CLARK'S NUTCRACKER - NUCIFRAGA COLUMBIANA

Clark's nutcracker is the primary seed disperser for whitebark pine (Pinus albicaulis). Whitebark pine is in decline throughout its range, due to infection by white pine blister rust (Cronartium ribicola), widespread outbreaks of mountain pine beetle, and the long-term effects of fire suppression.

Taxonomy: Kingdom: Animalia Phylum: Chordata Class: Aves Order: Passeriformes Family: Corvidae Genus: Nucifraga Species: N. columbiana

Habitat:

Biomes: Clark's Nutcrackers live in open coniferous forests in the western United States and southwestern Canada, at anywhere from 3,000 to 12,000 feet. Starting in early June, they become more abundant at higher elevations, in stands of shrubby whitebark or limber pine (sometimes mixed with fir, spruce, or other pines) with nearby creeks, small lakes, and moist meadows. In the fall, nutcrackers move down to lower elevations into forests of Jeffrey pine, pinyon-juniper, limber pine, southwestern white pine, bristlecone pine, ponderosa pine, or Douglas-fir, depending on which forests have the most available seeds.

Distribution:

In US: It can be seen in western North America from British Columbia and western Alberta in the north to Baja California and central New Mexico in the south. There is also a small isolated population on the peak of Cerro Potosí, elevation 3,700 metres (12,200 ft), in Nuevo León, northeast Mexico. It is mainly found in mountains at altitudes of 900–3,900 metres (3,000–12,900 ft) in conifer forest. Outside the breeding season, it may wander extensively to lower altitudes and also further east as far as Illinois (and exceptionally, Pennsylvania), particularly following any cone crop failure in its normal areas.

In Other Countries: NONE

Holistic Description: High in the mountains of the West, gray-and-black Clark's Nutcrackers swoop among wizened pine trees, flashing white in the tail and wing. They use their dagger-like bills to rip into pine cones and pull out large seeds, which they stash in a pouch under their tongue and then carry away to bury for the winter. Each birds buries tens of thousands of seeds each summer and remembers the locations of most of them. Seeds they don't retrieve play a crucial role in growing new pine forests.

Species Richness: NO SUBSPECIES

Population Dynamic: CHECK THREATS

Evolution and Systematics:

Evolution: Fossil jay from late Miocene described from distal portion of right humerus, collected near Peetz, Logan Co., CO, bears some resemblance to Clark's Nutcracker.

Systematics: Originally described in genus Corvus by Wilson, but Nucifraga soon used by Audubon. Bonaparte erected the genus Picicorvus to indicate the woodpecker-like aspects of nutcrackers, and many references in late 1800s use this name. No geographic variation described, although definitive study is lacking. Populations of nutcrackers may not be differentiated because gene flow from periodic mass irruptions swamps local adaptation.

Number of Species: NO SUBSPECIES

Number of Genera: NO SUBSPECIES

Physical Characteristics:

Size and Length: Length: 10.6-11.8 in (27-30 cm) Weight: 3.7-5.7 oz (106-161 g)

Wingspan: 18 inches

Coloration: Clark's Nutcrackers are pale gray birds with black wings. In flight, the wings show large white patches along the trailing edges (secondaries). The tail is black in the center with broad white along either side. Nutcrackers have black bills, legs, and feet.

General Body Features: Clark's Nutcrackers are the size of a jay but the shape of a crow, with short tails and rounded, crestless heads. The bill is long, straight, and sharp-tipped.

Special Features of the Body: NONE

Special Features of the Head and Sensory Organs: CHECK SPECIAL ADAPTATIONS FOR PREY. They have long, heavy, sharp bills that they use to break open cones. Many of the conifer species utilized by Clark's nutcrackers have seeds that are retained in the cone after seed ripening. By jabbing and stabbing at cones, Clark's nutcrackers break off cone scales and use their long, tweezer-like bills to extract seeds [72]. They also use their bills to push seeds into the soil one at a time.

Dentition: BEAK/LAMELLAE/GIZZARD

Special Features of the Limbs and Digits: The flight of Clark's nutcrackers is characterized as strong, bold, direct, and generally well above the forest canopy; long, pointed wings are adaptations for strong flight
Any Special Internal Anatomy: NONE
Sexual Dimorphisms: Sexes similar in appearance. Mass 106–161 g; males average 141 g, females 129 g.
Differences Between Juvenile Stage and Adult: Body plumage of juveniles buffy gray and fluffy, often with dull black or brown wings.

Behavior:

Diurnal, Nocturnal, or Crepuscular: Diurnal
Activity: Clark's Nutcrackers are gregarious birds that typically travel in small flocks, calling back and forth with far-carrying, rolling calls. When flying from tree to tree they often undulate like a woodpecker, alternately flapping and holding their wings close to their sides. They spend much of their time in summer gathering pine seeds and burying them in caches to be used later in the year. One nutcracker may fly toward another that is harvesting or digging up stored seeds and try to take over the food by pushing the bird out of the way. Clark's Nutcrackers are monogamous and pair bonds seem to last for many years, although this hasn't been studied closely enough to be certain. Courting birds fly together with fast dives and swoops, feed each other, and may hold twigs in their bills. Pairs hold nesting territories, which they may defend by locking bills and claws with intruders. They nest as early as January or February, possibly so the young will be independent by late summer, when it's time to start caching seeds. In late spring, family groups with newly fledged juveniles join together into loose flocks. The nutcrackers are almost always in groups, except while depositing or retrieving seed caches. Besides other members of their own species, they also forage with other birds and mammals, most of which defer to the dominant nutcrackers. Clark's Nutcrackers mob Red-tailed Hawks, Cooper's Hawks, Swainson's Hawks, Golden Eagles, and Great Horned Owls. They seem to play by flying wildly in high winds as well as by provoking and chasing small raptors.
Locomotion: Typically hops along ground, often turning head from side to side. Long-distance flight is above forest canopy, with strong, steady wing beats; similar in wing motion to crow. Gains lift from winds and updrafts; clocked at roughly 45 km/h.
Communication and Perception: Like other members of the crow family, the Clark's Nutcracker doesn't have any true songs, but it has a large repertoire of calls. It makes grating, metallic kraaks to maintain contact with other nutcrackers, it squalls when disturbed, and it makes a frog-like croak that may be part of pair-bonding. On the more musical end of the spectrum, family members communicate with low, melodious calls that rise in pitch.
Home Range: Nesting territory only; may be held by same pair for many years, but no data; size estimate of 1 territory was 0.85 ha. Sometimes territory vigorously defended against conspecific intruders, probably by male; other times, conspecifics are tolerated; other passerines tolerated.
Degree of Sociality: Moderately social; rarely solitary, except while making or retrieving caches. In late spring, family groups with fledged juveniles join other family groups to form loose flocks.
Level of Aggression: Frequent physical interactions; commonly expressed in "displacement." For example, one nutcracker may attempt to displace another that is harvesting seeds while perched in tree or is digging up seeds from a cache, by flying in and pushing away the "working bird." Often, aggressor succeeds immediately, but sometimes after brief struggle first bird prevails. Displaced birds at recovered caches are often smaller; could be female of pair.
Migration: Altitudinal migrant. In late spring, after their young fledge, Clark's Nutcrackers move upslope to subalpine habitats of whitebark pine and limber pine. They migrate back downslope in the fall, or earlier if the whitebark and limber pines have poor cone crops. Occasionally, when cones are especially scarce, large numbers of nutcrackers will move longer distances within or outside of their normal range. They have shown up as far away as Pennsylvania and central Ontario.

Predators:

Predators: Red-tailed Hawk, Cooper's Hawks, Prairie Falcon, Northern Goshawk, Swainson's Hawk, Golden Eagle, Great Horned Owl.
Anti-Predator Defenses: Mobs Red-tailed, Cooper's, and Swainson's (Buteo swainsoni) hawks. (1) Two nutcrackers pursued flying Red-tailed Hawk for 25 min, taking turns diving at hawk (no contact). (2) Cooper's Hawk perched in whitebark pine was soon harassed by nutcrackers and Steller's Jays; same hawk joined another in flight, and the pair was pursued by mixed mob. One hawk singled out a nutcracker and dived at it, while pursuing nutcrackers dived aggressively at hawk; hawk dived at different nutcracker, and pursuers escalated attack, and so on for nearly an hour; all birds were silent during interaction. May provoke and chase small raptors-e.g., American Kestrels (Falco sparverius) and Sharp-shinned Hawks (Accipiter striatus) for play; easily outmaneuver them in flight.

Diet and Nutrition:

Adult Diet: All year round, the staple food of a Clark Nutcracker's diet is pine seeds, either fresh or stored. The nutcracker uses its long, sharp, sturdy bill to crack open closed, unripe pine cones and remove seeds from the cone scales. It shells seeds by cracking them in its bill or by holding them in its feet and hammering them. Between September and December it stores seeds to eat later, placing 30–150 seeds in the pouch under its tongue and carrying them to a spot nearby or up to 15 miles away. It digs a trench in the soil with its bill and puts a cluster of seeds inside before covering them up again, or it pushes individual seeds into gravelly soil, pumice, or crevices in wood. During the winter and spring, it relocates caches by remembering where they lie in relation to nearby objects like rocks, logs, and trees. Nutcrackers have such good memories that they can relocate seeds more than nine months after caching them, though their accuracy declines after about six months. They don't recover all the seeds they bury, and it's estimated that for some high-elevation pines, such as whitebark pine, virtually all the trees you can see on the landscape come from seeds planted by a nutcracker. Nutcrackers use cached seeds to feed both themselves and their young. Clark's Nutcrackers also opportunistically eat insects and spiders, and small vertebrates such as other birds, ground squirrels, chipmunks, voles, toads, and carrion.
Juvenile Diet: ^^^^^^^
Special Adaptations for Getting Prey: Long, sharp, sturdy bill enables nutcracker to open unripe pine cones and remove seeds from cone scales; also enables opportunistic foraging, including probing for and seizing insects, killing small vertebrates, and feeding on carrion. Removes seeds from closed whitebark, piñon, limber, Jeffrey, and ponderosa pine cones by standing on cone, on adjacent cone, or on branch, or by gripping vertical branch tip with feet, and then jabbing bill between cone scales to loosen and tear scales to expose unripe seeds; removes pieces of unripe seed.

Reproduction:
Mode of Reproduction: Monogamous
Mating System: Apparently monogamous with potentially long-lasting pair bonds, but no data on turnover; no genetic studies of paternity. Because there is no plumage dimorphism, sex ratio difficult to determine.
Mating Season: March to April
Courtship: Courtship displays are most intense in breeding season, but also occur at other times of year. These behaviors include wild or rapid flights in quick succession: One bird flies about 200 m, and the other follows (e.g., 9 times in 1 observation), returning each time to same or nearby tree, or together they perform fast dives and swoops. May hold twig in beak while courting; courtship-feeding occurs at nest or elsewhere: One bird crouches, flutters wings, and gives persistent Courtship Begging Call; fed by mate.
Territoriality: HOME RANGE
Mating: NONE
Nest Placement: Nests are in forks of the outer branches of conifers such as pines, larches, junipers, spruces, and firs near seed stores from the previous fall. They are built on the leeward side of trees for shelter from the wind, and they are often poorly concealed. It's not known how males or females contribute toward choosing nest sites.
Nest Description: Males and females both gather nest material and build the nest in 5–8 days. They bring twigs of Douglas-fir, juniper, or incense cedar to the nest at a rate of one twig every 3–4 minutes, sometimes collecting material from 500 yards or more from the nest. While the male stands lookout on a perch, the female weaves twigs into a platform 8–13 inches across, secured to small branches on a supporting limb. She makes a cup of rotten wood pulp about 4 inches across and 3 inches deep, and lines it with dried grass, fine strips of bark, moss, or animal hair, with a layer of mineral soil on the floor.
Egg-Laying: Clutch Size: 2-6 eggs Number of Broods: 1 brood Egg Length: 1.1-1.5 in (2.9-3.7 cm) Egg Width: 0.9-1.0 in (2.2-2.5 cm) Incubation Period: 18 days Nestling Period: 20 days Egg Description: Pale greenish flecked with brown, olive, or gray.
Hatching and Incubation/Gestation: Helpless, with sparse white down and closed eyes. The insides of the bill are salmon red.
Development: Altricial: 1 newly hatched, unfed nestling weighed 7.1 g; eyes closed; sparse white down on feather tracts.
Parental Care: Brooding commences immediately after hatching, with nearly 100% attentiveness until day 10 or 11 after hatching, after which attention is limited to feeding and nest sanitation. Nestlings fed throughout altricial period, with slight increase in interval between feedings (nonsignificant) through time. Female fed nestlings on average every 117 min, male every 98 min; range about 10–140 min for both sexes.
Lifespan: The maximum recorded life span of the Clark's nutcracker is 17 years 5 months.

Conservation:
Official Federal Status: Least Concern
Special Statuses in Individual States: NONE

Threats: Clark's Nutcracker populations appear to have experienced declines between 1966 and 2015, most notably in Washington, according to the North American Breeding Bird Survey. Partners in Flight estimates a global breeding population of 230,000, with 89% living in the U.S. and 11% in Canada. The species rates and 11 out of 20 on the Continental Concern Score. It is a U.S.-Canada Stewardship species. Clark's Nutcracker is not on the 2016 State of North America's Birds' Watch List. Local declines may be due to a pine beetle epidemic and the arrival of white pine blister rust, both of which kill the whitebark pines that many nutcrackers depend on. Limber pine and southwestern white pine face similar threats, while pinyon pine is declining as people clear land for cattle. Because Clark's Nutcrackers live in fragile subalpine zones near the tops of mountains, they are one of the species most vulnerable to climate change: as temperatures warm, habitat zones are likely to shift upward in elevation, reducing the amount of subalpine habitat available on mountaintops.
Conservation Efforts: ^^^^^^
Extra Facts:

1. The Clark's Nutcracker has a special pouch under its tongue that it uses to carry seeds long distances. The nutcracker harvests seeds from pine trees and takes them away to hide them for later use.
2. The Clark's Nutcracker hides thousands and thousands of seeds each year. Laboratory studies have shown that the bird has a tremendous memory and can remember where to find most of the seeds it hides.
3. The Clark's Nutcracker feeds its nestlings pine seeds from its many winter stores (caches). Because it feeds the young on stored seeds, the nutcracker can breed as early as January or February, despite the harsh winter weather in its mountain home.
4. The Clark's Nutcracker is one of very few members of the crow family where the male incubates the eggs. In jays and crows, taking care of the eggs is for the female only. But the male nutcracker actually develops a brood patch on its chest just like the female, and takes his turn keeping the eggs warm while the female goes off to get seeds out of her caches.
5. Not only do the lives of Clark's Nutcrackers revolve around their pine seed diet, but the pines themselves have been shaped by their relationship with the nutcrackers. Whitebark pines, limber pines, Colorado pinyon pines, single-leaf pinyon pines, and southwestern white pines depend on nutcrackers to disperse their seeds. Over time this interaction has changed their seeds, their cones, and even the trees' overall shape in comparison with other pine species whose seeds are dispersed by the wind.
6. The Clark's Nutcracker tests a seed for soundness by moving it up and down in its bill while quickly opening and closing its bill, in a motion known as "bill clicking." It also chooses good seeds by color: when foraging on Colorado pinyon pines, it refuses all but dark brown seeds.
7. Ounce for ounce, the whitebark pine seeds that many Clark's Nutcrackers depend on have more calories than chocolate.
8. Clark's Nutcracker is in the crow and jay family—but the first time Captain William Clark saw one, in August of 1805, he thought it was a woodpecker. He and Meriwether Lewis collected a specimen in Idaho on their return journey a year later. Clark's Nutcracker was one of three new bird species brought back from their expedition, all of which were described by the naturalist Alexander Wilson.
9. The oldest recorded Clark's Nutcracker was at least 17 years, 5 months old when it was recaptured and rereleased during banding operations in Oregon in 1969. It had been banded in the same state in 1952.

Notable Species: NONE