Red Wolf

Recovery Program

Captive red wolf, Healthcare and Education Facility
Photo credit: Becky Bartel/USFWS

4th Quarter Report

July – September 2013

Coordinator: David R. Rabon Jr., PhD
Assistant Coordinator: Becky Bartel, PhD
Field Coordinator: Art Beyer
Wildlife Biologists: Chris Lucash, Ford Mauney, Michael L. Morse
Biological Technician: Ryan Nordsven
Administrative Assistant: Vacant
Intern(s) (Caretaker): Lizzie Baxter / Kate Hankins

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The Red Wolf Recovery Program

The red wolf (*Canis rufus*) is one of the most endangered canids in the world. Once occurring throughout the eastern and south-central United States, red wolves were decimated by predator-control programs and the loss and alteration of habitats. By the 1970s, these activities had reduced the red wolf population to a small area along the Gulf coast of Texas and Louisiana. To protect the species from extinction, the U.S. Fish and Wildlife Service initiated efforts to locate and capture as many red wolves as possible for the purposes of establishing a program to breed the species in captivity and one day reintroduce the species into a portion of its former range. More than 400 canids were captured in coastal areas of Texas and Louisiana, but only 17 were identified as pure red wolves. Fourteen of these wolves would become the founding members of the captive-breeding program and the ancestors of all red wolves existing today.

The first litter of red wolves born in captivity occurred in 1977. Within a few years red wolves were successfully reproducing in captivity, allowing the U.S. Fish and Wildlife Service to consider reintroducing the species in the wild. In 1987, four male-female pairs of red wolves were released in Alligator River National Wildlife Refuge (ARNWR) in northeastern North Carolina and designated as an experimental population. Since then, the experimental population has grown and the recovery area expanded to include four national wildlife refuges, a Department of Defense bombing range, state-owned lands, and private lands, encompassing about 1.7 million acres.

Adaptive Management

The recovery and restoration of red wolves requires the careful management of eastern coyotes (*C. latrans* var.) and occasionally wolf-coyote hybrids in the red wolf recovery area. The non-native coyotes spread across North Carolina to the red wolf recovery area in the early to mid-1990s. It soon was recognized that interbreeding between red wolves and eastern coyotes would produce hybrid offspring resulting in coyote gene introgression into the wild red wolf population, and that this introgression would threaten the restoration of red wolves. An adaptive management plan was developed to reduce interbreeding and introgression while simultaneously building the red wolf population. The adaptive management plan effectively uses techniques to capture and sterilize hormonally intact coyotes via vasectomy or tubal ligation, then releases the sterile canid at its place of capture to act as a territorial "placeholder" until the animal is replaced by wild red wolves. Sterile coyotes are not capable of breeding with other coyotes, effectively limiting the growth of the coyote population, nor are they capable of interbreeding with wild red wolves, limiting hybridization events. In addition, the sterile canid will exclude other coyotes from its territory. Ultimately, the placeholder canids are replaced by the larger red wolves either naturally by displacing the coyote or via management actions (e.g., removal of the coyote followed by insertion of wild or translocated wolves). Coyotes that are captured on private property are euthanized at the landowner's request.

Currently, adaptive management efforts are making progress in reducing the threat of coyotes to the red wolf population in northeastern North Carolina. Other threats, such as habitat fragmentation, disease, and anthropogenic mortality, also are of concern in the restoration of red wolves. Efforts to reduce these threats are presently being explored.

Program Objectives

The current recovery plan (U.S. Fish and Wildlife Service, 1990) specifies the following objectives:

1) Establish and maintain at least three red wolf populations via restoration projects within the historic range of the red wolf. Each population should be numerically large enough to have the potential for allowing natural evolutionary processes to work within the species. This must be paralleled by the cooperation and assistance of at least 30 captive-breeding facilities in the United States.
2) Preserve 80% to 90% of red wolf genetic diversity for 150 years.
3) Remove threats of extinction by achieving a wild population of approximately 220 wolves and a captive population of approximately 330 wolves.

4) Maintain the red wolf into perpetuity through embryo banking and cryogenic preservation of sperm.

Northeastern North Carolina Restored Population

We estimate between 90 and 110 red wolves in the Red Wolf Recovery Area, but for the purposes of this report all population figures are comprised only of known canids (i.e., those that are regularly monitored through either a functioning radio-collar or surgically implanted abdominal radio transmitter). Additional wolves are likely present, but have not been captured/radio-collared or their continued presence otherwise confirmed.

Beginning with the first quarter of the fiscal year 2012 (FY12) we have changed the way we report population and pack numbers. This change more accurately represents the managed population of canids that are part of our efforts to restore red wolves. The managed population includes wolf packs (i.e., packs consisting entirely of wolves) and mixed packs (i.e., packs of a wolf and sterile coyote pair). A pack is defined as at least two known canids cooperatively inhabiting an established territory.

Population and Territory Status

A total of 66 known red wolves occupied the Red Wolf Recovery Area (i.e., 1.7 million acres in five counties in northeastern North Carolina) at the end of the fourth quarter of our fiscal year 2013 (FY 13). The population includes 13 wolf packs (comprised of 40 wolves and 11 breeding pairs), and 10 mixed packs (comprised of 10 wolves and 10 coyotes). An additional 16 wolves are not known to be associated with a pack.

A total of 63 sterile coyotes were monitored in the Red Wolf Recovery Area at the end of this quarter.

Pairings

There has been no change in the number of red wolf breeding pairs this quarter.

One mixed pair (wolf-coyote) was lost and two mixed pairs were formed during the quarter. The pair that was lost was due to the resident sterile female coyote being lost to contact.

Captures and Radio-Telemetry Marking

One adult male red wolf was captured and released during the quarter. An attempt has been made to pair him with a female wolf from a nearby pack.

No coyotes were captured and released during the quarter.

Dispersals

No known red wolves dispersed from their natal territories during the quarter.

Displacements

No known red wolves or coyotes were displaced from their territories during the quarter.

Mortalities

Four known red wolves (3 males, 1 female) from the Red Wolf Recovery Area are known to have died during the quarter. Two adults (1 male, 1 female) died from collisions with vehicles. One adult male and one juvenile male were killed by gunshot. The adult wolf had previously been lost to contact and was killed outside the recovery area.

No sterile, radio-collared coyotes are known to have died during the quarter.

Disappearances

The Red Wolf Recovery Program lost radio contact with one sterile, radio-collared female coyote during the quarter. A different sterile, radio-collared female coyote was relocated after having previously been lost to contact.

Pack Summaries

The Pack Summaries *section has been indefinitely discontinued due to recent events and current circumstances involving the apparent illegal take of red wolves within the Red Wolf Recovery Area.*

Species Survival Plan (SSP) Managed Population

Red Wolf Species Survival Plan (RWSSP) cooperating facilities are coordinated and managed by the RWSSP Coordinator, Will Waddell, and based at Point Defiance Zoo & Aquarium (PDZA) in Tacoma, Washington. The RWSSP is guided by a steering committee currently comprised of representation from the North Carolina Museum of Life and Science (Durham, NC), Chattanooga Arboretum and Nature Center (Chattanooga, TN), North Carolina Zoo (Asheboro, NC), Wolf Conservation Center (South Salem, NY), Miller Park Zoo (Bloomington, IL), and Western North Carolina Nature Center (Asheville, NC). The RWSSP also benefits from a volunteer advisory board in the fields of veterinary medicine (Dr. Karen Wolf, PDZA), reproduction (Dr. Karen Goodrowe Beck, PDZA), education (Craig Standridge, PDZA), population biology (Sarah Long, Lincoln Park Zoo), *in situ* population management (Dr. David Rabon, USFWS), and pathology (currently vacant). The following information is based on activities completed or conducted by the RWSSP Coordinator during the quarter reported.

RWSSP Population Status

The RWSSP coordinates 44 captive facilities (e.g., approved zoos and nature centers) throughout the United States, housing 194 wolves, ranging from pups to geriatrics, at the end of this quarter.

Breeding / Transfer Recommendations

The RWSSP Coordinator reported that a total of four wolves were transferred to three different SSP facilities.

Mortalities

Four mortalities were reported at RWSSP sites (3 adults and 1 juvenile). One adult male wolf housed at the North Carolina Zoo (Asheboro, NC) died from unknown causes (pathology report is pending) and one adult female wolf at Northeastern Wisconsin Zoo (Green Bay, WI) died from lymphoma. Two female red wolves (1 adult, 1 juvenile) at Northwest Trek (Eatonville, WA) were reported to have died during the fourth quarter from health-related issues.

SSP Facilities Updates

Three new cooperators joined the RWSSP program in the fourth quarter. Akron Zoo (Akron, OH) received two females in early July. Charles Towne Landing Historic Site (Charleston, SC) placed four female wolves on exhibit in July that had been transferred from Trevor Zoo (Millbrook, NY) in June. Binghamton Zoo (Ross Park, NY) is making arrangements to receive wolves this fall.

The Red Wolf Recovery Program received $1000 from the Knoxville Zoo (Knoxville, TN) through their Quarters for Conservation Program. The Red Wolf Recovery Program was one of six organizations that benefitted from the fundraising efforts of the zoo. We sincerely thank Knoxville Zoo for including the Red Wolf Recovery Program in their Quarters for Conservation Program.

Other Activities

The RWSSP Coordinator coordinated and facilitated the annual RWSSP meeting and husbandry manual update at Homosassa Springs State Wildlife Park (Homosassa, FL) in July. Participants from 15 RWSSP sites met over several days to discuss husbandry methods and techniques, current and ongoing red wolf research, and facility updates. The draft breeding and transfer plan document was completed and distributed.

In August, the Red Wolf Recovery Program Coordinator, Assistant Coordinator, and RWSSP Coordinator traveled to Lincoln Park Zoo (Chicago, IL) to meet with collaborators from the Alexander Center for Applied Population Biology and the Population Management Center. They discussed the different data sets for the zoo and wild populations and considered various model structures and data analyses associated with collaborative research. The research project is supported by a Conservation Committee grant awarded to the collaborators, and supported by generous contributions from PDZA, Point Defiance Zoo Society, and the Point Defiance American Association of Zoo Keepers chapter. This research project will develop baseline red wolf population viability models of both wild and zoo-based populations.

The RWSSP Coordinator also is organizing efforts to collect retrospective and contemporary data associated with another research project examining prevalence, clinicopathological, and demographic characteristics of gastro-intestinal disease (e.g. inflammatory bowel disease) in red wolves.

Island Propagation Sites

The U.S. Fish and Wildlife Service utilizes island sites to propagate red wolves and contribute to the restoration of a wild red wolf population, primarily by inserting island-born wolves into the wild population as a means to augment the wild red wolf gene pool with “under-represented” genes from the captive population. Currently, the Red Wolf Recovery Program cooperates with St. Vincent National Wildlife Refuge in maintaining a breeding pair of red wolves on an island site.

Collaborations

Research

The Red Wolf Recovery Program provided financial and in-kind support for collaborative research with scientists at other institutions, including universities, interagency divisions, and non-government research organizations. These investigations required project staff to assist outside researchers and graduate students in their efforts to better understand red wolf ecology, ecosystem function, and conservation efforts.

Project Title: Prevalence of cystic endometrial hyperplasia and its effect on reproduction in the red wolf (*Canis rufus*).
Graduate Student: n/a
Committee Chair/Principal Investigator: Kadie Anderson, DVM, and Karen Wolf, DVM, Dipl. ACZM, Point Defiance Zoo & Aquarium (PDZA)

Project Title: Inbreeding avoidance in red wolves.
Graduate Student: Kristin Brzeski (PhD student)
Committee Chair/Principal Investigator: Sabrina Taylor, PhD, Louisiana State University

* Kristin recently received a Doctoral Dissertation Improvement Grant from the National Science Foundation to examine immunocompetence and disease resistance in the wild red wolf population.

Project Title: Identifying management procedures to reduce red wolf-coyote interactions in eastern North Carolina.
Graduate Student: Joseph Hinton (PhD student)
Committee Chair/Principal Investigator: Michael Chamberlain, PhD, University of Georgia

Project Title: Use of stable isotope analysis to elucidate predation patterns of sympatric canids.
Graduate Student: Anne-Marie Hodge (MS student)
Committee Chair/Principal Investigator: Brian Arbogast, PhD, University of North Carolina at Wilmington

Project Title: Evaluating potential effects of widening US Highway 64 on red wolves, Washington, Tyrrell, and Dare Counties, North Carolina.
Graduate Student: Christine Proctor (PhD student)
Committee Chair/Principal Investigator: Michael R. Vaughan, PhD, Virginia Polytechnic Institute and State University (Virginia Tech)

Project Title: Sperm morphology and motility of the red wolf (*Canis rufus*).
Graduate Student: n/a
Committee Chair/Principal Investigators: Albrecht Schulte-Hostedde, PhD, Laurentian University, and Gabriela Mastromonaco, PhD, Toronto Zoo

Publications

The following publications have gone to print in this quarter. A complete list of publications related to red wolves can be found at http://www.fws.gov/redwolf/images/RWBibliography.pdf.

Asa, C.S., K.L. Bauman, S. Devery, M. Zordan, G.R. Camilo, S. Boutelle, and A. Moresco. 2013. Factors associated with uterine endometrial hyperplasia and pyometra in wild canids: implications for fertility. Zoo Biology [first published online DOI: 10.1002/zoo.21069]

Hinton, J.W., M.J. Chamberlain, and D.R. Rabon. 2013. Red wolf (*Canis rufus*) recovery: a review with suggestions for future research. Animals 3: 722-744.

Presentations

Brzeski, K.E., M. Chamberlain, D.R. Rabon, Jr., and S. Taylor. Major histocompatibility complex variation and its effects on fitness in the endangered red wolf (*Canis rufus*). Congress of the European Society for Evolutionary Biology, Lisbon, Portugal, (August 2013).

Staff and Volunteers

The Red Wolf Recovery Program employs eight full-time staff, including the program coordinator, assistant coordinator, field coordinator, three wildlife biologists, a biological technician, and an Administrative Assistant. The Red Wolf Recovery Program also benefits from unpaid interns (Caretakers).

Outreach

Staff from the Red Wolf Recovery Program conduct presentations and attend events to inform and educate the public on the conservation needs of the red wolf and the restoration efforts of the Red Wolf Recovery Program. As part of our effort to assist educators, red wolf “discovery boxes” that include materials about the red wolf are distributed to educational facilities. The distribution of discovery boxes is

managed by the Red Wolf Coalition. Requests for discovery boxes should be made to kwheeler@redwolves.com.

The Red Wolf Recovery Program also seeks to achieve a quality visitor and participant experience in the U.S. Fish and Wildlife Service's priority recreational uses on National Wildlife Refuges. Our outreach efforts focus on four of the six program elements, including wildlife observation, wildlife photography, environmental education, and interpretation, and are conducted frequently in partnership with ARNWR and Pocosin Lakes National Wildlife Refuge (PLNWR) educators and volunteers.

Presentations

Date	Location	Audience	Length	Attendance	Presenter
July 3	ARNWR, NC	Howling Safari	2 hrs	57	L. Baxter
July 10	ARNWR, NC	Howling Safari	2 hrs	61	L. Baxter
July 17	ARNWR, NC	Howling Safari	2 hrs	51	L. Baxter
July 24	ARNWR, NC	Howling Safari	2 hrs	64	L. Baxter
July 25	Homosassa Springs, FL	RWSSP meeting	1 hr	22	B. Bartel
August 7	ARNWR, NC	Howling Safari	2 hrs	77	L. Baxter
August 14	Chicago, IL	Lincoln Park Zoo	2 hrs	~80	D. Rabon
August 14	ARNWR, NC	Howling Safari	2 hrs	69	L. Baxter
August 21	ARNWR, NC	Howling Safari	2 hrs	98	L. Baxter/ K. Hankins
August 22	Manteo, NC	Coastal Studies Institute	3 hrs	21	B. Bartel

Website / Social Media

The Red Wolf Recovery Program has launched Facebook and Flickr internet pages. Our Facebook page connects our program with "friends" from around the world and informs them of the conservation efforts of the Red Wolf Recovery Program. The Facebook page can be found at www.facebook.com/redwolfrecoveryprogram. Our Flickr page provides a site for users to view and download high resolution pictures related to red wolves and the Red Wolf Recovery Program. Our Flickr page can be found at www.flickr.com/photos/trackthepack.

The Red Wolf Recovery Program also has a weblog that highlights the efforts of the Red Wolf Recovery Program staff in the conservation of the red wolf. The weblog combines text, images, videos, and links to other media related to its topic. The content includes educational, informational, and general journal entries written by program staff, and allows readers to leave comments in an interactive format. The weblog can be found at trackthepack.blogspot.com.

Media Inquires

The Red Wolf Recovery Program responded to numerous media inquiries during this quarter, including North Carolina State University, CNN.com, and WUNC.

Partnerships

Red Wolf Coalition

The Red Wolf Coalition (RWC), a not-for-profit education organization based in Columbia, NC, advocates for the long term survival of wild red wolf populations by teaching about red wolves and by engaging the public in red wolf conservation. The RWC's web site (www.redwolves.com) provides information about the history, biology, and ecology of red wolves, as well as news about red wolf restoration. The RWC gives red wolf programs to school groups, professional organizations, university students, and other groups. The RWC also conducts workshops for teachers and non-formal educators, including people seeking certification in environmental education.

The RWC offered multiple summer educational programs and activities at the Red Wolf Education and Healthcare Facility (Columbia, NC) including Talk Like a Red Wolf, Red Wolf 101, and Red Wolf Kids. These programs provide families or small groups interested in an introduction to red wolves, their lives and their conservation. Reservations are required for those wishing to attend an event and can be scheduled online (http://redwolves.com/program/) or by phone (252-796-5600).

The RWC Executive Director reported conducting several education programs during the quarter, including presentations to Dare County Kids, PLNWR Summer Camp, and two Tyrrell County 4-H Camps. The RWC also hosted more than 120 visitors for Pocosin Lakes Friends Group Fun Day. Additionally, the RWC participated in a Skype presentation for the Science Summer Camp in Hertford, NC, and hosted a group of eight graduate students, visiting from Germany, who are studying environmental education at East Carolina University (Greenville, NC). The RWC Executive Director is continuing to work with the students as an advisor on the development of education programs.

The RWC also has three Red Wolf Discovery Boxes for all grade levels available for educational use. These boxes are filled with a variety of hands-on items, activities and artifacts that help students explore the world of red wolves. The red wolf curriculum *Far Traveler* and a variety of books and other resources also are included. Contact Kim Wheeler at 252-796-5600 or kwheeler@redwolves.com for more information or to reserve your Red Wolf Discovery Box. Red Wolf Discovery Boxes were sent to one group this quarter.

Friends of the Red Wolf

The Friends of the Red Wolf is a non-profit organization established to support the conservation and recovery of wild red wolves. The Friends of the Red Wolf is a program affiliate of The WILD Foundation (www.wild.org), which shares its 501(c)3 non-profit status, and enables all donations to be tax-deductible as charitable contributions. Their work is informed by sound scientific research and adaptive management practices. They collaborate directly with the Red Wolf Recovery Program to help them achieve recovery goals for the red wolf. Their web site (friendsofredwolves.org) provides information about ecology of red wolves, as well as news and updates about red wolf restoration.

Announcements

There are no announcements for this quarter.