



A Monitoring Challenge: Clark's Nutcracker Population Trends

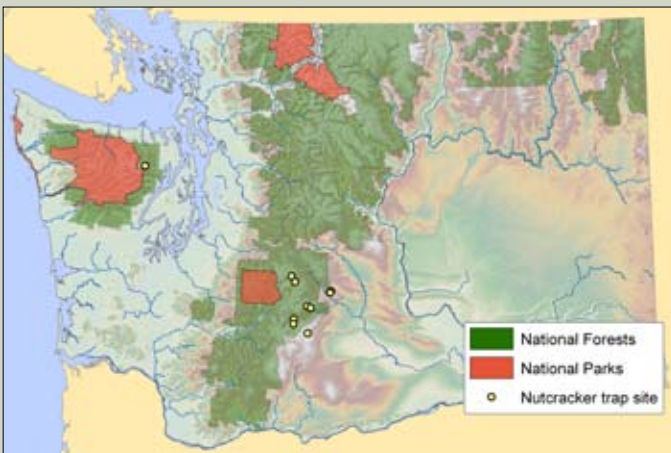
ARE CLARK'S nutcrackers declining? Many resource managers think so, yet long-term national surveys say no. Problem is, these birds are so hard to monitor. How can we improve on methods to accurately detect changes in Clark's nutcracker populations?

BACKGROUND

We investigated habitat use, caching behavior, and migratory patterns in Clark's nutcrackers in the Pacific Northwest using radio telemetry. Over 4 years (2006–2009), we captured 54 adult nutcrackers at 10 sites in the Cascade and Olympic Mountains in Washington State. We fitted nutcrackers with a back-pack style harness. The battery life on the radio tags was 450 days, and we tracked nutcrackers year-round, on foot (to obtain behavior observations) and via aircraft (to obtain point locations). We obtained more than 6,000 telemetry point locations on radio-tagged nutcrackers, and we observed more than 1,000 seed-harvest events and 655 seed-caching events.

Of nutcrackers captured in this study, we classified 20 nutcrackers as residents and 21 as emigrants wintering on our study area. Among residents, 11 had home ranges in whitebark pine stands and 9 had home ranges in ponderosa pine stands.

The future of whitebark pine is of serious concern because of the species' vulnerability to white pine blister rust, mountain pine beetle infestation, wildfires, and climate change. The Clark's nutcracker is the primary means of whitebark pine seed dispersal.



THE STUDY'S Clark's nutcracker trap sites.

What's the current status of Clark's nutcrackers?

Breeding Bird Surveys (conducted nationwide each May since 1966) show a significant range-wide increase in numbers of Clark's nutcrackers from 1966 through 2007. Christmas Bird Counts (done in December across the country since 1900) show fairly strong population fluctuations, but no overall trend (either increasing or decreasing). Data from these annual surveys (shown in the map and graph, next page) are valuable for assessing possible long-term population trends because counts are conducted over large geographic areas and long time periods.

Are Clark's nutcrackers considered an at-risk or sensitive species?

As of 2010, Clark's nutcrackers were not considered at-risk or sensitive by the U.S. Fish and Wildlife Service or by any state or province except Montana (because of concerns over habitat loss). The National Audubon Society and the IUCN rely on Breeding Bird Survey data (which show an overall increase in nutcracker trends) and, consequently, classify Clark's nutcracker as a species of least concern; they consider nutcracker populations stable or increasing.

How reliable are the surveys?

These annual bird counts have limitations for projecting population trends in Clark's nutcrackers for several reasons:

- Most routes are along established roads to facilitate access by volunteer surveyors; species occupying remote terrain, like Clark's nutcrackers, might be poorly sampled.
- Clark's nutcrackers breed in March, so May and December surveys miss breeding populations.
- Nutcrackers move around a lot in search of cones; their erratic movements may artificially inflate or deflate counts.
- Counts rely on auditory or visual cues, but nutcrackers are not territorial and, thus, are quiet and less noticeable during count periods; this can result in inaccurately low detection rates.
- Nutcrackers occupy large home ranges, so even if nutcrackers are residents of a survey area, they may not be present during a particular survey.



NUTCRACKERS ARE difficult to monitor because they occupy remote and rugged terrain and they breed in late winter at a time when no surveys are being conducted.



David Herr

LIKE CLARK'S nutcracker, the pinyon jay relies on pine seeds; however, pinyon jays are more easily monitored because they inhabit lowland areas frequented by humans. Survey data show that pinyon jay populations are rapidly declining, and they are considered an at-risk species in several western states (Balda 2002). These declines in pinyon jays suggest that we should look more closely at population trends in nutcrackers for evidence of a decline.



THESE FIVE nutcrackers were part of a larger flock of an estimated 1,000 birds that descended on our Washington study area to harvest ponderosa pine seeds in September 2009. Such flocks are wide-ranging and ever-changing, making monitoring efforts challenging at best.



Nicholas Ernst

ARE CLARK'S nutcrackers declining? Many resource managers think so. However, a cursory look at survey data shows stable or increasing populations, with only a few regional and mostly non-significant declines.

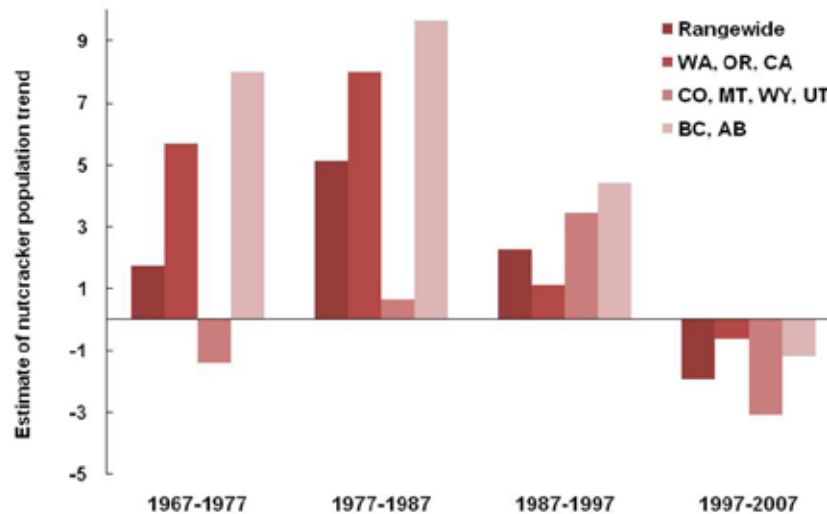
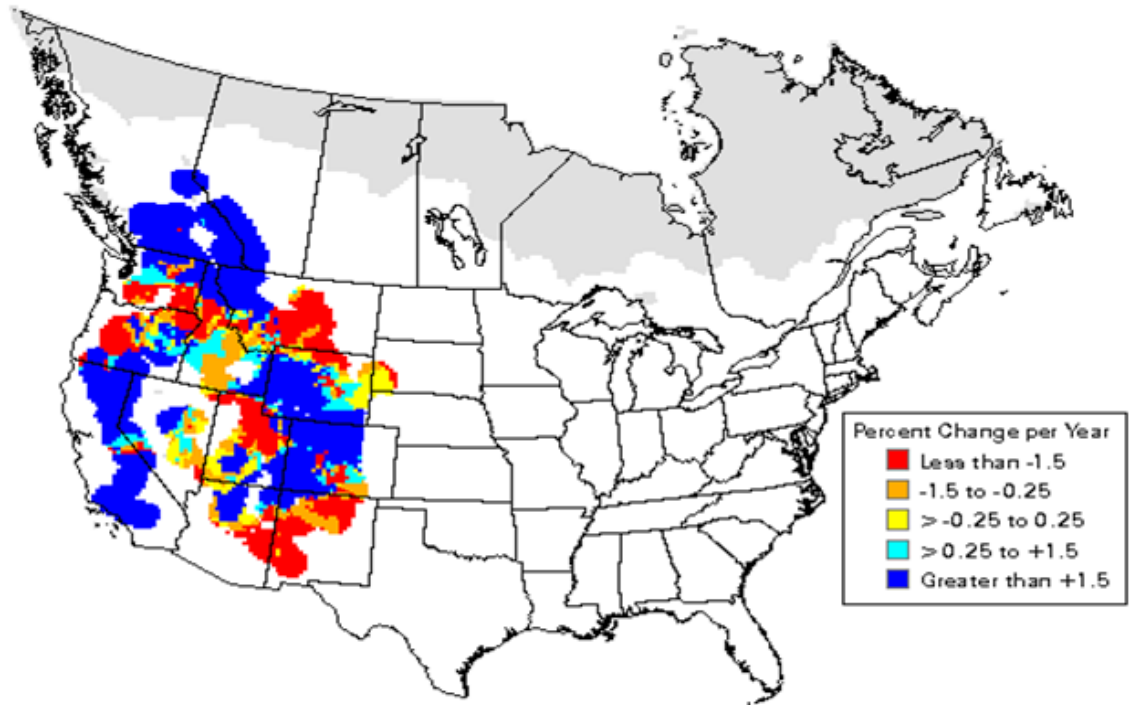
So, what if we take a closer look?

If we look just at regional trends by decade, we get a more sobering picture for Clark's nutcrackers. As the bar graph shows, for the first 3 decades of surveys (1967–1997), population trends were strongly positive, with a couple of exceptions. However, in the last decade illustrated (1997–2007), all states and provinces within the range of whitebark pine show negative nutcracker population trends. This sudden switch ominously suggests recent population declines in nutcrackers that have not yet been detected in overall national trends.

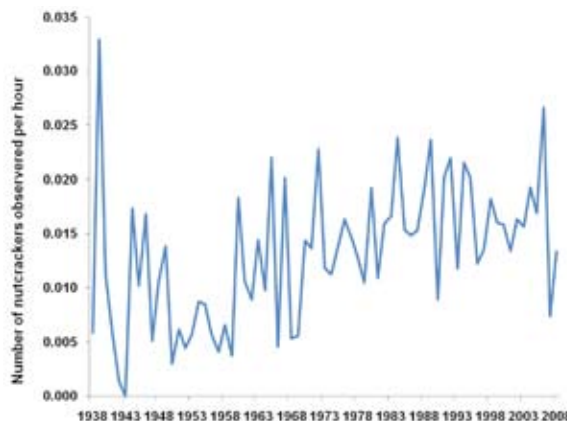
Is West Nile virus a threat to nutcracker populations?

There are no published accounts of Clark's nutcracker's susceptibility to West Nile virus (WNV) or the effects of WNV on nutcracker populations, but the Clark's nutcracker is listed as a carrier by the Centers for Disease Control. Since nutcrackers are corvids, and since corvids show high mortality rates from WNV, we can assume that WNV is a threat to Clark's nutcracker populations. However, evidence in other corvids suggests that populations can rebound from WNV-caused declines fairly rapidly. Habitat loss and declining cone production likely represent a larger threat to nutcracker populations.

THE MAP and bar graph below show trends in nutcracker abundance from 1966 through 2007 based on Breeding Bird Survey data.



THIS GRAPH shows nutcracker detections from Christmas Bird Counts from 1938 to 2009. Based on these sources, nutcracker populations appear to be stable or increasing.



THE BOTTOM LINE: MANAGER'S PERSPECTIVE

What's the best way to monitor nutcrackers?

Conventional methods

Two conventional methods are used to monitor songbirds:

Walking transect surveys—observers walk a predetermined distance and record all birds heard and seen along the way, useful for species in open habitats.

Point count surveys—observers remain stationary (multiple individual stations along a single route) and record birds within a predetermined time interval, useful for monitoring species in forested habitats (Ralph et al. 1993).

In conjunction with our telemetry study, we monitored Clark's nutcrackers at 8 sites to determine the most cost-effective, accurate method for monitoring populations. We compared detection rates among 4 survey types: transects, point counts, driving surveys, and "playback point counts" (broadcasting nutcracker calls), and have the following recommendations:

- Either transects or point counts could be used.
- For monitoring local nutcracker populations, counts should be conducted in summer.
- Playback point count surveys are useful in

increasing detections of nutcrackers in late fall (October-November).

Improving on convention

Counts should be long (minimum of 15–30 min for one transect or point count route, preferably 2+ hr) (Ralph et al. 1993).

- Survey large tracks of land (10-km transects) (Ralph et al. 1993).
- Employ distance sampling (Buckland et al. 2001) or time-to-detection methods (Farnsworth et al. 2002) for more accurate estimates of density and detectability.
- Conduct cone counts at the same sites as nutcracker surveys and weight counts by an estimate of cone production.
- Rely on long-term (10+ years) changes in detection rates to assess changes in population size.
- Collaborate with resource managers in other regions for a concerted, large-scale, united monitoring program.
- Include lowland conifer forests in surveys for nutcrackers—in addition to high-elevation whitebark pine forests—because, in many regions, nutcrackers spend much of the year in these lower-elevation forests.

Monitoring nutcrackers: A cautionary note

Nutcrackers rely on conifer cones, which are an unpredictable and ephemeral food supply. As such, they are exceptionally difficult to accurately monitor at small scales because of their dramatic, irregular ("irruptive") migrations—in addition to the difficulties with monitoring protocols mentioned earlier. Balda (2002) cogently summarized the problem when describing a monitoring program for the pinyon jay (a close relative of Clark's nutcracker):

"Conventional methods for censusing . . . are doomed to fail because the birds have large home ranges, range widely throughout these areas, and are always united in a flock. . . finding a flock is often like finding the proverbial needle in a haystack."

FURTHER READING

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Breeding Bird Survey data. <http://www.pwrc.usgs.gov/BBS/>.

Christmas Bird Count data. <http://www.audubon.org/Bird/cbc/>.

FOR FURTHER INFORMATION

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