWC, 2013, USDA, 2010.

**4.4. Level of effort required.**

- A. Management is not required (e.g., species does not persist without repeated human mediated action) 0
- B. Management is relatively easy and inexpensive; invasive species can be maintained at low abundance causing little or no ecological harm (e.g., 10 or fewer person-hours of manual effort can eradicate a local population in 1 year) 1
- C. Management requires a major short-term investment, and is logistically and politically challenging; eradication is difficult, but possible (e.g., 100 or fewer person-hours/year of manual effort, or up to 10 person-hours/ year for 2-5 years to suppress a local population) 2
- D. Management requires a major investment and is logistically and politically difficult; eradication may be impossible (e.g., more than 100 person-hours/ year of manual effort, or more than 10 person hours/year for more than 5 years to suppress a local population) 3
- U. Unknown

Score 

3
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**Documentation:**  
 Identify types of control methods and time required:  
 Hunting and trapping are two methods of removal. Very inefficient and time consuming.  
 Trapping often attracts non-target species.  
 Sources of information:  
 USDA, 2010.

Total Possible 

10
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 Section Four Total 

7
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**Total for 4 sections Possible**

100
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**Total for 4 sections**

83
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**C. STATUS OF GENETIC VARIANTS AND HYBRIDS:**

At the present time there is no protocol or criteria for assessing the invasiveness of genetic variants independent of the species to which they belong. Such a protocol is needed, and individuals with the appropriate expertise should address this issue in the future. Such a protocol will likely require data on cultivar fertility and identification in both experimental and natural settings.

Genetic variants of the species known to exist:

**NEW YORK**  
**TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

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Hybrids (crosses between different parent species) should be assessed individually and separately from the parent species wherever taxonomically possible, since their invasiveness may differ from that of the parent species. An exception should be made if the taxonomy of the species and hybrids are uncertain, and species and hybrids can not be clearly distinguished in the field. In such cases it is not feasible to distinguish species and hybrids, and they can only be assessed as a single unit.

Hybrids of uncertain origin known to exist: Wild boar hybridize with domestic pigs.

**References for species assessment:**

- Australian Department of Agriculture, Fisheries, and Forestry (ADAFF). 2013. Climatch Mapping Tool. <<http://adl.brs.gov.au:8080/Climatch/climatch.jsp>>; [Accessed on January 22, 2013].
- Campbell, T.A. and D.B. Long. 2009. Feral swine damage and damage management in forested ecosystems. *Forest ecology and management*, 257(12): 2319-2326.
- Dexter, N. 2003. Stochastic models of foot and mouth disease in feral pigs in the Australian semi-arid rangelands. *Journal of Applied Ecology*, 40: 293–306.
- Dukes, J.S., and H.A. Mooney. (2004). Disruption of ecosystem processes in western North America by invasive species. *Revista chilena de historia natural*, 77(3): 411-437.
- Fordham, D., A. Georges, B. Corey, and B.W. Brook. 2006. Feral pig predation threatens the indigenous harvest and local persistence of snake-necked turtles in northern Australia. *Biological Conservation*, 133(3): 379-388.
- Graves, H.B. (1984). Behavior and ecology of wild and feral swine (*Sus scrofa*). *Journal of Animal Science*, 58(2), 482-492.
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- Kurz, J. C., and R.L. Marchinton. (1972). Radiotelemetry studies of feral hogs in South Carolina. *The Journal of Wildlife Management*, 1240-1248.
- Michigan Department of Natural Resources (MDNR). 2013. A pickup load of pigs: the feral swine pandemic video. <[http://www.michigan.gov/dnr/0,1607,7-153-10370\\_12145\\_55230-251114--,00.html](http://www.michigan.gov/dnr/0,1607,7-153-10370_12145_55230-251114--,00.html)>; [Accessed on January 22, 2013].
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- Montmorency Conservation District (MCD). 2013. Feral swine. <<http://www.montmorencyd.org/resources/feral-swine.pdf>>; [Accessed on January 22, 2013].
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**NEW YORK**  
**TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

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- Schaefer, T. 2004. Video monitoring of shrub-nests reveals nest predators: Capsule Jays *Garrulus glandarius* are the most common predators, but carnivorous mammals and some other species also predate nests. *Bird Study*, 51(2): 170-177.
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- Texas A&M. 2013. Feral Hog Statewide population growth and density, Institute of Renewable Natural Resources. <<http://feralhogs-tamu-edu.wpengine.netdna-cdn.com/files/2011/05/FeralHogFactSheet.pdf>>; [Accessed on January 22, 2013].
- The New York Invasive Species Clearinghouse (TNYISC). 2013. Cornell Cooperative Extension Invasive Species Program. 2013. Feral Swine. <[http://www.nyis.info/index.php?action=invasive\\_detail&id=18](http://www.nyis.info/index.php?action=invasive_detail&id=18)>; [Accessed on January 22, 2013].
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**TERRESTRIAL VERTEBRATE INVASIVENESS RANKING FORM**

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