

Merlin Tuttle's Bat Conservation

# Addressing WNS and COVID-19 Exposure in North American Bats

Suggestions for Improvement

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## **Background**

We applaud the Herculean efforts of regulatory agencies who protect bats and the humans who work with them. Nevertheless, current policies to protect bats and bat workers from WNS and COVID-19, have proven prohibitively costly, largely unenforceable, and ineffective due to inconsistent application. At a time when conservation workshop training and public education opportunities are most needed have been greatly reduced.

Current policies were developed to address an emergency created by the sudden deaths of millions of American bats due to a mysterious pathogen of unknown origin. Because WNS was assumed to be spread by humans, policies were developed to protect bats by limiting human contact and access to caves. With the emergence of SARS-CoV-2, the same protocols are being implemented with the addition of masks. These measures failed to prevent the spread of WNS and are unnecessary for SARS-CoV-2.

Cave closures were unenforceable, as were requirements for protective equipment, such as N95 face masks and gloves, or mandated decontamination of equipment used by cavers and bat researchers. Even rare permit violations can render pathogen halting impossible, and permit holders are only a tiny fraction among the thousands of uninformed humans who annually contact bats.

WNS continues to spread across North America. Already established in the environment, bats are the primary spreaders of the fungus (Meierhofer et al., 2021).

## **Current Policies**

COVID-19 – Most requirements to protect against the spread of SARS-CoV-2, the coronavirus that causes COVID-19, began as vague recommendations. The first [memorandum](#), issued by the U.S. Fish and Wildlife Service Director on June 12, 2020, contained no guidance for working with bats. It directed inquiries to the Center for Disease Control [webpage](#) where bats weren't even mentioned. The memorandum advised that each region be responsible for coordinating with state wildlife agencies to provide guidance. The [IUCN SSC Bat Specialist Group](#) (Botto Nuñez et al., 2020) suggested the use of face masks, gloves, and decontaminants to

reduce risk and referred to the USGS for additional risk evaluation [in North America](#) (Runge et al., 2020). These vague [recommendations](#) resulted in inconsistently enforced policies that have hindered needed research and conservation. Additionally, many government agencies in the U.S. rely on the FWS decontamination protocol for WNS to also protect against COVID-19.

WNS – The fungus, *Pseudogymnoascus destructans*, that causes WNS, has been present in North America for at least 15 years. Guidelines from the [WNS response team](#) are widely available and have been periodically reviewed and updated since 2012. The first [FWS management report](#) was published in 2009 (Szymanski et al., 2009), followed by a national [WNS implementation plan](#) for 2011-2015 led by the White Nose Syndrome Response Team (US Fish & Wildlife Service, 2011). The team's [webpage](#) is the primary resource where [Decontamination Protocol](#) is explained (White-nose Syndrome Management Working Group, 2020). Guidelines are available for bat rehabilitation, forest management, woodland owners, transportation infrastructure, show caves, etc. The latter recommends reliance on the public to truthfully answer screening questions before being permitted entry into tour caves (White-nose Syndrome Disease Management Working Group, 2019).

## SARS-CoV-2 Risks in Bats

Though COVID-19, is spreading rapidly in other widespread mammals (Chandler et al., 2021; Fagre et al., 2021; Goldberg et al., n.d.; Qiu et al., 2023) it has not been isolated from a bat despite intense international investigation. When big brown bats (*Eptesicus fuscus*) were deliberately inoculated in lab experiments, no evidence of infection or viral excretion was found. (Hall et al., 2020). When Mexican free-tailed bats (*Tadarida brasiliensis*) were inoculated with SARS-CoV-2, no clinical signs of disease were detected, though five of ten became infected. Further, the infected bats failed to transmit the virus to uninoculated roost mates. Thus, transmission was determined to be unlikely (Hall et al., 2020).

Currently, there are 109 independent spillover events with SARS-CoV-2 from people to white-tailed deer (*Odocoileus virginianus*) (Feng et al., 2023). The virus has jumped back into people from white-tailed deer in at least three potential cases (Feng et al., 2023). This poses an immediate risk to public health, yet hunting and recreation continues, highlighting inequities between policies involving bats vs other mammals.

Based on a molecular simulation model, and binding of the SARS-CoV-2 spike protein in lab experiments, little brown bats (*Myotis lucifugus*) have been speculated to be potentially susceptible (Chothe et al., 2023). However, there is no evidence yet that susceptibility would result in serious illness or potential transmission (Chothe et al., 2023).

It is impossible to predict if or when SARS-CoV-2 will mutate and jump from humans into bats and back again, like it did with mink (Sharun et al., 2021). Since the devastation of the 1918 Spanish flu (Martini et al., 2019), we have been anticipating the zoonotic transmission of avian influenza, and yet it was swine flu in 2009 that struck first (Coburn et al., 2009). All we can do is remain vigilant but not obsess over it.

Worldwide, out of all taxonomic vertebrate orders, bats are the primary focus for viral research (Chomel et al., 2022; López-Baucells et al., 2023; M. D. Tuttle, 2017; Warmuth et al., 2023). This bias often shifts the focus away from the true sources of the problem and delays countermeasures. Despite all the attention bats receive, SARS-CoV-2 has yet to be detected in wild populations.

## **White-Nose Syndrome Risks in Bats**

Over the past 15 years, WNS has rapidly crossed the continent despite cave closures and the required use of face masks, gloves, and decontaminants (Canadian Wildlife Health Cooperative, 2023). Millions of North American bats have been killed (Hoyt et al., 2021).

WNS is widely assumed to have arrived via a person who inadvertently carried the causative fungus from a cave in Eurasia to one in New York (Magnino et al., 2021). Nevertheless, bats themselves travel in populations far greater than do bat-workers and they practice much closer associations with each other. Moreover, bats unpreventably cross the Atlantic and Pacific oceans in shipping containers (Constantine & Blehert, 2009), and it is not surprising that the first-noticed infections were seen in a tour cave just 350 miles from the Lower Bay, NY, port of entry.

However, some populations of highly susceptible species are showing signs of survival (Dobony & Johnson, 2018; Kaarakka, 2022; Reichard et al., 2014; Townsend, 2023 [unpublished data]; Melinchuk, 2019 [pers.comm.]) and/or rapid recovery not attributable to genetics or evolving resistance (Lilley et al., 2020).

Bats that are surviving WNS infection either gain more or lose less energy prior or during hibernation. We still do not fully understand all the mechanisms involved that allow them to survive. There is no evidence that WNS can be stopped or slowed by policies thus far implemented. Available information suggests that habitat protection and/or enhancement is the most likely course for achieving success.

Future policies on WNS should focus on bat recovery, rather than on stopping spread.

## Recommended Policies

1. Require rabies pre-exposure vaccination and recommend COVID vaccination for anyone who handles bats. Never risk bites from bats that are grounded or otherwise showing potential signs of illness.
2. Two, poorly fitting gloves, or heavier gloves increase injuries to bats. Where gloves are needed, use preferably the thinnest, tightest fitting option available (either latex or very light weight leather) should be used.
3. Discontinue current face mask and failed decontamination requirements, as they are inconsistently applied and are more performative than functional.
4. Discontinue general closure of caves not essential for bats or other protected biota, or unique speleothems. Where feasible, permit exploration and research at times when caves are not needed by bats (June and July in most hibernation caves, December and January in most summer caves).
5. Limit winter surveys in hibernation caves to once every 3-5 years, protecting sites of both current and past use. Any winter research or photography permitted should be of minimal duration, coordinated to occur simultaneously with scheduled status surveys, and should be needed to promote bat conservation and population recovery.

## Closing Remarks

Existing restrictions have failed to stop, or even slow WNS and bats in North America are highly resistant to SARS-CoV-2 while other wildlife are a current public risk. Public disease-spreading activities far exceed those of researchers and cannot be controlled with current policies which were created inequitably and enforced inconsistently. It is impossible to halt the movement of goods via shipping or prevent uninformed humans from interaction with bats.

Current policies are also cost prohibitive and time consuming, harming field research, training workshops, and public education which has never been more needed. They also reduce essential volunteer assistance formerly provided by organized caving groups. Speculation used to justify restrictions directly harms bats by fostering fear and intolerance (Fenton et al., 2020; Lu et al., 2021).

Throughout history, humans have lived in close association with bats, but there are no records of pandemic disease transmission either to or from bats (Tuttle, 2020; [Tuttle, 2017](#)). For more than 50 years, simple, prophylactic rabies vaccination has provided effective protection for bat researchers with outreach and education informing the public not to handle bats.

There is little more we can do now beyond helping bat populations to recover from WNS by restoring and protecting essential habitats.

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