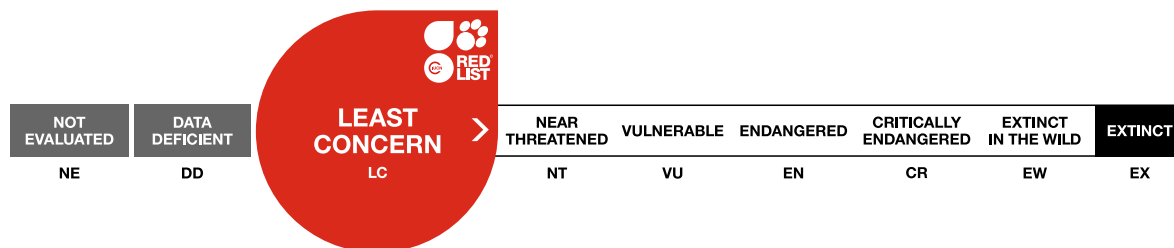


## *Capricornis crispus*, Japanese Serow

Assessment by: Tokida, K.



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## Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Cetartiodactyla	Bovidae

**Scientific Name:** *Capricornis crispus* (Temminck, 1836)

### Common Name(s):

- English: Japanese Serow
- Spanish; Castilian: Serau japonés
- German: Japanischer Serau

### Taxonomic Notes:

Wilson and Reeder (1993) treated this as *Naemorhedus crispus*, but Grubb (2005) placed it in the genus *Capricornis* and *C. swinhoei*. See also Jass and Mead (2004). Recent genetic evidence has supported that *Capricornis swinhoei* is a distinct species from *Capricornis crispus* (Chang 2002, Min *et al.* 2004, Mori *et al.* 2019).

Taxonomy of serows has been reviewed recently by Mori *et al.* (2019) and four species are recognised: the Red serow *Capricornis rubidus*, the Mainland serow *C. sumatraensis*, the Formosan serow *C. swinhoei* and the Japanese serow.

## Assessment Information

**Red List Category & Criteria:** Least Concern [ver 3.1](#)

**Year Published:** 2020

**Date Assessed:** February 11, 2020

### Justification:

This species is listed as Least Concern in view of its wide distribution, large population, and stable population. Its conservation will depend on continued protection, including from hunting and persecution because of forestry operations, and appropriate management of sika deer population.

### Previously Published Red List Assessments

2008 – Least Concern (LC)

<https://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T3811A10097895.en>

1996 – Lower Risk/conservation dependent (LR/CD)

1965 – Unknown (N/A)

## Geographic Range

### Range Description:

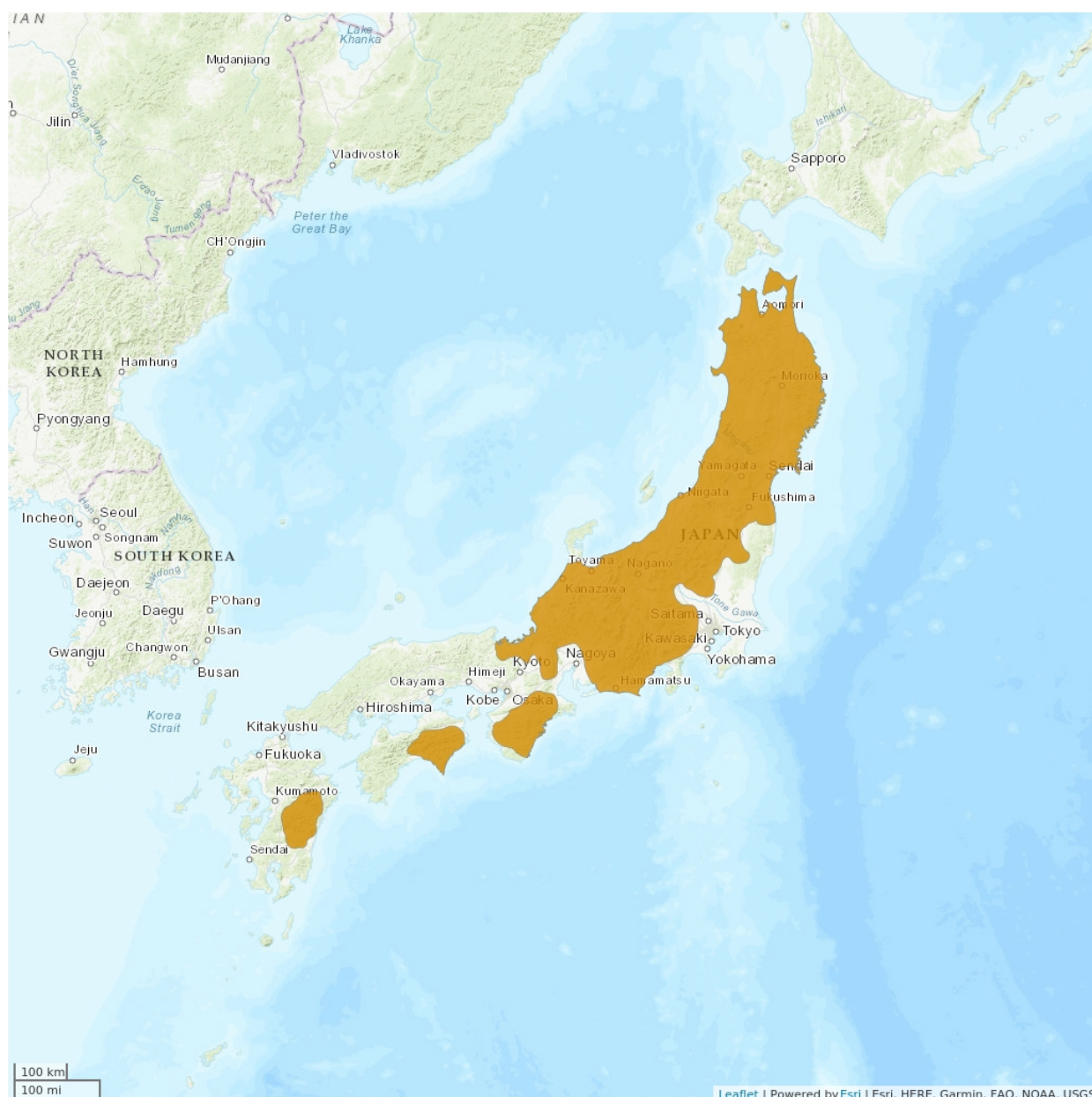
The Japanese serow *Capricornis crispus* is endemic to Japan on three of the main islands: Honshu,

Shikoku and Kyushu. This species is common in the mountain ranges of northern and central Honshu, and eastern Shikoku, but it is restricted to small fragmented areas in Kyushu. It went extinct in western Honshu and greatly reduced in other areas before the early 20th century. Since 1960s, its range has been expanding.

**Country Occurrence:**

**Native, Extant (resident):** Japan

# Distribution Map

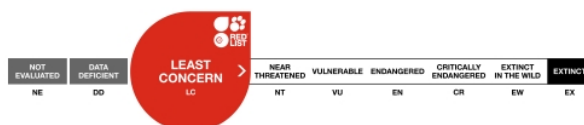


## Legend

EXTANT (RESIDENT)

Compiled by:

IUCN (International Union for Conservation of Nature) 2020



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

## Population

Based on the national survey reported by the Environment Agency in 1978, the distribution area and population size of serow were estimated at 35,000 km<sup>2</sup> and 75,000-90,000 individuals, respectively. In a subsequent survey report of the Environment Agency in 1984, the distribution area and population size of serow were estimated at 39,000 km<sup>2</sup> and 100,000 individuals, respectively. These estimates of distribution areas and population sizes for serow should be considered underestimates for the following reasons:

- In the calculation of the distribution area, sample areas did not cover the whole range inhabited by serows. There were other areas, inhabited by the serow, e.g. the mountainous backland, which were not considered.
- The serow population size was calculated by multiplying the distribution area by the average population density. The density estimation by the block count method (Maruyama and Nakama 1983), which was the main method used in the surveys, shows a strong tendency to be an underestimate (Ochiai 1997).

Since 1984, nationwide estimates of population size and distribution areas of the serow have not been made, but distribution surveys in 5 km grid squares were conducted in 2003 and 2018 by the Ministry of Environment. In 2018, the distribution expanded to 183% of that in 1978. On the other hand, many regional surveys have reported that serow population densities are decreasing. Since the beginning of the 21<sup>st</sup> century, most local serow populations in Honshu are thought to be stable or at least not significantly decreasing, while significant declines were observed in the western Honshu, Shikoku and Kyushu populations.

**Current Population Trend:** Stable

## Habitat and Ecology (see Appendix for additional information)

The ecological characteristics of this species were summarised in Ochiai (2015). This species is active at dawn and dusk. Their habitat includes various vegetation types such as broad-leaved evergreen forest, subalpine coniferous forest, alpine meadow and coniferous plantations, but the temperate deciduous forest is their preferred habitat. They eat fleshy leaves, evergreen leaves, plant shoots, and acorns (Jass and Mead 2004). This species is a monogamous, sexually monomorphic, territorial browser. They are found solitary, in pairs or small family groups (Kishimoto and Kawamichi 1996). The population density is generally low (on average, 2.6 ind./km<sup>2</sup>, in the 1983 survey). Females mature sexually at 30 months from birth. The rutting season is from September to November. The gestation period is 7 months, and females give birth to a single fawn usually between May and June. Life expectancy at birth and longevity are estimated to be 4.8-6.5 years and 25 years respectively (Tokida and Miura 1988, Miura and Tokida 1992).

**Systems:** Terrestrial

## Use and Trade

The meat of the serow killed in pest control operations is used for food. The fur products can be sold, after being registered officially. However, in recent years, the production and sale of fur products has declined.

## Threats (see Appendix for additional information)

The serow were threatened with over-hunting until the 1950s. Poaching pressure was also exceedingly high before the 1950s. However, poaching was eliminated by an anti-poaching campaign in 1959, and, upon that, the serow population began to increase. Furthermore, the increase of young conifer plantations, occurring from 1950s to 1970s, provided indirectly a large quantity of food for the serow and could have determined population growth. The serow is currently not at risk of extinction as a species, but some local populations in western Japan are vulnerable because of potential interspecific competition with sika deer and the decrease of forest understory. In 1990s, damage by serow declined with the decrease of young plantations. On the other hand, damage on forestry and agriculture by sika deer *Cervus nippon*, wild boar *Sus scrofa*, and Japanese monkey *Macaca fuscata* has remarkably increased, and social demands for control of serow have decreased. The sika deer population has conspicuously increased throughout Japan from 1990s, and the forest undergrowth has decreased because of the grazing and browsing of the deer. About 40% of the serow range overlaps with that of sika deer. The interspecific competition with sika deer affects serow populations.

## Conservation Actions (see Appendix for additional information)

Due to a severe decline in the early 20th century, serow was excluded from 'Game Species' by the Hunting Law in 1925, and hunting of this species was prohibited. In 1934, this species was designated to be a 'Natural Monument Species' under the Law for Protection of Cultural Properties (LPCP). In 1955, its status was raised to 'Special Natural Monument Species'. Although serow hunting has been prohibited by laws since 1925, poaching pressure was high before the 1950s. An anti-poaching campaign was conducted throughout the country in 1959, and, after eliminating poaching, the serow population began to increase. The population increase was probably also due to an increase of suitable habitat in the form of young coniferous plantations created from mid 1950s to 1970s. However, damage to young artificial plantations and crops also drastically increased with the serow increase. Nevertheless, any capture of serows including damage control, was not permitted until 1978, with the exception of scientific research. The management measures of this species became a matter of controversy between conservationists, forest owners and/or farmers. Then the government agencies permitted to capture serows by using tranquilizer guns in 1978, but many of the captured serows died during the darting operations.

The Japanese serow is managed under two laws: LPCP, and the Wildlife Protection and Hunting Law

(WPHL) which was enacted in 1963 by the revision of the Hunting Act. The executive authority of LPCP is the Agency for Cultural Affairs (AFCA), and that of WPHL is Ministry of Environment (MOE). The Forestry Agency (FA) has jurisdiction over forest management policy, which concerns damage prevention and forest use. The executing organization of the LPCP in each prefecture is Board of Education of the prefectural governments, and that of the WPHL is Wildlife Management Division, Section, or Unit of prefectural governments. In 1979, these three Agencies reached an agreement to change serow management measures, as previous management measures could no longer solve the problems mentioned above. The essential points of the new management policy were as follows.

- To establish serow protection areas. This decision meant the designation of 'Special Natural Monument Species' would be repealed and instead 'Serow Protection Areas' would be designated based on LPCP in the future.
- To allow nuisance animal control outside the serow protection areas, in cases of necessity.
- The AFCA takes administrative responsibility for preservation of serow in protected areas, the MOE for managing serow outside protected areas, and the FA for avoiding damage to young coniferous plantations by non-lethal methods such as fencing and netting.

Conservation NGOs and the majority of ecologists opposed to this policy change. However, this policy change was inevitable from the viewpoints of the serow population trends and social conditions at that time.

Three primary functions expected to the protection areas were (1) to maintain stable and viable local populations; (2) to preserve the geographical and genetic diversity of serow populations; and (3) to establish a management system for the serow and its habitat. Of the 15 protection areas planned, 13 had been established by 1989, but the remaining two protection areas have not yet been established in Kyushu and Shikoku due to disagreements with land owners. Therefore, the Japanese serow still retains the status of 'Special Natural Monument Species'. The size of serow protection area ranges from 143km<sup>2</sup> to 2,180 km<sup>2</sup> with total area of 11,800 km<sup>2</sup>, covering about 20% of the serow range in 1983 and spanning 23 prefectures. However, in many cases, the protection areas avoid commercial forests and are situated at relatively high elevation areas including unsuitable habitats. In addition, densities of serow in most protection areas declined significantly over the last 20 years. As a result, some protection areas have not been able to maintain the minimum viable population size within them. Further expansion of each protection area faces difficulty due to social conditions e.g. land ownership. Therefore, it is necessary to conserve serow populations by integrated management of protected areas and non-protected areas, through the cooperation of the AFCA and the MOE. The AFCA initiated a systematic survey of serow management for protection areas in 1985, composed of main and supplemental survey programs. The purpose of the main survey program is to monitor population trends and habitat conditions every 6 to 8 years for each protection area. This program is carried out by survey specialists. Annual supplemental surveys are carried out by non-specialist local inhabitants using simple and easy methods to monitor population indices, habitat changes and damage. The data from both surveys are used to develop the management plan for each protection area. However, since the AFCA is neither land owner nor land manager of serow protection areas, the measures that the AFCA can implement are limited to, for example, the prohibition of serow capture, monitoring of population and habitat etc.

Control culling began in the restricted small areas of Gifu and Nagano Prefecture with tranquillizer guns only in 1978, and with shooting guns from 1979, and the culling area has expanded in central Honshu. As a matter of course, control cull is conducted outside the protection areas. The damage to conifer

plantations in central Honshu markedly decreased in 1990s, because both the area of young conifer plantations and also population density of serow in this area have reduced. The number of serows removed in a year peaked at 1334 in 1996 and has decreased to about 500 in recent years. The total number of removed serow was about 37,000 by 2016. The serow control program that has been implemented since 1978 has led to a significant decrease of density in limited areas, but the impact on the whole population has not been remarkable. Two kinds of permissions, based on LPCP and WPHL, are required for control culls of serow. The areas and periods of control, upper limit of cull number and capture methods are specified in the permits. Biological investigation of killed serow has continued since the beginning of the control. Place and date of capture, sex, age, and reproductive conditions are recorded for almost all culled individuals. In addition, studies in various fields such as ecology, morphology, pathology etc. were conducted in 1980s to 1990s. These data are used for serow management. In 1999, the WPHL was amended and the 'Specified Wildlife Management Plan System' was established. This provided legal backing to manage local populations at each prefecture level. This plan must state specific goals for the target local populations, and prescribe concrete measure for properly controlled hunting and/or culling, preventing negative influences on the population, and conserving habitats. This adaptive management system is considered to be useful and practical for management of serow outside the protection areas. Eight prefectures are implementing such plans as of 2018, although control culling has not been conducted in two prefectures from the beginning and has been discontinued in one prefecture. The management system for serow has significantly progressed during the last 40 years. While serow populations are stable or at least not at risk in most areas, the following problems negatively affect some populations.

- Reduction of undergrowth forage due to maturing conifer plantations from late 1950s to early 1980s, and abandonment of fuel wood forests, and over-grazing and/or browsing by sika deer may reduce food supply for serow and deteriorate habitat quality. In particular interspecific competition with sika deer, not only exploitation competition but also interference competition, are assumed to be an important cause of serow decline, though research concerning this matter is limited.

- Increase of unintentional serow mortality associated with sika deer and wild boar control operations and damage prevention measure might have resulted in decrease of some local population.

While the current national policy for sika deer and boar targets a 50% reduction of the population size by 2025, strict firearm control causes the use of snares and box traps as preferred methods of control. Moreover, the already few shooters are declining due to ageing. These social and political conditions in Japan place pressures to use traps and result in further worsening of the by-kill issues. The use of snare and box trap instead of guns is increasing in population control operations, and about 60% of sika deer and wild boar catches are by trapping. It is difficult to ban or strongly restrict the use of snare, under current social circumstances in Japan, but various efforts are underway to reduce by-kill. There are two issues that currently serow management is facing.

- The top priority issues requiring urgent action are to avoid serow extinction in western Honshu, Shikoku, and Kyushu, and recovery of these populations. It is necessary to clarify the feasible conservation procedures for these populations and create specific management plans for each population.

- The second issue is distribution management of serow. The serow distribution has been expanding to low altitude areas, and overlap between serow distribution and cultivated land and human residential area is increasing. In addition, it is assumed that serow densities in the areas adjacent to farmland and residential areas is relatively high, while the densities in mountainous areas decrease. These phenomena should lead to an increase of conflict between serow and humans, such as damage on agriculture, human injuries caused by serow, and destruction of house gardens.



## Credits

**Assessor(s):** Tokida, K.

**Reviewer(s):** Kishimoto, R., Koike, S. & Lovari, S.

**Authority/Authorities:** IUCN SSC Caprinae Specialist Group (wild sheep and goats)

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# Appendix

## Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
1. Forest -> 1.4. Forest - Temperate	-	Suitable	Yes
3. Shrubland -> 3.4. Shrubland - Temperate	-	Marginal	-
4. Grassland -> 4.4. Grassland - Temperate	-	Marginal	-
14. Artificial/Terrestrial -> 14.1. Artificial/Terrestrial - Arable Land	-	Marginal	-
14. Artificial/Terrestrial -> 14.2. Artificial/Terrestrial - Pastureland	-	Marginal	-
14. Artificial/Terrestrial -> 14.3. Artificial/Terrestrial - Plantations	-	Suitable	Yes

## Use and Trade

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

End Use	Local	National	International
Sport hunting/specimen collecting	Yes	Yes	Yes

## Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.1. Intentional use (species is the target)	Past, unlikely to return	-	-	Past impact
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.3. Persecution/control	Ongoing	-	-	Low impact: 3
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
6. Human intrusions & disturbance -> 6.3. Work & other activities	Ongoing	-	-	Low impact: 3
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.1. Unspecified species	Ongoing	-	-	Low impact: 3
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
8. Invasive and other problematic species, genes & diseases -> 8.2. Problematic native species/diseases -> 8.2.2. Named species (Cervus nippon)	Ongoing	-	Causing/could cause fluctuations	Low impact: 4
	Stresses:	2. Species Stresses -> 2.3. Indirect species effects		

## Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

<b>Conservation Action in Place</b>
In-place research and monitoring
Systematic monitoring scheme: Yes
In-place land/water protection
Conservation sites identified: Yes, over part of range
In-place species management
Harvest management plan: Yes

## Conservation Actions Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

<b>Conservation Action Needed</b>
3. Species management -> 3.1. Species management -> 3.1.1. Harvest management

## Additional Data Fields

<b>Distribution</b>
Continuing decline in area of occupancy (AOO): No
Extreme fluctuations in area of occupancy (AOO): No
Continuing decline in extent of occurrence (EOO): No
Extreme fluctuations in extent of occurrence (EOO): No
Continuing decline in number of locations: No
Extreme fluctuations in the number of locations: No
Lower elevation limit (m): 0
Upper elevation limit (m): 3,000
<b>Population</b>
Continuing decline of mature individuals: No
Extreme fluctuations: No
Population severely fragmented: No
Continuing decline in subpopulations: No
Extreme fluctuations in subpopulations: No
All individuals in one subpopulation: No

<b>Habitats and Ecology</b>
Continuing decline in area, extent and/or quality of habitat: Yes

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