Scientific name: \textit{Rattus norvegicus} 

Common name: Norway rat

Alaska invasion/introduction history
Norway rats spread to the Aleutian Islands and the Alaska Maritime National Wildlife Refuge on cargo ships during WWII (Murie 1959, Ebbert and Byrd 2002).

<table>
<thead>
<tr>
<th>Ranking Summary</th>
<th>Potential Max</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Biological Characteristics</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Ecological Impact</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>Feasibility of Control</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>91</td>
</tr>
</tbody>
</table>

Invasiveness (out of 100) = 91 Extremely invasive

---

### Distribution

**Current global distribution (0-10)**

The Norway rat is native to Asia, but introduced worldwide, and is more common in cold climates (Kucheruk 1990, Nagorsen 1990).

**Extent of the species US range and/or occurrence of formal state or provincial listings (0-10)**

Norway rats are invasive in all U.S. states and the majority of the Canadian provinces and territories (Patterson 2003, Nature Serve 2009).

**Role of anthropogenic and natural disturbance in establishment (0-5)**

This species is typically commensal with humans and readily establishes in urban areas (Vignieri 2009). However, once introduced, Norway rats establish in undisturbed habitats on islands and along beaches (MacDonald and Cook 2009).

**Climatic similarity between site of origin and release (0-5)**

Norway rats are more common in cold climates and occur in northern latitudes with similar climatic zones to those found in Alaska (Kucheruk 1990, MacDonald and Cook 2009).

Total for distribution = 30 / 30

### Biological Characteristics and Dispersal

**Invasive elsewhere (0-5)**

Norway rats are invasive worldwide (Nagorsen 1990).

**Dietary specialization (0-5)**

Norway rats are omnivorous, eating a wide variety of plant and animal material (Johnson 2008). Rats prey on nesting birds (adults, nestlings, and eggs), intertidal invertebrates, seeds, berries, other plant parts, and food scrapes left by humans (Landry 1970, Moors 1990, Drever and Harestad 1998, Major et al. 2006, Johnson 2008).

**Habitat specialization (0-5)**

Norway rats nest in burrows, which can be created in the ground, trees, rock piles, buildings, and natural cervices (Johnson 2008). These rats are often commensal with humans and can easily find suitable habitats in urban areas (Johnson 2008, Vignieri 2009).

**Average number of reproductive events per adult female per year (0-5)**

Females have 3-6 litters per year, with 2-13 offspring (average of 7 offspring) per litter (Vignieri 2009).

**Potential to be spread by human activities (0-5)**

Norway rats hitch-hike to new locations on ships and airplanes via physically walking aboard and by hiding in cargo (Fritts 2007, Johnson 2008). Norway rats are commensal with humans, so as fisheries, tourism, and the human populations increase in Alaska, chances for accidental introduction of rats from increased human traffic rises (Ebbert and Byrd 2002).

**Innate potential for long distance dispersal (0-5)**

Norway rats do not have any mechanisms for long distance dispersal, limited by daily movements of up to several kilometers on land and several hundred meters in water (Taylor et al. 2000, NatureServe 2009).

Total for biological characteristics = 25 / 30

### Ecological Impact

**Impact on population dynamics of other species (0-10)**

Norway rats are known to severely reduce or extirpate native ground nesting seabirds, burrow nesting seabirds, and shorebirds (storm petrels, puffins, auklets, gulls, Black Oystercatchers, and Rock Sandpipers) by feeding on individual birds and disturbing nesting adults (Ebbert and Byrd 2002, Major and Jones 2005, Kurle et al. 2008).

**Impact on natural community composition (0-10)**

Norway rats reduce the biodiversity of insular
Scientific name: *Rattus norvegicus*

avifauna by greatly reducing and/or extirpating many ecologically important bird species (Ebbert and Byrd 2002, Major and Jones 2005, Kurle et al. 2008).

Additionally, Norway rats provide supplemental prey to introduced foxes which also prey on native bird species (Ebbert and Byrd 2002). Indirectly, Norway rats impact marine intertidal communities by reducing the densities of intertidal foraging birds, which in turn shifts the intertidal community from algae to invertebrate dominated because the marine herbivores are released from predation (Kurle et al. 2008). Additionally, a reduction in seabirds may reduce the nutrient flow into terrestrial soils, thus impacting below-ground invertebrate communities (Towns et al. 2009).

**Impact on natural ecosystem processes (0-10)**

The indirect impact of Norway rats changing marine rocky intertidal communities can cascade to changes in ecosystem processes (Kurle et al. 2008, Simberloff 2009). Marine birds connect the marine and terrestrial communities and ecosystems, and as bird densities decrease, the productivity changes as invertebrates (not algae) dominate intertidal communities (Kurle et al. 2008). A reduction in birds means a reduction in guano inputs into terrestrial and marine ecosystems, resulting in a change to the nutrient cycling of the ecosystem (Kurle et al. 2008). The reduction of nutrients from seabirds can cause changes in soil fertility, which in turn impacts belowground organisms (Fukami et al. 2006).

**Total for ecological impact**

27/30

<table>
<thead>
<tr>
<th>Feasibility of control</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of populations in Alaska (0-3)</strong></td>
<td>2</td>
</tr>
<tr>
<td>Populations of Norway rats are on many Aleutian Islands and in southeast Alaska (MacDonald and Cook 2009).</td>
<td></td>
</tr>
</tbody>
</table>

| Significance of the natural area(s) and native species threatened (0-3) | 3 |
| The insular communities that Norway rats invade are often refuges and source populations for large colonies of birds, such as the Least Auklet and Ancient Murrelet (Bertram 1995, Major and Jones 2005). Predation by invasive species is the second highest cause (after habitat destruction) of the endangerment, extirpation, and extinction of island birds, which places a high conservation value on Alaskan insular avifauna communities (King 1985). |

**General management difficulty (0-4)**

4

Eradication of rats on islands is expensive (Ebbert and Byrd 2002) and involves continued monitoring, but is possible and has been done on many islands (Taylor et al. 2000, Fritts 2007, Howald et al. 2007). The following are prevention and control methods that are possible in Alaska. To prevent new introductions, public education events have been held to spread awareness, and bait and trap stations (often referred to as "rat spill") are set up at ports to catch rats as they arrive from docking and shipwrecked vessels. Also, rodenticides are used in some communities (Fritts 2007). Removing clutter off the ground of ports by relocating objects that create shelter and concealed transport corridors for rats (e.g., old crate material, excess shrubs), is an inexpensive way to prevent and control rats (Johnson 2008).

**Total for feasibility of control**

9/10

**Range Map**

![Range Map](image)

**References**


**Scientific name:** *Rattus norvegicus*  

**Common name:** Norway rat  


Simberloff, D. 2009. Rats are not the only introduced rodents producing ecosystem impacts on islands. Biological Invasions 11: 1735-1742.


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**Reviewer(s):** Stephen MacLean, The Nature Conservancy.