Statement on **COVID-19 Considerations for Wildlife Rehabilitation**

The International Wildlife Rehabilitation Council (IWRC) and National Wildlife Rehabilitators Association (NWRA) recognize concerns that have been raised regarding the possible spread of SARS-CoV-2 to wild animals from humans. However, our organizations believe that this potential zooanthroponosis should not prevent professional wildlife rehabilitators from ensuring appropriate care for wildlife.

NWRA and IWRC take the position that taxa-specific protocols, based on scientific evidence and region-specific risk assessments, should serve as the basis for an informed approach to managing the risk of disease spread and for formulating any restrictions on wildlife rehabilitation.

Wildlife agencies and the public rely on the services of wildlife rehabilitators. Rehabilitators provide public education on handling conflicts with wildlife; mitigate the potential for unnecessary human/wildlife interaction; care for sick, injured, or orphaned wild animals found by members of the public; and preserve public health and safety. Ensuring wildlife is cared for by professional rehabilitators is the best way to keep the public and wildlife safe. Wildlife rehabilitators must work with veterinary supervision, follow husbandry and safety standards[1], and have facilities that ensure appropriate biosecurity standards are met. When wildlife rehabilitation services are unavailable, the public will resort to taking possession of wildlife inappropriately. Members of the public are not skilled in safe handling of wildlife, biosecurity measures, or zoonotic disease prevention and are at high risk of physical injury or zoonotic disease transmission (e.g., rabies). Taking animals needing rehabilitation into private homes may result in a wild animal interacting with a greater number of individuals, including children and domestic species, than it would in a professional rehabilitation setting. Public possession of many wildlife species is illegal; well-intentioned members of the public that take in wildlife may be reticent to disclose possession of wildlife, making it more difficult to trace the potential spread of disease.

Unskilled wildlife care is detrimental to animal welfare. Wild animals kept in unsuitable conditions in domestic settings will be highly stressed and likely experiencing pain and suffering from medical issues that have not been evaluated and treated. Stress compromises immune system function and reduces their ability to recover from illness/injury, leaving them more susceptible to infections. When combined with a lack of biosecurity measures, these circumstances have the potential to increase the risk of SARS-CoV-2 transmission between humans and wild animals.

Scientific data regarding transmission of SARS-CoV-2 to wildlife will continue to emerge, and wildlife rehabilitators, in conjunction with their veterinarians, will remain informed on this topic.

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The theoretical concerns are that the virus could pass from humans into wild animal populations[2], resulting in (a) naive wildlife becoming infected with a novel virus, which could decimate wild populations and (b) wildlife serving as a reservoir for the virus, potentially posing a risk for future human re-infection. These are worst-case scenarios; region-specific risk assessments should carefully weigh these theoretical risks against the very real risks to the public and animal welfare as noted above. Rehabilitators and veterinarians should closely follow scientific developments to determine whether these concerns are borne out or not and adapt biosecurity protocols accordingly.

At the moment, felids and mustelids are the taxa of key concern[2] as SARS-Cov-2 has been reported in zoo tigers and farmed mink, as well as some domestic pets.[3] Suspected mink-to-human transmission has been reported on mink farms with poor biosecurity measures[4–6]. While some studies report human-to-cat and cat-to-cat transmission, the infection rate and virulence appear to be low[7–10]. In addition, as of 01 June only six confirmed cases in animals in the US have been reported by the USDA[11]. Bats have been identified as a possible source of the virus (via an intermediate host), and bats are known to be carriers of many other coronaviruses, but there is no evidence of any bat in North America being infected by SARS-Cov2[12]. A recent predictive model indicates that ruminating ungulates and certain rodents may also be at high risk for SARS-CoV-2 infection via the ACE2 receptor[13]. Because there is still scant scientific information on SARS-CoV-2 prevalence and COVID-19 transmission in wild animal populations, wildlife rehabilitators should implement additional biosecurity measures when working with mammals in areas with COVID-19; extra precautions should be taken with at-risk taxa (currently believed to be felids and mustelids) and threatened or endangered species.

Local wildlife agencies may, as a precaution for populations at large, choose to impose a delay in returning rehabilitated mammals to the wild for a defined period of time. If this course is taken, we again encourage a targeted, evidence-based approach for specific at-risk taxa; a general moratorium on releasing any rehabilitated mammals will rapidly cause wildlife rehabilitators to reach capacity and greatly hamper their ability to provide critical services to protect animal welfare and public health. Local wildlife agencies should work with wildlife rehabilitators to provide evidence-based criteria for clearing at-risk species for release as quickly as possible. Many wildlife rehabilitation facilities have initial quarantine procedures in place for newly admitted patients, particularly rabies-vector species (RVS), as well as strict biosecurity protocols that can help to inform release criteria development.

With regard to non-mammalian species, Lam *et al*, (2020) explicitly states "*Our results suggest that SARS-CoV-2 can infect a broad range of mammals—but not fish, birds or reptiles—which could serve as reservoirs of the virus, necessitating careful ongoing animal management and surveillance.*"[14] Further evidence supports the theory that birds[15] and reptiles[16] should not be of concern; rehabilitation and return to the wild of these taxa should not be restricted.

As always, wildlife rehabilitators must follow requirements mandated by permitting agencies and veterinarians of record, which include biosecurity protocols. In addition, wildlife rehabilitators should follow relevant recommendations for personal protective equipment and disinfection

established by the World Health Organization (WHO) and the Center for Disease Control and Prevention (CDC) to reduce the potential spread of transmissible diseases.

IWRC and NWRA believe an evidence-based approach to mitigate risk is a practicable way to continue to provide wild animals the assistance they need without compromising their welfare as individuals or populations. The development of taxa-specific protocols, based on region-specific risk assessments, manages the risk of further disease spread, while allowing the unrestricted rehabilitation of taxa that are not deemed to present a risk.

Resources:
https://www.aza.org/taxon-advisory-groups
https://www.aza.org/list-of-taxon-advisory-groups
https://zahp.aza.org/covid-19-animal-care/
OIE COVID-19

References:

1. Miller EA, editor. Minimum Standards of Wildlife Rehabilitation. 4th ed. IWRC and NWRA; 2012.

2. Gryseels S, De Bruyn L, Gyselings R, Calvignac-Spencer S, Leendertz F, Leirs H. Risk of Human-to-Wildlife Transmission of SARS-CoV-2. BIOLOGY. 2020. https://www.preprints.org/manuscript/202005.0141/v1. doi:10.20944/preprints202005.0141.v1

3. Questions and Answers on the COVID-19: OIE - World Organisation for Animal Health. [accessed 2020 May 20]. https://www.oie.int/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/

4. COVID-19 update (209): Netherlands (NB) farmed mink, animal-to-human, cat, epid. ProMED International Society for Infectious Diseases. 2020 May 25 [accessed 2020 Jun 4]. https://promedmail.org/promed-post/?id=20200525.7375359

5. Oreshkova N, Molenaar R-J, Vreman S, Harders F, Oude Munnink BB, Hakze R, Gerhards N, Tolsma P, Bouwstra R, Sikkema R, et al. SARS-CoV2 infection in farmed mink, Netherlands, April 2020. bioRxiv. 2020 [accessed 2020 Jun 4]:2020.05.18.101493. https://www.biorxiv.org/content/10.1101/2020.05.18.101493v1. doi:10.1101/2020.05.18.101493

6. OIE Wildlife Working Group. 7th Call OIE ad hoc group on COVID-19 at the animal-human interface [Meeting Minutes]. 2020. https://www.oie.int/fileadmin/Home/eng/Our_scientific_expertise/docs/pdf/COV-19/7th_call_OIE-AHG_COVID19_and_animals_28.05.pdf

7. Shi J, Wen Z, Zhong G, Yang H, Wang C, Huang B, Liu R, He X, Shuai L, Sun Z, et al. Susceptibility of ferrets, cats, dogs, and other domesticated animals to SARS-coronavirus 2. Science. 2020 Apr 8. http://dx.doi.org/10.1126/science.abb7015. doi:10.1126/science.abb7015

8. Zhang Q, Zhang H, Huang K, Yang Y, Hui X, Gao J, He X, Li C, Gong W, Zhang Y, et al. SARS-CoV-2 neutralizing serum antibodies in cats: a serological investigation. bioRxiv. 2020 [accessed 2020 May 20]:2020.04.01.021196. https://www.biorxiv.org/content/10.1101/2020.04.01.021196v1. doi:10.1101/2020.04.01.021196

9. Temmam S, Barbarino A, Maso D, Behillil S, Enouf V, Huon C, Jaraud A, Chevallier L, Backovic M, Pérot P, et al. Absence of SARS-CoV-2 infection in cats and dogs in close contact with a cluster of COVID-19 patients in a veterinary campus. bioRxiv. 2020 [accessed 2020 May 20]:2020.04.07.029090. https://www.biorxiv.org/content/10.1101/2020.04.07.029090v1. doi:10.1101/2020.04.07.029090

10. Halfmann PJ, Hatta M, Chiba S, Maemura T, Fan S, Takeda M, Kinoshita N, Hattori S-I, Sakai-Tagawa Y, Iwatsuki-Horimoto K, et al. Transmission of SARS-CoV-2 in Domestic Cats. The New England journal of medicine. 2020 May 13. http://dx.doi.org/10.1056/NEJMc2013400. doi:10.1056/NEJMc2013400

11. USDA APHIS | Confirmed cases of SARS-CoV-2 in Animals in the United States. [accessed 2020 June 04]. https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/sa_one_health/sars-cov-2-animals-us

12. Findings in animals. Questions and Answers on the COVID-19: OIE - World Organisation for Animal Health. [accessed 2020 Jun 3]. https://www.oie.int/en/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/

13. Damas J, Hughes GM, Keough KC, Painter CA, Persky NS, Corbo M, Hiller M, Koepfli K-P, Pfenning AR, Zhao H, et al. Broad Host Range of SARS-CoV-2 Predicted by Comparative and Structural Analysis of ACE2 in Vertebrates. bioRxiv. 2020 [accessed 2020 May 20]:2020.04.16.045302. https://www.biorxiv.org/content/10.1101/2020.04.16.045302v1. doi:10.1101/2020.04.16.045302

14. Lam SD, Bordin N, Waman VP, Scholes HM, Ashford P, Sen N, van Dorp L, Rauer C, Dawson NL, Pang CSM, et al. SARS-CoV-2 spike protein predicted to form stable complexes with host receptor protein orthologues from mammals, but not fish, birds or reptiles. bioRxiv. 2020 [accessed 2020 May 20]:2020.05.01.072371. https://www.biorxiv.org/content/10.1101/2020.05.01.072371v1.abstract. doi:10.1101/2020.05.01.072371

15. Wu C, Zheng M, Yang Y, Li M, Liu Y, Zhang P, Wang Y, Wang Q, Xu Y, Chen L, et al. In Silico Analysis of Intermediate Hosts and Susceptible Animals of SARS-CoV-2. 2020. https://chemrxiv.org/articles/In_Silico_Analysis_of_Intermediate_Hosts_and_Susceptible_Animals_of_SARS-CoV-2/12057996. doi:10.26434/chemrxiv.12057996.v1

16. Luan J, Jin X, Lu Y, Zhang L. SARS-CoV-2 spike protein favors ACE2 from Bovidae and Cricetidae. Journal of medical virology. 2020 Apr 1. http://dx.doi.org/10.1002/jmv.25817. doi:10.1002/jmv.25817