**WILD HOPE 3.0: Bat Vax**

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|  | **TIMECODE** | **VIDEO** | **AUDIO** |
|  | 01:00:09:08 | B-roll of Fort Laramie National Historic Site | **TONIE ROCKE**  We're at Fort Laramie in Wyoming, one of our study sites for bats affected by White-nose Syndrome. |
|  | 01:00:16:17 | Aerials of Fort Laramie National Historic Site | **TONIE ROCKE**  We were looking for sites that were sort of on the leading edge of the outbreak as it's moving west. So that's where we want to be conducting an experiment. |
|  | 01:00:26:10 | Close ups of bats during the vaccination process | **TONIE ROCKE**  We're happy to see feisty ones, but sometimes they're a little harder to administer the vaccine to. |
|  | 01:00:32:14 | Vaccination b-roll and Tonie OTF | **TONIE ROCKE**  If vaccination is shown to improve survival of bats, we hope it can be put to use quickly. |
|  | 01:00:38:12 | Shots of bats flying away | **TONIE ROCKE**  We just want to solve this problem. |
|  | 01:00:40:03 | **GRAPHIC TITLE**  WILD HOPE:  Bat Vax | [WINGS FLAPPING] |
|  | 01:00:47:07  01:00:58:00 | **LOWER THIRD** Dr. Tonie Rocke  Research Epidemiologist, National Wildlife Health Center | **TONIE ROCKE**  My whole career has been centered around wildlife health issues. I started working on botulism in waterfowl. I worked on plague in prairie dogs and black-footed ferrets.  **NARRATOR**  **FOR DECADES, TONIE ROCKE HAS BEEN ON THE FRONTLINES, WORKING TO PROTECT WILDLIFE FROM DISEASE.**  And then White-nose Syndrome became a big issue. |
|  | 01:01:08:15 | B-roll of scientist entering cave and bats along cave walls | **NARRATOR**  **WHITE-NOSE SYNDROME, AND THE INVASIVE FUNGUS THAT CAUSES IT, THREATENS CREATURES ACROSS NORTH AMERICA.**  **CREATURES THAT OFTEN LIVE IN THE SHADOWS.**  **BATS.**  **AND IT’S TARGETING THEM WHERE THEY SLEEP.** |
|  | 01:01:22:16 | Tonie on camera | **TONIE ROCKE**  It's been surprising to us how quickly this fungus is spreading from cave to cave. |
|  | 01:01:28:02 | Tonie and Ellen get out of a car and start setting up bat traps | **NARRATOR**  **THE FAST-MOVING DISEASE HAS PUT SCIENTISTS ON THE BACK FOOT—TRYING TO PREVENT MASS EXTINCTION OF CRITICAL BAT SPECIES.**  **TONIE IS ONE OF THE SCIENTISTS LEADING AN AMBITIOUS EFFORT TO TEST A BREAKTHROUGH VACCINE THAT COULD GIVE THE BATS A FIGHTING CHANCE.** |
|  | 01:01:46:20 | Montage of bat species and different bat behaviors | **TONIE ROCKE**  Bats are so remarkable because of their unique behaviors and traits.  [WINGS FLAPPING]  They're the only mammal capable of true flight. They also use echolocation. It basically allows them to see using sound. They can live more than 30 years despite the small size of some of them. They're quite amazing.  [WINGS FLAPPING] |
|  | 01:02:10:02 | Frenzy of bats taking flight | **NARRATOR**  **LOSING THESE UNIQUE CREATURES COULD HAVE DEVASTATING CONSEQUENCES ACROSS THE CONTINENT.**  [WINGS FLAPPING] |
|  | 01:02:16:10 | **LOWER THIRD** Dr. Michelle Verant  Wildlife Veterinarian National Park Service | **MICHELLE VERANT**  Bats play a lot of really important roles in our ecosystem. And if we lose bats, that could have a ripple effect for all the different species that rely on bats for food, for nutrients, for pollinating plants, and for pest control. |
|  | 01:02:31:10 | B-roll of bats flying through the sky | [WINGS FLAPPING]  [BATS CHIRPING]  **NARRATOR**  **SOME BATS DEVOUR UP TO HALF THEIR BODY WEIGHT IN BUGS EVERY NIGHT—A CRITICAL ECOSYSTEM SERVICE, AND ONE THAT BENEFITS US HUMANS AS WELL.**  [BATS CHIRPING] |
|  | 01:02:42:10 | A bat flies across the screen with a bug in its mouth | **MICHELLE VERANT**  These insects can destroy crops and can also transfer diseases to us. |
|  | 01:02:48:05 | B-roll of a crop field, cut to bugs eating crops and planes spraying pesticides on farms | [PLANE ENGINE ROARING]  **NARRATOR**  **WITHOUT BATS, FARMERS WILL OFTEN USE MORE INSECTICIDES, WHICH DRIVES UP COSTS, AND POTENTIALLY EXPOSES NEARBY COMMUNITIES TO HIGHER HEALTH RISKS.**  **IN FACT, ONE RECENT STUDY LINKED INCREASED PESTICIDE USE IN AREAS HARDEST HIT BY WHITE-NOSE SYNDROME WITH AN 8% RISE IN INFANT MORTALITY!** |
|  | 01:03:11:05 | Close up of bats in a cave | **NARRATOR**  **THE DEADLY FUNGUS IS A RECENT ARRIVAL IN NORTH AMERICA—AND WAS LIKELY INTRODUCED FROM EUROPE BY PEOPLE VISITING CAVES.** |
|  | 01:03:19:13 | Tonie on camera  Tonie on camera and cut to bats in a cave | **TONIE ROCKE**  White-nose Syndrome was first detected in bats in New York State in 2006, and it has become one of the worst wildlife disease outbreaks in modern time, killing millions of bats. |
|  | 01:03:30:22 | Scientists collect samples from bats | **NARRATOR**  **IT ATTACKS THE BATS WHEN THEY GATHER TO HIBERNATE THROUGH THE WINTER.** |
|  | 01:03:35:00 | Bats in caves | **TONIE ROCKE**  It's a cold loving fungus. It grows on sleeping bats. They have no natural defenses against it. |
|  | 01:03:42:10 | Scientists in caves | **TONIE ROCKE**  In the caves where bats are acquiring the disease, there's millions of spores, probably billions of fungal spores. |
|  | 01:03:50:20 | Bats huddled next to each other in caves | **NARRATOR**  **BATS PICK UP THE SPORES FROM THE CAVE WALLS AND SPREAD THEM THROUGH GROOMING AND CLOSE CONTACT.**  [BATS CHIRPING]  **DURING HIBERNATION, WHEN THE BATS’ METABOLISM SLOWS DOWN, THE FUNGUS INVADES THEIR SKIN, FORMING THE WHITE GROWTH ON THEIR FACES THAT GIVES THE DISEASE ITS NAME.** |
|  | 01:04:10:16 | Stills of bat wings torn from WNS | **NARRATOR**  **AS THE INFECTION GETS WORSE, IT DAMAGES THEIR DELICATE WING TISSUE TOO.** |
|  | 01:04:16:07 | Bats in caves, cut to Michelle on camera | **MICHELLE VERANT**  When this fungus invades the wing tissues, it causes them to arouse more frequently, and they burn through their fat reserves a lot quicker and that affects how their bodies function and essentially leads to a spiral of death in many cases. |
|  | 01:04:34:15 | B-roll of bats huddles together and lining cave walls | **NARRATOR**  **EVEN THOSE THAT SURVIVE CAN BE RE-EXPOSED EACH WINTER, WEAKENING THEM AND MAKING THEM LESS LIKELY TO REPRODUCE.** |
|  | 01:04:43:09 | **GRAPHIC MAP**  White-nose Syndrome spread across North America | **NARRATOR**  **WHAT BEGAN IN ONE CAVE SYSTEM HAS NOW SPREAD ACROSS FORTY U.S. STATES AND NINE CANADIAN PROVINCES.**  **AT LEAST 12 BAT SPECIES IN NORTH AMERICA HAVE BEEN AFFECTED—ALL OF THEM BATS THAT HIBERNATE.**  **SOME HAVE BEEN HIT HARDER THAN OTHERS.** |
|  | 01:05:01:04 | B-roll of Little brown bats | **TONIE ROCKE**  The little brown bat suffered terribly with over 90% of their populations declining. There's a few other species we have more concerns about, the Northern long-eared bat is one. |
|  | 01:05:11:19 | Northern Long-eared Bats b-roll | **ELLEN WHITTLE**  I think that people kind of took Northern long-eared bats for granted because they were one of the most abundant bats. No one could have predicted that kind of unprecedented levels of mortality rates of 99 to a 100 percent. |
|  | 01:05:23:13 | *Emotional moment where Ellen tears up*  **LOWER THIRD**  Ellen Whittle  Researcher, Wyoming Natural Diversity Database | **ELLEN WHITTLE**  I feel like as a scientist, we're not supposed to really like have feelings about it. I'm maybe not there yet because, sorry. <tearing up> [ELLEN SNIFFLING] I think when you get really close to a species like this, it is so sad to watch them disappear.  **NARRATOR**  **ELLEN, TONIE, AND OTHERS ARE THROWING EVERYTHING THEY HAVE INTO THE FIGHT.** |
|  | 01:05:51:19 | Scientists conduct a survey in a cave | **TONIE ROCKE**  For most wildlife diseases, we need more than one method to manage the disease. |
|  | 01:05:58:02 | Scientists exploring caves | **NARRATOR**  **WHITE-NOSE IS NO EXCEPTION.**  **ACROSS THE COUNTRY, SCIENTISTS FROM FEDERAL, STATE, AND LOCAL AGENCIES ARE JOINING FORCES.** |
|  | 01:06:06:21 | B-roll from USFWS | **TONIE ROCKE**  The U.S. Fish and Wildlife Service is the agency that leads the effort to recover species affected by White-nose Syndrome. They have brought in so many organizations to be part of this conservation effort. |
|  | 01:06:19:06 | **GRAPHIC ILLUSTRATION #2** | **NARRATOR**  **RESEARCHERS ARE EXPLORING A WIDE RANGE OF APPROACHES.**  **SOME ARE TESTING ANTIFUNGAL TREATMENTS AND UV LIGHT TO RID THE CAVES OF THE SPORES WITHOUT HARMING THE BATS.** |
|  | 01:06:32:14 | **GRAPHIC ILLUSTRATION #2 CONT.** | **NARRATOR**  **OTHERS ARE DEVELOPING PROBIOTIC SPRAYS TO INTRODUCE BENEFICIAL BACTERIA THAT CAN OUTCOMPETE THE FUNGUS ON THE BATS’ SKIN.** |
|  | 01:06:41:13 | **GRAPHIC ILLUSTRATION #2 CONT.** | **NARRATOR**  **AND TEAMS ARE EVEN PIONEERING GENE-SILENCING TECHNIQUES TO NEUTRALIZE DANGEROUS PARTS OF THE FUNGUS’ GENES.**  [WINGS FLAPPING] |
|  | 01:06:49:15 | **GRAPHIC ILLUSTRATION #2 CONT.** | **NARRATOR**  **TONIE AND *HER* TEAM’S EFFORT – THE ORAL VACCINE – IS AS EXPERIMENTAL AS IT GETS.** |
|  | 01:06:56:21 | Tonie on camera intercut with lab b-roll | **TONIE ROCKE**  Fungi are very complicated organisms, much more complicated than bacteria or viruses. In fact, even for humans, there are no approved fungal vaccines. So, it was a novel thing to think about developing a fungal vaccine, you know, for use in a bat. |
|  | 01:07:13:18 | Scientists swab bats in caves | **NARRATOR**  **FUNGAL CELLS’ SIMILARITIES TO MAMMAL CELLS MAKE IT DIFFICULT TO CREATE DRUGS THAT TARGET THE FUNGUS WITHOUT HARMING THE ANIMAL.**  **BUT THE TEAM WAS ABLE TO IDENTIFY SOME PROTEINS UNIQUE TO THE FUNGUS, AND BUILT THE VACCINE AROUND THEM.** |
|  | 01:07:30:11 | B-roll of a scientist making the vaccine in a lab | **TONIE ROCKE**  We were skeptical at first, and as were others. We had no idea what kind of protein would be protective against a fungus like this. |
|  | 01:07:41:06 | Scientists vaccinate a bat in a lab setting | **NARRATOR**  **AFTER SIX YEARS IN THE LAB, THEY GOT THE RESULTS THEY WERE LOOKING FOR.**  **THEIR VACCINE—CONSTRUCTED FROM A HARMLESS VIRUS AND HARMLESS BITS OF FUNGAL PROTEIN—TRIGGERED AN IMMUNE RESPONSE THAT GAVE THEIR CAPTIVE BATS RESISTANCE TO THE FUNGUS.** |
|  | 01:07:58:12 | Stills of bats in a lab setting | **TONIE ROCKE**  It doesn't completely prevent infection, but the disease is less severe. Hopefully, that allows them to survive through hibernation and breed and keep going. |
|  | 01:08:10:02 | Transition to stills of bats being held by gloved hands in a wild setting | **NARRATOR**  **WITH THEIR PROMISING LAB RESULTS**, **TONIE AND HER PARTNERS WERE READY TO TEST THE VACCINE ON BATS IN THE WILD.** |
|  | 01:08:18:00 | **LOWER THIRD**  Laura Beard  Bat Biologist  Wyoming Game and Fish Dept. | **LAURA BEARD**  The White-nose Syndrome National Response Team is a super collaborative effort. Tonie got on a call and said, “Hey, we need some sites that are newly infected. We’re in Wyoming because we are still kind of the leading edge of the White-nose Syndrome invasion. |
|  | 01:08:36:00 | Tonie’s team sets up nets for bat capture | **NARRATOR**  **LAST YEAR, THE TEAM CAME TO FORT LARAMIE AND TREATED 200 LITTLE BROWN BATS…**  **THEY’RE BACK NOW TO VACCINATE ANOTHER ROUND—AND SEE IF ANY OF THE VACCINATED ANIMALS FROM LAST YEAR SURVIVED THE WINTER.** |
|  | 01:08:50:01 | Bat condo and cut to Fort Laramie buildings | **TONIE ROCKE**  We're here because of the presence of this large bat condominium. It was designed to help attract the bats away from the historic buildings. |
|  | 01:08:59:17 | Shots of the bat condo | **TONIE ROCKE**  It's a really nice place to do our work. We can catch a lot of bats at one time. |
|  | 01:09:05:06 | Tonie conducts a team meeting | **TONIE ROCKE**  Our goal tonight is to try to catch up to about 200 bats. We're going to be treating about half those bats with vaccine and half with a placebo. |
|  | 01:09:15:21 | Montage of people setting up bat traps | **NARRATOR**  **TO DO THAT, THEY’VE GOT TO CATCH THE BATS AS THEY LEAVE THE ROOST.**  **SO, IT’S ALL HANDS ON DECK.** |
|  | 01:09:22:08 | Scientists set up the harp net  **LOWER THIRD**  Robert Schorr  Biologist  Colorado State University | **ROBERT SCHORR**  Because bats are so difficult to capture, we set up a square frame with fishing line that looks like a big harp. There's two of those side by side. And as bats navigate through the first one, which they can, they can't adjust quickly enough to avoid the second set and fall nicely into a bag where they can be handled. |
|  | 01:09:40:08 | Laura night OTF | **LAURA BEARD**  We want to get 'em out as quick as possible. Probably under 10 minutes from capture to release. |
|  | 01:09:47:00 | B-roll of bats at different stations | [BAT CHIRPS]  **MICHELLE VERANT**  This bat is a female. |
|  | 01:09:49:23 |  | **ROBERT SCHORR**  When we get the bats in hand, we want to find out if they're male or female, if they're older or younger, what size they are. |
|  | 01:09:57:00 | Michelle in the field giving measurements | **MICHELLE VERANT**  39.2  **SCIENTIST**  Got it.  [BAT SQUEAKING]  **MICHELLE VERANT**  This is a juvenile bat that was born this spring. |
|  | 01:10:02:05 | Michelle OTF at night | **MICHELLE VERANT**  It's really exciting to see this population continuing to reproduce even though we know they're affected by White-nose Syndrome.  **NARRATOR**  **SOME BATS SHOW CLEAR SIGNS THAT THEY’VE BEEN BATTLING THE DISEASE.** |
|  | 01:10:14:16 | Close up of bat wing | **ELLEN WHITTLE**  Do you see all the lighter colored skin? Scar tissue. That is probably from White-nose. She's healed really well.  [BAT SQUEAKING]  **NARRATOR**  **AFTER EXAMINATION, EACH BAT RECEIVES EITHER A VACCINE OR A PLACEBO.** |
|  | 01:10:26:20 | Low angle of Tonie | **TONIE ROCKE**  This is a feisty one. You're like mad, mommy. <laughs>  [TONIE LAUGHING]  Good girl. <handing off bat> |
|  | 01:10:33:03 | Rob pit tags a bat | **NARRATOR**  **THEN, EACH BAT GETS CHIPPED, SO THEY CAN BE MONITORED YEAR AFTER YEAR.** |
|  | 01:10:38:11 | Tonie on camera cut to the pit tag being placed in a bat | **TONIE ROCKE**  Just like a cat or dog gets a pit tag to identify them, we're putting those in the bats. We use that data to tell us if they're surviving and how well they're doing. |
|  | 01:10:49:21 | Rob scans a bat he just pit tagged | **NARRATOR**  **IF THE SAME BAT IS CAPTURED NEXT YEAR, THEY’LL BE ABLE TO PULL THE DATA WITH A QUICK SCAN.** |
|  | 01:10:56:08 | Tonie hero shots | **TONIE ROCKE**  Even if we only treat 150 bats tonight, I know from past work that we can see a difference between our vaccinated bats and our control bats.  **NARRATOR**  **IMMUNIZING A FEW HUNDRED BATS HERE WON’T SAFEGUARD THE ENTIRE POPULATION, BUT IT CAN HELP CONFIRM THAT THE VACCINE WORKS IN THE WILD.**  **AND SOME BATS ARE ALREADY SHOWING SIGNS OF RESILIENCE.** |
|  | 01:11:20:03 | Michelle shows a previously vaccinated female bat | **MICHELLE VERANT**  This is a female bat that we captured last year. She has a band and a pit tag. So she was vaccinated. She survived the winter and she had a pup because she was lactating  [BAT SQUEAKING]  so we can let her go. And she's off. |
|  | 01:11:38:13 | Scientists work at night | **NARRATOR**  **SO FAR, THE FORT LARAMIE TRIAL ON THE LITTLE BROWN BAT IS SHOWING GREAT PROMISE.**  **THE NEXT CHALLENGE IS FINDING A WAY TO TREAT MILLIONS MORE ACROSS THE COUNTRY.** |
|  | 01:11:49:23 | Tonie on camera to bats licking themselves | **TONIE ROCKE**  We're currently working on methods that we can apply the vaccine either by spraying bats so that they'll get coated with the vaccine and then they lick it off of themselves. |
|  | 01:12:00:16 | Tonie hero shot to Northern Long-eared bats | **NARRATOR**  **TONIE HOPES A MORE EFFICIENT VACCINATION PROTOCOL LIKE THAT WILL BE AVAILABLE SOON.**  **BUT FOR SOME OF THE MORE THREATENED SPECIES, THERE IS NO TIME TO LOSE.**  **SO EVEN THOUGH THE VACCINE IS STILL IN TRIALS, ITS ENCOURAGING RESULTS HAVE OPENED THE DOOR TO AN URGENT FIRST:**  **VACCINATING A COLONY OF *ENDANGERED* LONG-EARED BATS IN THE WILD.**  **ABOUT 200 MILES NORTH OF FORT LARAMIE, THE TEAM FINDS THEIR ELUSIVE ROOST.**  **ALT: ABOUT 322 KILOMETERS NORTH OF FT. LARAMIE, THE TEAM FINDS THEIR ELUSIVE ROOST.** |
|  | 01:12:31:05 | GoPro footage of Northern long-eared bats being vaccinated | **ELLEN WHITTLE**  We are the first group to try to vaccinate Northern Long-eared Bats. Everyone was so excited. Someone told me this is cooler than working with wolves. <laugh>  [ELLEN LAUGHING] |
|  | 01:12:40:00 |  | **ELLEN WHITTLE**  I respect Northern Long-eared Bats so much. They're very, I would say, spirited animals. They have this will to fight back and keep surviving. I'd love to give them that chance. |
|  | 01:12:51:03 | People on Congress Bridge watch bats take flight at dusk | **NARRATOR**  **THERE ARE ABOUT 150 SPECIES OF BATS IN NORTH AMERICA, AND NOT ALL ARE EQUALLY VULNERABLE TO THE DISEASE.**  **FOR THOSE HIBERNATING BATS AT RISK**,  **THESE EFFORTS—VACCINATIONS AND OTHER TREATMENTS—MAY MAKE A CRITICAL DIFFERENCE.**  **AND SOME SPECIES MAY BE DEVELOPING A NATURAL IMMUNITY ON THEIR OWN.** |
|  | 01:13:11:18 | Ellen on camera | **ELLEN WHITTLE**  We're starting to see signs that some species can bounce back. So, the story is not concluded for all bats. |
|  | 01:13:19:06 | Close up of Little Brown Bat, to Tonie, and then bats flying | **TONIE ROCKE**  I have the most hope for the Little Brown Bat. We're starting to see them recover in many places, both in the east and in the Midwest. We believe they're adapting to the disease, and that's why we suspect eventually bats in North America will eventually tolerate and be able to live with this disease. |
|  | 01:13:38:01 | Transition to the scientists in the field at Fort Laramie working at their stations | **NARRATOR**  **TO HELP THAT DAY COME MORE QUICKLY, TONIE AND HER COLLEAGUES WILL KEEP INNOVATING TO GIVE EVEN THE MOST ENDANGERED BATS A FIGHTING CHANCE AT SURVIVAL.**  [WINGS FLAPPING] |
|  | 01:13:50:17 | **END CREDITS** |  |