



Working Report 2009-79

# Game Statistics for the Island of Olkiluoto in 2008–2009

**Ilkka Jussila**  
**Marko Nieminen**

October 2009

**Working Report 2009-79**

# **Game Statistics for the Island of Olkiluoto in 2008–2009**

**Ilkka Jussila**

University of Turku

Satakunta Environmental Research Institute

**Marko Nieminen**

Faunatica Oy

**October 2009**

---

Working Reports contain information on work in progress  
or pending completion.

The conclusions and viewpoints presented in the report  
are those of author(s) and do not necessarily  
coincide with those of Posiva.

## **ABSTRACT**

The game statistics for the island of Olkiluoto were updated in April 2009, and compared with earlier studies. Population size estimates are based on interviews of local hunters, and other available material. Conclusions of changes in game populations are based on rough estimates primarily from interviews, only in Elk and Deer also on inventories.

Elk population is still slightly decreasing. The growth of the White-tailed Deer population is slowing down. The changes in the Roe Deer population are not precisely known, but it is seemingly varying to some extent in different years.

The populations of small predators (American Mink, Raccoon Dog and Red Fox) are still strong in Olkiluoto, partly because of very dense population of voles during the hunting season. The Raccoon Dog population has been diminished due to shooting several individuals during the Elk and Deer hunting. The Red Fox population is obviously increasing.

The Mountain Hare population is strong and it increased in 2008. However, the Brown Hare population is apparently decreasing, probably due to kills by mammalian predators, eagles and traffic.

Currently, other game animals (e.g. waterfowl) are hardly ever hunted.

**Keywords:** Game statistics, hunting, Olkiluoto.

## OLKILUODON RIISTATILASTOT METSÄSTYSKAUDELTA 2008–2009

### TIIVISTELMÄ

Olkiluodon saaren riistaeläimistön saalistiedot päivitettiin huhtikuussa 2009. Riistaeläinten populaatiokoot arvioitiin metsästäjiltä saatujen saalistietojen ja saatavilla olevan muun tiedon perusteella. Nyt saatua aineistoa metsästyskaudelta 2008–2009 verrattiin aiempiin saarelta tehtyihin riistaeläintilastoihin. Päätelmät riistakantojen suuruudesta ja niiden vaihtelusta perustuvat osittain haastatteluissa saatuihin karkeisiin arvioihin, hirvieläinten osalta myös eläinkantojen maalaskentaan. Laskettuja tiheyksiä eri alueilla ja eri mitta-kaavoissa tulee kuitenkin tarkastella kriittisesti.

Alueen suurista riistaeläimistä hirvikanta on edelleen hivenen laskussa. Valkohäntäkauriin (ent. valkohäntäpeura) kannan kasvu on tasoittumassa. Metsäauriskannan muutoksista ei ole tarkkaa tietoa ja ilmeisesti kanta vaihtelee jonkin verran vuosittain.

Pienpedoista sekä minkin, supikoiran että ketun kannat ovat pysyneet Olkiluodossa edelleen korkeina, mihin on ilmeisesti osaltaan vaikuttanut erittäin vahva myyräkanta. Supikoirakantaa on pienennetty ampumalla useita yksilöitä hirvieläinten metsästyksen yhteydessä vuonna 2008. Kettukanta on ilmeisesti edelleen kasvanut.

Myös metsäjäniksen kanta on pysynyt korkeana ja jopa voimistunut vuonna 2008. Sen sijaan rusakkokanta on havaintojen perusteella ilmeisesti taantunut edellisistä vuosista. Ilmeisesti alueen pienpedot ja kotkat (4-5 lintua) sekä liikenne verottavat rusakkokantaa.

Muiden riistaeläinten (mm. vesilintujen) metsästystä ei harjoiteta alueella juuri lainkaan.

**Avainsanat:** Metsästys, Olkiluoto, riistatilasto.

## TABLE OF CONTENTS

ABSTRACT

TIIVISTELMÄ

1.	INTRODUCTION AND STUDY AREA.....	2
2.	MATERIAL AND METHODS.....	3
3.	GAME ANIMALS IN OLKILUOTO.....	4
3.1.	Mammals.....	4
3.1.1.	Elk ( <i>Alces alces</i> ).....	4
3.1.2.	White-tailed Deer ( <i>Odocoileus virginianus</i> ) .....	5
3.1.3.	Roe Deer ( <i>Capreolus capreolus</i> ) .....	6
3.1.4.	Red Fox ( <i>Vulpes vulpes</i> ).....	8
3.1.5.	Raccoon Dog ( <i>Nyctereutes procyonoides</i> ) .....	8
3.1.6.	European Badger ( <i>Meles meles</i> ) .....	9
3.1.7.	American Mink ( <i>Neovison vison</i> ) .....	10
3.1.8.	Pine Marten ( <i>Martes martes</i> ).....	10
3.1.9.	Mountain Hare ( <i>Lepus timidus</i> ) .....	11
3.1.10.	Brown Hare ( <i>Lepus europaeus</i> ).....	11
3.1.11.	Muskrat ( <i>Ondatra zibethicus</i> ) .....	12
3.1.12.	Red Squirrel ( <i>Sciurus vulgaris</i> ) .....	12
3.2.	Birds .....	12
3.2.1.	Mallard ( <i>Anas platyrhynchos</i> ).....	12
3.2.2.	Teal ( <i>Anas crecca</i> ) .....	13
3.2.3.	Hazel Grouse ( <i>Bonasa bonasia</i> ).....	13
3.2.4.	Black Grouse ( <i>Tetrao tetrix</i> ) .....	14
3.2.5.	Woodcock ( <i>Scolopax rusticola</i> ) .....	14
3.2.6.	Hooded Crow ( <i>Corvus corone</i> ) .....	14
4.	DISCUSSION .....	16
	REFERENCES .....	17
	APPENDIX 1. NOMENCLATURE OF THE SPECIES.....	19
	APPENDIX 2. WEIGHTS OF THE SPECIES .....	20

## 1. INTRODUCTION AND STUDY AREA

The island of Olkiluoto (ca. 12 km<sup>2</sup>) is situated off the Finnish coast in the Bothnian Sea. The coast is characterised by shallow bays surrounded by small islands and skerries. The soil of this relatively flat island consists mainly of gravel, sand and fine-textured till. There are also some sedge and sphagnum peat soils, and exposed bedrock. The landscape at Olkiluoto is characterised by forests: pine, spruce, mixed coniferous, mixed deciduous/coniferous forests and deciduous forests. There are some small mires and near shore also meadows and shore scrubs. The whole local hydrogeochemical and biological system is affected by the postglacial land up-lift (6 mm/y) typical to the Finnish western coast.

There are two nuclear power plant units situated in Olkiluoto and a third one is under construction. Olkiluoto has also been selected as a location for final repository of spent nuclear fuel, and currently a test repository cave is under construction. These projects have taken over a large land area and traffic has increased a lot on the island.

This report was carried out by Satakunta Environmental Research Institute (University of Turku), where it was coordinated by Ilppo Vuorinen, and by Faunatica Oy, where coordinated by Marko Nieminen. The work was ordered by Posiva Oy.

## 2. MATERIAL AND METHODS

A first estimate of game populations in Olkiluoto was conducted in 2002 (Kaapu 2003) and was based on interviews of local hunters and available statistical material. Next interviews were carried out in winter 2003-2004 (Ranta et al. 2005), updated by new interviews in January and March 2006 (Oja & Oja 2006) and in March 2007 (Oja & Oja 2007). The most recent interviews were conducted in March 2008 (Jussila & Nieminen 2008).

To update the game estimates, new interviews were carried out in April 2009. This current report is mainly based on interviews of hunters of a local hunting group (Olkiluodon metsästysseura) and, therefore, inaccuracies may occur in the data collected. Only the Elk and White-tailed Deer data are based on actual numbers of killed animals during the hunting season and inventories of the remaining stock, others are estimates and more prone to error. The population sizes and their changes are based on observations and estimates by hunters in Olkiluoto, mainly Antti Kallio and Kari Pipatti. Hunting statistics from the surrounding area and other corresponding data concerning game populations in Finland have been used to evaluate these numbers. Hunting statistics from the surrounding area were presented by Jari Toivonen, who is the chairman of the society of game preservation in SW Satakunta (Lounais-Satakunnan riistanhoitoyhdistys). The mean population densities were calculated from those statistics. Home range sizes are usually based on a combination of information from several sources, in which case references are not specified in section 3.

List of scientific names of species included in the report is shown in Appendix 1 with common names in English and Finnish. The average weights of game species are shown in Appendix 2. Each weight represents a typical Finnish animal, heavier and lighter individuals do occur. The average weight is not a statistical mean but an estimated weight of both females and males. The literature used to construct species descriptions and Appendix 2 is listed in section 5 (References).

### 3. GAME ANIMALS IN OLKILUOTO

#### 3.1. Mammals

##### 3.1.1. Elk (*Alces alces*)

**Habitat use:** Elk typically inhabits boreal coniferous and mixed deciduous forests, and prefers continuously forested areas and relatively young forests. In spring and early summer elks are often seen on more open habitats such as mires. In the summer months they mainly inhabit areas with young deciduous trees around woodland glades and clearings, in the autumn they gather together in mature forests, in early winter along forest streams and rivers, and in the wintertime they prefer pine seedlings and young birch but also mature forests with lighter snow cover. Their home range is 5-10 km<sup>2</sup> on average.

**Main food source(s):** Elk consumes a variety of vegetation: leaves, needles, twigs and buds of trees (birch, aspen, willow, rowan) and shrubs (blueberry, lingonberry, heather), sprouts of cereals, grains and also some aquatic and terrestrial herbaceous plants. In winter it feeds on twigs and buds of trees and shrubs, bark and buds of pine and aspen, pine needles, juniper and lichens. Elk rarely feeds on spruce. Elks eat daily up to 50 kg in summertime and 10-20 kg in winter.

**Densities:** Density after hunting in winter 2009 in Olkiluoto was ca. 5 inds./1000 ha. In Satakunta the mean density was 2.5 inds./1000 ha and in SW Satakunta 3.9 inds./1000 ha after the hunt in winter 2008-2009.

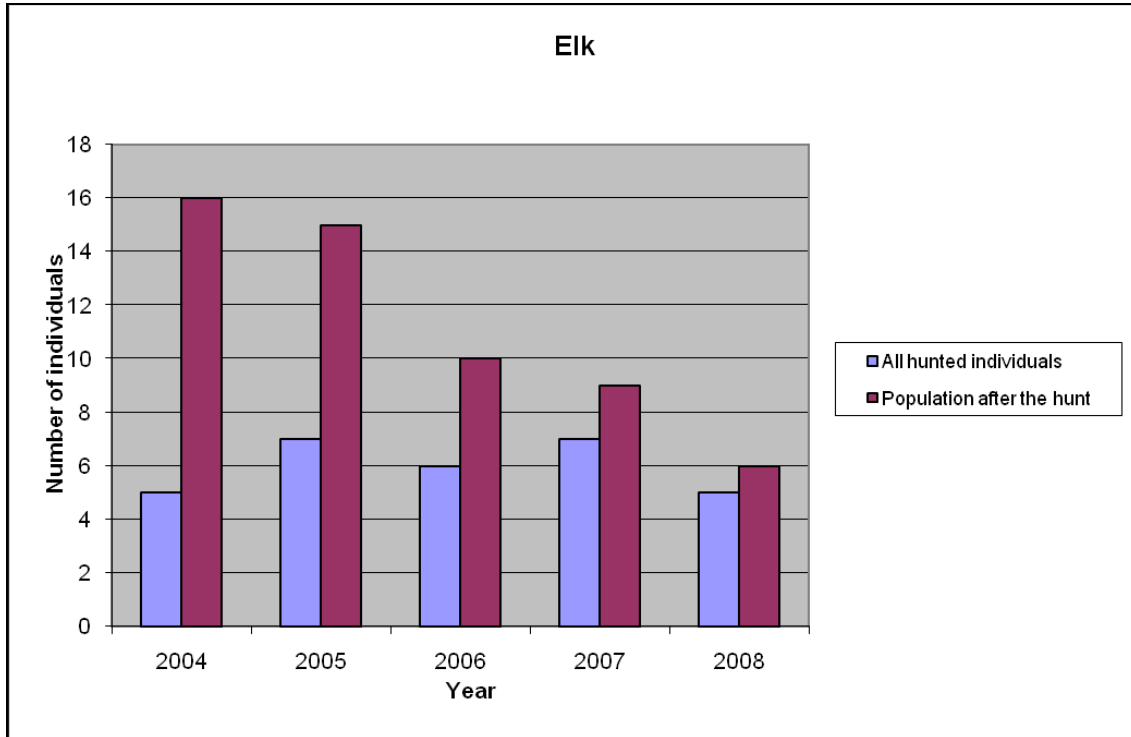
**Hunting period:** 27.9. – 31.12.2008.

**Hunting in 2008:** One adult Elk and four fawns were brought down in Olkiluoto (Table 1) (Kallio 2009). The estimated size of the Elk population after the hunting season was six individuals (Fig. 1). The exact number of remaining stock is difficult to determine because all individuals are not able to notice in wintertime. It is possible that some Elks are moving to mainland from Olkiluoto. Likewise, there is some migration between Olkiluoto and the surrounding archipelago.

*Table 1. Numbers of hunted Elks and estimated population size after the hunting in different years.*

Elk	2004	2005	2006	2007	2008
Hunted adults	3	2		3	1
Hunted fawns	2	5		4	4
All hunted individuals	5	7	6	7	5
Population after the hunt	16	15	10	9	6





**Figure 1.** Numbers of hunted Elks (all individuals) and estimated population sizes after the hunting in different years.

### 3.1.2. White-tailed Deer (*Odocoileus virginianus*)

**Habitat use:** White-tailed Deer is a generalist and can use a wide variety of habitats. Mostly it is a forest animal depending on relatively small openings and edges. In the mornings and in the evenings White-tailed Deer can be seen grazing on the fields. Their home range is typically 10-100 ha.

**Main food source(s):** White-tailed Deer eats a variety of vegetation: grasses, herbaceous plants, leaves, needles, young shoots, acorns, mushrooms, sprouts of cereals, grains, root vegetables (sugar-beet), fruits and other cultivated plants. In winter, it feeds on shrubs (blueberry, lingonberry, heather), twigs, buds and bark of trees (aspen, willow, rowan) and also juniper, pine needles and lichens. It can also eat some fern and mosses, but consumes spruce rarely.

**Densities:** Density after hunting in Olkiluoto in winter 2009 was ca. 16.7 inds./1000 ha. In Satakunta the mean density was 5.5 inds./1000 ha after the hunt in 2008-2009 and in SW Satakunta 5.7 inds./1000 ha.

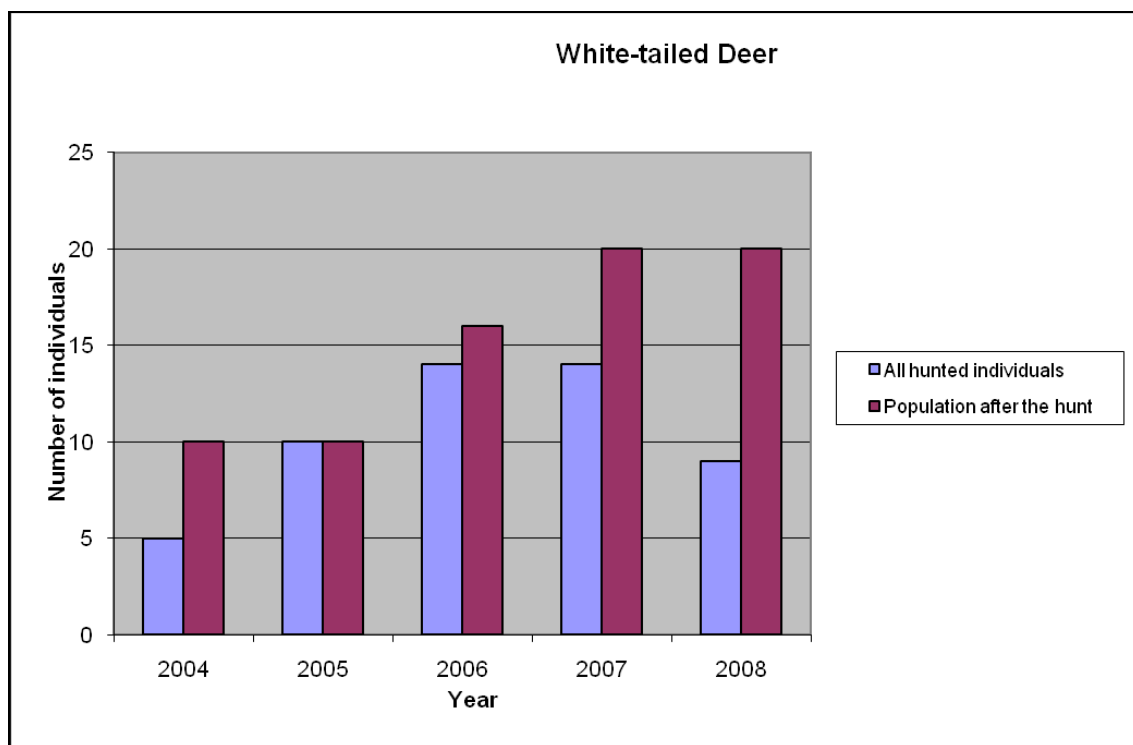
**Hunting period:** 27.9.2008 – 31.1.2009.

**Hunting in 2008-2009:** Altogether nine White-tailed Deer were brought down in 2008-2009 (Table 2) (Kallio 2009). The estimated size of the White-tailed Deer population was 20 individuals after the hunting season of 2008-2009 (Fig. 2). The exact number of

remaining stock is difficult to determine because all individuals are not able to notice in wintertime.

**Table 2.** Numbers of hunted White-tailed Deer and estimated population size after the hunting in different years.

White-tailed Deer	2004	2005	2006	2007	2008
Hunted adults					3
Hunted fawns					6
All hunted individuals	5	10	14	14	9
Population after the hunt	10	10	16	20	20



**Figure 2.** Numbers of hunted White-tailed Deer and estimated population sizes in different years.

### 3.1.3. Roe Deer (*Capreolus capreolus*)

**Habitat use:** Roe Deer lives mostly in woods, although it ventures regularly out to the grasslands, fields and sparse forests. Their home range in summertime is 50-100 ha on average.

**Main food source(s):** Roe Deer feeds mainly on grasses, herbaceous plants, leaves, young shoots, berries, mushrooms, sprouts of cereals and grains. It particularly likes very young, tender grass with a high content of moisture, i.e. grass that has been watered by rain the previous day. In winter Roe Deer feeds on shrubs and lichens, twigs, buds and bark of trees and also some juniper and pine needles.

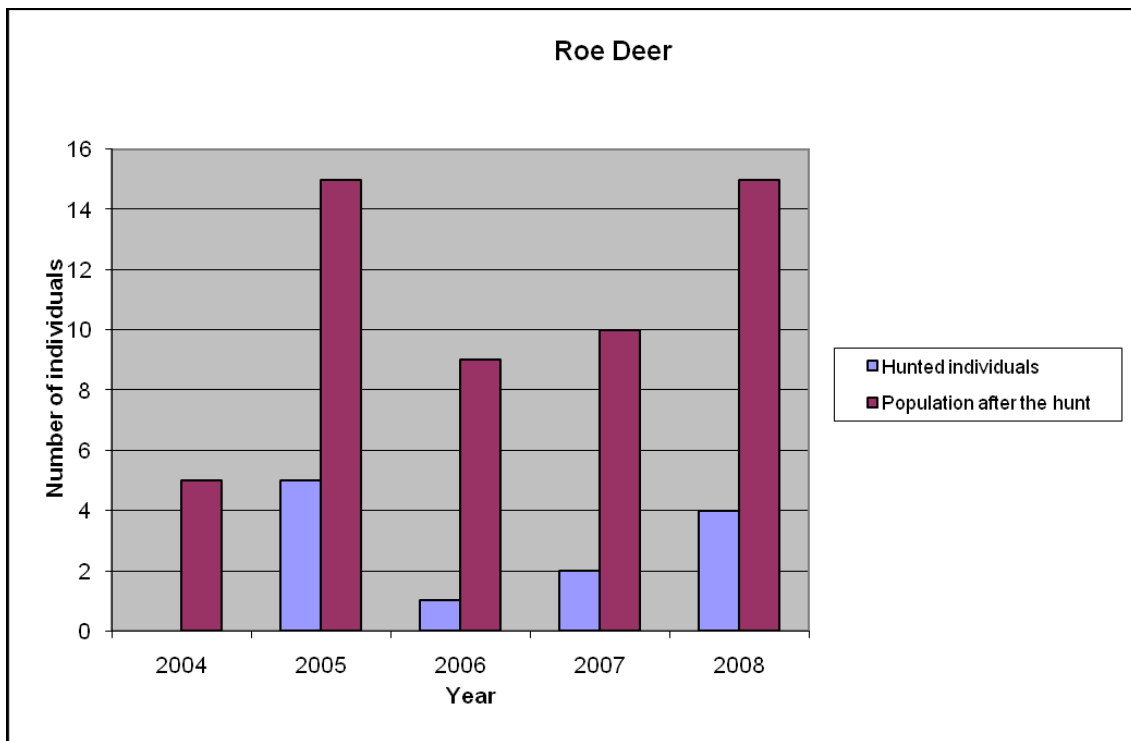
**Densities:** Density after hunting in Olkiluoto in winter 2009 was ca. 12.5 inds./1000 ha.

**Hunting period:** Female and fawn 1.9. – 31.1.2008, male 1.9. – 31.1.2008 and 16.5. – 15.6.2009.

**Hunting in 2008-2009:** Four Roe Deer were brought down in 2008 (Table 3) (Kallio 2009). The estimated size of the Roe Deer population after hunting season was 15 individuals (Fig. 3). The exact number of bag is difficult to determine because hunting of Roe Deer is free and all hunters don't notify the number they have killed. Furthermore the remaining stock is difficult to determine because all individuals are not able to notice in wintertime.

**Table 3.** Numbers of hunted Roe Deer and estimated population size after the hunting in different years.

Roe Deer	2004	2005	2006	2007	2008
Hunted individuals	0	5	1	2	4
Population after the hunt	5	15	9	10	15



**Figure 3.** Numbers of hunted Roe Deer and estimated population size after the hunting in different years.

### 3.1.4. Red Fox (*Vulpes vulpes*)

**Habitat use:** Red Fox is a generalist and can adapt to a wide variety of habitats but is mainly found from forests, copses and field thickets, often in places with rock cavities or sandy ground. It can live in cultivated areas and near developments. In good habitats its home range is 5-12 km<sup>2</sup> and in poor habitats 12-50 km<sup>2</sup>. In a case study in Virolahti their home range was 5.7 km<sup>2</sup> on average (Kauhala ym. 2006). The dispersal distances of young females were 21 km and that of young males 29 km (Kauhala ym. 2006).

**Main food source(s):** Red Fox feeds mostly on various vertebrates, especially rodents (such as water voles, voles and mice), but also insects, molluscs, berries and fruits. They eat birds and eggs when available (Kauhala 2004, Kauhala ym. 1998). It can also catch bigger animals, like Mountain Hare, Brown Hare and even Roe Deer fawn. Sometimes it feeds on carrion and waste of foodstuff, such as surplus of butcheries and fisheries.

**Densities:** In Satakunta the mean density was 0.50-0.59 inds./km<sup>2</sup> in springtime 2007 (Kauhala 2007). In a case study in Virolahti their average density was 0.44 inds./km<sup>2</sup> (Kauhala ym. 2006).

**Hunting period:** Whole year but female with fawns cannot be killed 1.5. – 31.7.

**Hunting in 2008-2009:** Only one Red Fox were killed at Olkiluoto in 2008 (Table 4) (Kallio 2009). According to Kari Pipatti there is a strong population of Red Fox and the population has increased in Olkiluoto in the last few years. In Olkiluoto area Red Foxes move freely to and from mainland and there is also migration between Olkiluoto and the surrounding archipelago.

*Table 4. Numbers of hunted Red Foxes in different years.*

Red Fox	2002	2003	2005	2006	2007	2008
Hunted individuals	1	7	1	3	2	1

### 3.1.5. Raccoon Dog (*Nyctereutes procyonoides*)

**Habitat use:** Raccoon Dog lives in broadleaved and mixed woodlands intersected by streams and other water elements, and in scrubby and cultivated areas. Its home range is 2-10 km<sup>2</sup>. In a case study in Virolahti their home range was 2.6 km<sup>2</sup> on average (Kauhala ym. 2006). The dispersal distances of young females were 14 km and of young males 19 km (Kauhala ym. 2006).

**Main food source(s):** Raccoon Dog feeds on small mammals (also shrews) but also insects, larvae, earthworms, berries, fruits and grains. They eat birds and birds' eggs when available and also aquatic organisms including fish (Kauhala 2004, Kauhala ym. 1998). Raccoon Dog consumes also reptiles and amphibians. It feeds on carrion and waste of foodstuff. It can also scavenge food from bins and gardens.

**Densities:** In Satakunta the mean density was 0.60-0.69 inds./km<sup>2</sup> in springtime 2007 (Kauhala 2007). In a case study in Virolahti their average density was 0.77 inds./km<sup>2</sup> (Kauhala ym. 2006).

**Hunting period:** Whole year but female with fawns cannot be killed 1.5. – 31.7.

**Hunting in 2008-2009:** Three Raccoon Dogs were reported killed in Olkiluoto (Table 5) (Kallio 2009). According to Kari Pipatti there is a strong and stable population of Raccoon Dogs in Olkiluoto. The number of catches does not necessary indicate the population size, because formerly the hunting of Raccoon Dog has been much more effective. In autumn Raccoon Dogs move around considerably, especially the young individuals.

*Table 5. Numbers of hunted Raccoon Dogs in different years.*

Raccoon Dog	2002	2003	2004	2005	2006	2007	2008
Hunted individuals	12	19	10	9	2	0	3

### 3.1.6. European Badger (*Meles meles*)

**Habitat use:** Badger lives in broadleaved and mixed woodlands and scrubby country intersected by fields and other kind of open areas. It can live in cultivated areas, near developments and even in urban area. In Southern Finland its home range in winter is 3.9 km<sup>2</sup> on average and in summertime 7.8 km<sup>2</sup> on average (Holmala 2008). In a case study in Virolahti their home range was 6.7 km<sup>2</sup> on average (Kauhala ym. 2006).

**Main food source(s):** The diet of Badger consists of earthworms, insects, small mammals, reptiles, amphibians, eggs, young birds, berries, fruit, and other plant matter, depending on the season (Kauhala 2004, Kauhala ym. 1998). Badgers can also dig up the nests of wasps and bumblebees in order to eat their larvae. They also feed on carrion and waste of foodstuff and butchery. In urban areas some badgers can scavenge food from bins and gardens.

**Densities:** In Satakunta the mean density was 0.20-0.29 inds./km<sup>2</sup> in springtime 2007 (Kauhala 2007). In a case study in Virolahti their average density was 0.26 inds./km<sup>2</sup> (Kauhala ym. 2006).

**Hunting period:** Whole year but female with fawns is not allowed to be killed 1.5. – 31.7.

**Hunting in 2008-2009:** One Badger was killed in Olkiluoto (Table 6) (Kallio 2009). According to Kari Pipatti there is still one breeding Badger family on the island.

**Table 6.** Numbers of hunted European Badgers in different years.

Badger	2002	2003	2004	2005	2006	2007	2008
Hunted individuals	0	1	0	0	0	0	1

### 3.1.7. American Mink (*Neovison vison*)

**Habitat use:** American Mink is found in the vicinity of rivers, streams, lakes and other water elements with thick herbaceous vegetation along the banks and it lives also by the seaside and archipelago. Home ranges of females are on average 8-20 ha and of males up to 800 ha.

**Main food source(s):** Feeds on small mammals, birds, eggs, amphibians, fish, aquatic invertebrates and also some insects.

**Hunting period:** Whole year but female with fawns is not allowed to be killed 1.5. – 31.7.

**Hunting in 2008-2009:** Only a few American Minks were killed in Olkiluoto (Table 7) (Kallio 2009). According to Kari Pipatti there is, however, a strong population of American Mink on the island and the population has increased in the latest years. American Mink finds a lot of food from the seashore, which is mainly open also in winter as the nuclear power plant heats up the sea-water.

**Table 7.** Numbers of hunted American Minks in different years.

American Mink	2002	2003	2005	2006	2007	2008
Hunted individuals	2	8	9	3	2	2

### 3.1.8. Pine Marten (*Martes martes*)

**Habitat use:** Pine Marten inhabits different kinds of forests, but mostly spruce forests. Recently it has adapted to more various habitats and nowadays it can live near developed areas. Home ranges of females are on average 9 km<sup>2</sup> and of males up to 18 km<sup>2</sup>.

**Main food source(s):** Feeds on small rodents (mostly voles but also Red Squirrel), birds of different sizes, birds' eggs, various insects, honey, molluscs and berries, but sometimes it captures even larger prey such as hares. It can sometimes feed on carrion and waste of foodstuff and butchery.

**Hunting period:** 1.11.2008 – 31.3.2009.

**Hunting in 2008-2009:** No Pine Martens were killed in Olkiluoto (Table 8) (Kallio 2009). According to Kari Pipatti there was still one observation of Pine Marten on the island. It is possible that a pair or a solitary individual lives on the island.

**Table 8.** Numbers of hunted Pine Martens in different years.

Pine Marten	2002	2003	2004	2005	2006	2007	2008
Hunted individuals	0	0	0	0	0	0	0

### 3.1.9. Mountain Hare (*Lepus timidus*)

**Habitat use:** Mountain Hare is found in different habitats but it prefers forests and woodland glades, clearings, copses and field thickets. Its home range is from 2 to over 10 ha on average but in wintertime it can be up to 200 ha (Perkkiö 2008).

**Main food source(s):** The diet of Mountain Hare consists mainly of grasses, clovers, vetches, sprouts of oat, leaves (willow and aspen), shrubs (blackberry) but reed, sedge and herbs and berries are part of the nutrition. In winter Mountain Hare nibbles on the shoots and bark of young trees (birch, aspen, willow, rowan, juniper) and shrubs (blackberry).

**Hunting period:** 1.9.2008 – 28.2.2009.

**Hunting in 2008-2009:** Three Mountain Hares were killed in Olkiluoto (Table 9) (Kallio 2009). According to Kari Pipatti there is a strong population of Mountain Hare and the population has increased in the latest years, even though there are lots of predators and traffic in Olkiluoto.

**Table 9.** Numbers of hunted Mountain Hares in different years.

Mountain Hare	2002	2003	2004	2005	2006	2007	2008
Hunted individuals	3	2	0	2	0	0	3

### 3.1.10. Brown Hare (*Lepus europaeus*)

**Habitat use:** Brown Hare is found in cultivated areas and forest margins, and also sand dunes. It can live near developed areas and even in parks in urban area. Its home range is from 2 to over 20 ha on average.

**Main food source(s):** The diet consists mainly of grasses, clovers, vetches, yarrow, herbs and sprouts of cereals. In winter Brown Hare eats sprouts of cereals, grasses and hay, but also nibbles on the shoots and bark of young trees.

**Hunting period:** 1.9.2008 – 28.2.2009.

**Hunting in 2008-2009:** No Brown Hares were killed in Olkiluoto (Table 10) (Kallio 2009). According to Kari Pipatti there is a stable population of Brown Hare and the population has obviously slightly decreased in the latest years. Probably the mammalian predators and eagles (4-5 birds) living on the area and traffic kills some of the Brown Hares.

**Table 10.** Numbers of hunted Brown Hares in different years.

Brown Hare	2003	2004	2005	2006	2007	2008
Hunted individuals	1	0	2	0	0	0

### 3.1.11. Muskrat (*Ondatra zibethicus*)

**Habitat use:** Muskrat is found on the banks of flowing and standing water bodies with luxuriant shore and aquatic vegetation. It also lives on the seaside if there is protective archipelago. Along 1 km of shore there can be ten muskrats during the summer and three during the winter.

**Main food source(s):** The diet consists of both plants and animals. Most popular plants are cattail, common club-rush, sedges, water horsetail and sometimes common reed. In wintertime mussels are important food for Muskrat and it feeds also on crayfish and dead fishes, but it cannot catch living fish.

**Hunting period:** 1.10.2008 – 19.5.2009.

**Hunting in 2008-2009:** No Muskrats were killed in Olkiluoto. There is probably no Muskrat population in Olkiluoto anymore.

### 3.1.12. Red Squirrel (*Sciurus vulgaris*)

**Habitat use:** Red Squirrel is found on woodlands, parks and gardens, often in the immediate vicinity of humans. Its home range is 2-5 ha on average.

**Main food source(s):** Red Squirrel eats mostly the seeds of coniferous (spruce, pine) trees, neatly stripping conifer cones to get at the seeds within. Mushrooms, berries, young shoots, buds, flowers, fruits and nuts are also parts of the diet. Often Red Squirrel removes the bark of trees to access sap. Occasionally Red Squirrel eats animal food like birds' eggs, nestlings, insects and larvae.

**Hunting period:** 1.12. – 31.1.2008.

**Hunting in 2008:** No Red Squirrels were killed, though there still is a stable population of Red Squirrel in Olkiluoto.

## 3.2. Birds

### 3.2.1. Mallard (*Anas platyrhynchos*)

**Habitat use:** Mallard is found near all types of wetland habitats, except the least productive and most barren waters. It also lives on seashore.



**Main food source(s):** Feeds on insects and larvae, other (mainly aquatic) invertebrates, seeds, aquatic vegetation and grain.

**Densities:** There are on average 3.5 nesting pairs of Mallards per km<sup>2</sup> on lakes and river estuaries in Satakunta. Mallard is quite abundant also at seashore and in the inner archipelago. In Olkiluoto, estimated number of pairs was 30 in 2008 (Yrjölä 2009).

**Hunting period:** 20.8. – 31.12.2008.

**Hunting in 2008:** No Mallards were caught, though there is a stable population of Mallard in Olkiluoto.

### 3.2.2. Teal (*Anas crecca*)

**Habitat use:** Teal favours freshwater pools, lakes and streams with luxuriant shore vegetation, preferring shallower waters and smaller ponds and pools in breeding season. It also lives on seashore.

**Main food source(s):** Feeds on insects and larvae, other aquatic invertebrates like gastropods, and seeds and aquatic vegetation.

**Densities:** There are on average 2.9 nesting pairs of Teals per km<sup>2</sup> on lakes in Satakunta. However, Teal is much rarer at bays of the Baltic than on the mainland. In Olkiluoto, estimated number of pairs was 2 in 2008 (Yrjölä 2009).

**Hunting period:** 20.8. – 31.12.2008.

**Hunting in 2008:** No Teals were caught in Olkiluoto.

### 3.2.3. Hazel Grouse (*Bonasa bonasia*)

**Habitat use:** Hazel Grouse inhabits different kinds of mixed forests, but favours dense spruce forests with some deciduous trees. It prefers glens of streams and coastal areas of lakes and the sea, where alder is abundant.

**Main food source(s):** Hazel Grouse feeds mostly on the ground, feeding mainly on plant food like leaves and shoots of herbaceous plants and shrubs, seeds and berries, supplemented by insects when breeding. Fledglings of Hazel Grouse eat insects. In winter Hazel Grouse eats buds and catkins of deciduous trees (alder, birch).

**Densities:** There are on average 6.3 inds./km<sup>2</sup> of Hazel Grouse in Satakunta and 5.2 inds./km<sup>2</sup> in SW Satakunta. In Olkiluoto, estimated density was 4.5 inds./km<sup>2</sup> in 2008 (Yrjölä 2009).

**Hunting period:** 10.9. – 31.10.2008.

**Hunting in 2008:** No Hazel Grouses were caught, though there is a stable population of Hazel grouse in Olkiluoto.

#### **3.2.4. Black Grouse (*Tetrao tetrix*)**

**Habitat use:** Black Grouse inhabits bright boreal forests near moorland, bog areas and fields. It also lives in the archipelago. In winter Black Grouses gather to birch forests, where they find enough food.

**Main food source(s):** Black Grouse feeds mainly on plants like leaves, shoots and buds of shrubs, seed, berries and herbaceous plants. It also eats sprouts of cereals and grains on the fields. Fledglings of Black grouse eat insects, spiders and other small animals. In winter Black Grouse eats buds and catkins of birch, aments of alder and pine needles.

**Densities:** There are on average 4.9 inds./km<sup>2</sup> of Black Grouse in Satakunta and 3.4 inds./km<sup>2</sup> in SW Satakunta. In Olkiluoto, estimated density was 0.3 inds./km<sup>2</sup> in 2008 (Yrjölä 2009).

**Hunting period:** 10.9. – 31.10.2008.

**Hunting in 2008:** No Black Grouses were caught, though there is a small population of Black Grouse in Olkiluoto.

#### **3.2.5. Woodcock (*Scolopax rusticola*)**

**Habitat use:** Woodcock inhabits moist boreal forests, luxuriant mixed forests and broadleaved groves.

**Main food source(s):** Woodcock mainly eats earthworms, larvae, snails, insects and other invertebrates, but also plant material like seed and berries.

**Densities:** There are on average 0.9 nesting pairs of Woodcock per km<sup>2</sup> in south-western Finland.

**Hunting period:** 20.8. – 31.12.2008.

**Hunting in 2008:** No Woodcocks were caught, though there apparently is a stable population of Woodcock in Olkiluoto.

#### **3.2.6. Hooded Crow (*Corvus corone*)**

**Habitat use:** Hooded Crow lives in forests, open countryside, parks and gardens, often in the immediate vicinity of humans. It also lives in the archipelago.

**Main food source(s):** The Hooded Crow is omnivorous and a regular scavenger. It feeds on insects, earthworms, fish, molluscs, grains, seeds and fruits. Occasionally it eats eggs and nestlings from bird nests. In coastal areas it drops molluscs and crabs to break them. Hooded Crow also eats carrion, debris, and wastes of foodstuff and slaughterhouses, etc.

**Densities:** There are on average 1.9 nesting pairs of Hooded Crow per km<sup>2</sup> in southwestern Finland. In Olkiluoto, estimated density was 1.4 pairs/km<sup>2</sup> in 2008 (Yrjölä 2009).

**Hunting period:** 1.8.2008 – 9.3.2009.

**Hunting in 2008-2009:** No Hooded Crows were caught, though there apparently is a strong and stable population of Hooded Crow in Olkiluoto.

#### 4. DISCUSSION

This study presents game statistics for the island of Olkiluoto, and it is based on interviews of local hunters and numbers of kills of game animals. The population sizes and their variability are derived from observations and estimates made by hunters in Olkiluoto. The descriptions of habitat use and food sources are based on literature sources. Common knowledge on species' behavior in SW Finland has also been used in these descriptions.

The population of Elk is slightly decreasing like in some other areas in Satakunta and in western Finland. This is a result from efficient hunting in several years, as well as from some natural reasons (Leppäniemi & Halla 2006, Svensberg & Vikberg 2008a, Krusberg & Laaja 2009a). The population of White-tailed Deer has been remarkably increasing for several years but now the population growth is slowing down. This results mainly from high hunting pressure during the latest years. In Satakunta the number of kills and the population is still growing (Svensberg & Vikberg 2008b, Krusberg & Laaja 2009b). The changes in the population of Roe Deer are not exactly known, but it is seemingly varying to some extent in different years (Svensberg & Vikberg 2008b). The number of kills of Roe Deer has been decreasing in SW Satakunta in years 2005-2007 but increased in 2008 like in whole Satakunta.

The populations of small mammalian predators (American Mink, Raccoon Dog and Red Fox) are still strong in Olkiluoto, partly because of very dense population of voles during the hunting season. Population of Raccoon Dog has been diminished by shooting several individuals during the Elk and Deer hunting. The population of Red Fox has obviously been increasing (Pipatti 2009).

The population of Mountain Hare is also very strong and even increased in 2008. According to the less frequent sightings of Brown Hare its population is decreasing compared with the previous years. Probably both the mammalian predators and eagles (4-5 birds) living on the area, and traffic kills some Brown Hares (Pipatti 2009).

Other game animals like waterfowls are currently hunted infrequently.

## REFERENCES

- Bjärvall, A. & Ullström, S. 1996: Euroopan nisäkkäät. – Tammi, Helsinki.
- Ermala, A. 2008: Joka viides metsästää loukuilla tai raudoilla. – *Metsästäjä* 2008/2: 52-54.
- Holmala, K. 2008: Mäyrä. Elämää vuodenaikojen rytmissä. - Kirjassa: Katajisto, J. (toim.): Nisäkkäät 1: 48-49. – Weilin+Göös Oy, Porvoo.
- Jussila, I. & Nieminen, M. 2008: Habitats of game animals on Olkiluoto. – Memorandum for Posiva Oy, Faunatica Oy, Espoo.
- Jensen, B. 1994: Suomen ja Pohjolan nisäkkäät. – WSOY, Porvoo.
- Kaapu, J. 2003: Bird and mammal study of Olkiluoto. – In: Ikonen, A.T.K., Kaapu, J., Lehtonen, K., Mattila, J., Räisänen, R., Turkki, H. & Sauvonsaari, J. 2003: Environment studies in the Olkiluoto area. Posiva Working Report 2003-15: 9-23.
- Kallio, A. 2009: Toimitakertomus 2008. Olkiluodon Metsästysseura ry.
- Kauhala, K. 2004: Removal of medium-sized predators and the breeding success of ducks in Finland. – *Folia Zool.* 53(4): 357-378.
- Kauhala, K. 2007: Paljonko Suomessa on pienpetoja? – Riista- ja kalatalous - selvityksiä 1/2007, Riista- ja kalatalouden tutkimuslaitos.
- Kauhala, K., Laukkanen, P. & von Rége, I. 1998: Summer food composition and food niche overlap of the raccoon dog, red fox and badger in Finland. – *Ecography* 21: 457-463.
- Kauhala, K., Holmala, K., Lammers, W. & Schregel, J. 2006: Home ranges and densities of medium-sized carnivores in south-east Finland, with special reference to rabies spread. – *Acta Theriologica* 51: 1-13.
- Krusberg, M. 2008: Personal communication and formal material.
- Krusberg, M. & Laaja, R. 2009a: Tiedote 19.1.2009. – Satakunnan riistanhoitopiiri.
- Krusberg, M. & Laaja, R. 2009b: Tiedote 3.3.2009. – Satakunnan riistanhoitopiiri.
- Leppäniemi, J. & Halla, T. 2006: Hirvieläimet ja metsästys. – Kustannusosakeyhtiö Perhemediat Oy, Helsinki.
- Oja, J. & Oja, S. 2006: Game statistics for the island of Olkiluoto in 2005-2006. – Posiva Working Report 2006-53.
- Oja, J. & Oja, S. 2007: Game statistics for the island of Olkiluoto in 2006-2007. – Suomen Luontotieto Oy 12/2007.

Perkkiö, S. 2008: Metsäjänis. Papanoiden kierrättäjä. - Kirjassa: Katajisto, J. (toim.): Nisäkkäät 1: 224-225 – Weilin+Göös Oy, Porvoo.

Pipatti, K. 2009: Personal communication.

Ranta, P., Pöyri, V. & Vihervaara, P. 2005: Small Mammal, Bat and Carabid Beetle Inventories and Update of Game Statistics for the Olkiluoto Site in 2004. – Posiva Working Report 2005-19.

Svensberg, M. & Vikberg, P. 2008a: Hirvikanta vähentynyt – syksyn hirvisaalis 62 600. – Metsästäjä 2008/2: 56-57.

Svensberg, M. & Vikberg, P. 2008b: Valkohäntäpeurasaalis historian suurin – yli 22 600. – Metsästäjä 2008/2: 54-55.

Toivonen, J. 2009: Personal communication and statistical material.

Yrjölä, R. 2009: Eurajoki Olkiluoto Birdlife Survey 2008. – Posiva Working Report 2009-14.

**Appendix 1.** Nomenclature of the species.

English name(s)	Finnish name(s)	Scientific name
Elk (Eurasian Elk, Moose)	Hirvi	<i>Alces alces</i>
White-tailed Deer (Virginia Deer)	Valkohäntäkauris (valkohäntäpeura, laukonpeura)	<i>Odocoileus virginianus</i>
Roe Deer	Metsäkauris	<i>Capreolus capreolus</i>
Red Fox	Kettu (punakettu)	<i>Vulpes vulpes</i>
Raccoon Dog	Supikoira	<i>Nyctereutes procyonoides</i>
(European) Badger	Mäyrä (metsäsika)	<i>Meles meles</i>
American Mink	Minkki	<i>Neovison vison</i>
Pine Marten	Näätä	<i>Martes martes</i>
Mountain Hare (Blue Hare, Varying Hare)	Metsäjänis	<i>Lepus timidus</i>
European Hare (Brown Hare)	Rusakko	<i>Lepus europaeus</i>
Muskrat	Piisami (vesirotta, myskirotta)	<i>Ondatra zibethicus</i>
(Eurasian) Red Squirrel	Orava	<i>Sciurus vulgaris</i>
Mallard	Sinisorsa (heinäsorsa)	<i>Anas platyrhynchos</i>
(Common) Teal	Tavi	<i>Anas crecca</i>
Hazel Grouse	Pyy	<i>Bonasa (Tetrastes) bonasia</i>
(Eurasian) Black Grouse	Teeri	<i>Tetrao (Lyrurus) tetrix</i>
(Eurasian) Woodcock	Lehtokurppa	<i>Scolopax rusticola</i>
Hooded Crow (Carrion crow)	Varis	<i>Corvus corone</i>

**Appendix 2. Weights of the species.**

<b>Species</b>	<b>Weight of females</b>	<b>Weight of males</b>	<b>Average weight</b>
Elk	240-450 kg	250-600 kg	350 kg
White-tailed Deer	60-90 kg	85-140 kg	100 kg
Roe Deer	15-30 kg	20-36 kg	30 kg
Red Fox	3000-6500 g	4000-8000 g	6000 g
Raccoon Dog	4000-7000 g	4000-7000 g	5500 g
European Badger	4000-12000 g	6000-15000 g	10000 g
American Mink	500-1000 g	500-1500 g	1000 g
Pine Marten	500-1800 g	900-1800 g	1400 g
Mountain Hare	2000-5800 g	2000-5800 g	3500 g
European Hare	3500-9000 g	3500-9000 g	4000 g
Muskrat	1000-1800 g	1000-1800 g	1400 g
Red Squirrel	200-480 g	200-480 g	350 g
Mallard	900-1500 g	900-1500 g	1200 g
Common Teal	250-400 g	300-450 g	350 g
Hazel Grouse	350-450 g	350-450 g	400 g
Black Grouse	800-1000 g	1000-1300 g	1000 g
Woodcock	145-420 g	145-420 g	300 g
Hooded Crow	450-650 g	450-650 g	550 g