

Recovery Implementation Strategy for the Red Wolf (*Canis rufus*)



Photo Credit – Eve Turek

U.S. Fish and Wildlife Service
Region 4
Atlanta, Georgia

PURPOSE AND DISCLAIMER

The U.S. Fish and Wildlife Service (FWS) uses a three-part process to develop our recovery plans. This approach is intended to reduce the time needed to develop and implement recovery plans, increase recovery plan relevancy over a longer timeframe, and add flexibility to recovery plan implementation so we and our partners can adjust on the ground activities to new information or circumstances.

The three-part process of recovery planning for the Red Wolf includes:

1. The **Species Status Assessment** (SSA) informs the recovery plan; it describes the biology and life history needs of the species, includes analysis of each species' historical and current conditions, and includes discussion of threats and conservation needs of each species. The SSA's format is structured around the conservation biology principles of resiliency, redundancy, and representation. These principles are used to assess the species' ability to maintain populations over time (viability) (Shaffer and Stein 2000, pp. 307-310; Smith et al. 2018, entire; Wolf et al. 2015, entire). The SSA for the Red Wolf was completed in 2018 (FWS 2018).
2. The **Recovery Plan** contains a streamlined overview of the recovery strategy for the species (indicating how its recovered state (viability) will achieve redundancy, resiliency, and representation), as well as the elements required under section 4(f)(1)(B) of the Act:
 - (i) Objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list;
 - (ii) A description of such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species; and
 - (iii) Estimates of the time required and the cost to carry out those measures needed to achieve the plan's goal and to achieve intermediate steps toward that goal.

3. The **Recovery Implementation Strategy (RIS)** was developed by the Red Wolf Recovery Team and serves as an easily adaptable operational plan for stepping down the broad recovery actions (actions) identified in the recovery plan into more detailed recovery activities (activities)¹ needed to carry out the actions. The RIS focuses on how and by whom the actions may be implemented. This approach allows us to incorporate new information and adapt to changing circumstances with greater flexibility and efficiency as that information becomes available and to improve coordination with the states and other partners to achieve recovery. The RIS identifies those actions as required by section 4(f) of the Endangered Species Act (ESA) that are implemented by the recovery activities. We note, however, activities in the RIS do not replace the statutory requirement to describe site-specific management actions to the maximum extent practicable; rather, the RIS must be consistent with and contribute to implementing actions in the recovery plan and cannot add or revise actions without a recovery plan revision. Identification of an activity that can be implemented by any public or private party does not create a legal obligation beyond existing legal requirements. The RIS will focus on the period of time and scope of activities that work best for our partners to achieve recovery goals.

ACKNOWLEDGEMENTS

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See Appendix A – Red Wolf Recovery Team Members

RECOMMENDED CITATION AND ELECTRONIC AVAILABILITY

U.S. Fish and Wildlife Service. 2026. Recovery implementation strategy for Red Wolf (*Canis rufus*). U.S. Fish and Wildlife Service, Region, Atlanta, Georgia, USA. 33 pp.

An electronic copy of this RIS will be made available at: <https://ecos.fws.gov/ecp/species/37>

¹ Nothing in this RIS should be construed as a binding commitment to implement such strategies or a requirement that any Federal agency obligate or pay funds in any fiscal year in excess of appropriations made by Congress for that fiscal year in contravention of the Anti-Deficiency Act, 31 U.S.C. 1341, or any other law or regulation.

RECOVERY ACTIONS AND ACTIVITIES

Recovery Action Priority Number In Relation to Recovery Activities

The FWS assigns recovery action priority numbers (1-3) to rank recovery actions as required by the Act, as follows:

- Priority 1: An action that must be taken to prevent extinction or to prevent the species from declining irreversibly.
- Priority 2: An action that must be taken to prevent a significant decline in species population/habitat quality, or some other significant negative impact short of extinction.
- Priority 3: All other actions necessary to provide for full recovery of the species.

Recovery activities are not assigned independent priority numbers. They correspond with the recovery action priority number of their related action. (48 FR 43098).

Key Acronyms Used in the RIS

AP	Albemarle Peninsula
AZA	Association of Zoos and Aquariums
DOI	U.S. Department of the Interior
DOJ	U.S. Department of Justice
ENC RWP	Eastern North Carolina Red Wolf Population
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
PMC	Population Management Center
PVA	Population Viability Analysis
RWT	Red Wolf Team
SAFE	Saving Animals from Extinction
TEK	Tribal Ecological Knowledge
WRC	North Carolina Wildlife Resources Commission

Recovery Strategy Summary

The recovery strategy for the Red Wolf focuses on improving resiliency and redundancy and maintaining representation to meet the species' needs for viability (FWS, 2023). Specifically, the strategy seeks to expand distribution of the species in the wild, increase population abundance, maintain gene diversity long-term, and implement collaborative conservation to address species threats as well as societal values related to Red Wolf recovery (FWS, 2023). This approach recognizes that recovery requires that the species' needs for viability (multiple resilient populations, genetic diversity, and adequate numbers and habitat) be met and certain biological

targets (i.e., criteria) achieved, but that those targets would be difficult to achieve and likely cannot be met without social acceptance of and community support for the strategies and Red Wolf recovery (FWS, 2023).

We acknowledge that recovery of threatened and endangered species cannot be accomplished by a single agency or organization. FWS must work with others to be successful, and effective recovery requires participation by multiple parties, including Tribal Nations, State and Federal agencies, landowners and other community members, nongovernmental organizations (NGOs), zoological institutions and wildlife centers, and scientific researchers. Each of these parties has a role to play and unique perspectives that will make recovery of the Red Wolf possible.

Recognizing and honoring these unique contributions, we refer to these parties as contributors (FWS, 2023) and use this term under the Potential Partners column in the Table below.

Recovery Implementation Strategy

The recovery actions outlined below were identified in the recovery plan as those necessary to carry out the recovery strategy, meet the recovery criteria identified in the recovery plan, and recover the Red Wolf. Each action has been stepped down into specific activities needed to implement the prioritized recovery actions identified for the Red Wolf. Because Red Wolf recovery is dependent on collaborative conservation, the list of potential partners for most activities is long and could include entities such as State wildlife agencies, Tribes, other Federal agencies, local landowners and other community members, NGOs, SAFE and other zoological institutions and wildlife centers, scientific researchers, and corporations. In the Recovery Plan, the various parties are referred to as “contributors” due to each party’s unique role and perspective that will make Red Wolf recovery possible. To simplify the table, the partners, or contributors, that would most likely take the lead for that activity are listed. For most activities, this does not limit the ability of other contributors to participate. However, while recovery is a shared endeavor, activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved. Time estimates are based on how long until the activity is anticipated to be completed once initiated. Some activities may overlap while others may require a sequential order.

Table 1. Implementation strategy for Recovery Action 1:

Develop with State wildlife agencies criteria for and identify all potential ecologically and socially suitable reintroductions sites that could support a viable population of Red Wolves within the species' historical range. (Priority 1)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
1.1	Develop an interagency team.	Team will consist of mostly State wildlife agency and FWS representatives, but could also include other Federal agencies, Tribes, and other contributors, as appropriate.	FWS	6 months
1.2	Gather and use best scientific and commercial data available and technical expertise to identify the ecological and social criteria needed to support successful Red Wolf reintroduction, population establishment, and population viability.	Identifying variables/criteria to build models for identifying potential reintroduction sites. Ecological criteria identify habitat characteristics that will support the needs of the Red Wolf for viability. Social criteria identify important factors that can affect individual attitudes and feelings toward Red Wolves.	Interagency team	1-2 years
1.3	Gather needed data and use criteria to develop a list of potential reintroduction sites that could support the ecological and social requirements for viable Red Wolf populations.	Existing RWT, State wildlife agencies, local governments, and other agencies or organizations may be incorporated, as needed, for data gathering. Model and map potential reintroduction sites based on criteria developed in 1.2. Potential sites will likely consist of Federal, State, municipal, and private land.	Interagency team	1-2 years

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Table 2. Implementation strategy for Recovery Action 2:

Further engage State wildlife agencies and other contributors in discussions and collaborative efforts to determine locations for additional Red Wolf populations. (Priority 1)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
2.1	Engage State wildlife agencies, Tribal representatives, and other Federal agencies from identified potential Red Wolf reintroduction sites, identified in 1.3, to have initial discussions on the process behind identifying potential sites, the selection of sites, to understand the unique wildlife and landscape priorities and concerns of each group, and explore how a Red Wolf reintroduction could align with and support their conservation goals.	Engaging these contributors provides the opportunity for dialogue focused on fostering a collaborative approach to reintroducing Red Wolves in a way that respects the priorities of the agencies and Tribes while addressing the needs of the species and the landscape. Engaging these contributors early in the process of identifying potential reintroduction sites is critical to ensure their expertise is included, establishing a strong partnership, and building trust.	FWS	9 months
2.2	Engage a facilitator to support contributor engagement and enhance communication.	The facilitator may be a professional facilitator, third party neutral, or other type of facilitator like a community engagement specialist.	FWS, State wildlife agency	9-12 months
2.3	Identify additional contributors to maximize perspectives and ensure/optimize success (e.g., landowners and other community members, local special interest groups [hunters/trappers, wildlife enthusiasts], NGOs, zoological institutions, and wildlife centers, and scientific researchers).	Maximizing representation in contributor engagement will be critical to establishing trust, building true partnerships, and addressing values to obtain social acceptance and support for Red Wolf recovery.	FWS, State wildlife agency, Tribes, Federal agencies, facilitator	3-6 months
2.4	Establish county-based groups of landowners to provide input on the reintroduction of Red Wolves in their area, ensuring their concerns, priorities, and needs are integrated into the planning process and vision for the project.	This is critical to build trust, acceptance and support of a Red Wolf population. These groups would be composed of, and represent, local landowners and their interests. These groups could also be the first point of contact for questions or concerns in the area. Non-resident corporate landowners also need to be effectively engaged to be successful.	RWT	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
2.5	Work with facilitator to develop a process to co-develop with community members and other contributors a more effective and inclusive community-based collaboration format to align goals with local values, incorporate local knowledge and expertise, and empower local leadership.	Providing a process for contributor engagement and input will facilitate trust, partnerships, and address values to obtain social acceptance and support for Red Wolf recovery.	FWS, State wildlife agency, Tribes, facilitator, Federal agencies	6 months
2.6	Identify and formalize funding strategies for each population.		FWS, State wildlife agencies, Tribes, Federal agencies, NGOs	Ongoing
2.7	Finalize potential reintroduction sites.		FWS, State wildlife agency, Tribes, Federal agencies, contributors identified in 2.3	2 years

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 3. Implementation strategy for Recovery Action 3:

Increase capacity of the SAFE population to maintain a minimum of 400 Red Wolves to support establishment of wild populations of Red Wolves and maintain gene diversity. (Priority 1)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
3.1	Develop outreach resources for existing and new potential partner facilities focused on types of spaces needed, habitat specifications, and number of each type.	Types of spaces include holding, breeding, temporary holding space for Red Wolves removed from the wild due to veterinary or behavioral issues, pre-release, other.	SAFE, AZA	1 year
3.2	Identify funding sources to support construction of new spaces or expansion of existing facilities.		SAFE, AZA, FWS	7-10 years
3.3	Develop and disseminate surveys to existing partners to evaluate current space utilization and assess potential expansion opportunities.	Review survey results and space evaluations, identify type of space, determine ways to improve space usage, identify strengths of each partner, and identify growth potential.	SAFE	1-2 years
3.4	Identify and contact additional AZA and non-AZA facilities, including existing canid holding facilities (e.g., coyote, gray wolf) that do not currently house Red Wolves, to assess feasibility and interest in housing Red Wolves in the future.	Utilize AZA, ZAA, and other organizations to expand reach.	SAFE	5 years
3.5	Identify and build new holding/breeding spaces.		SAFE, FWS	7-10 years
3.6	Identify and build space for temporary holding of Red Wolves removed from the wild (due to veterinary or behavioral issues).	Identify potential partners and suitable habitat parameters, ideally in locations near each Red Wolf population.	SAFE, RWT	2 years
3.7	Identify and build multiple spaces for pre-release of sub-adults, adults or family groups.	Identify potential partners, habitat parameters, area of reasonable size and locations, ideally near each Red Wolf population, and assist with design.	SAFE, FWS	7-10 years

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 4. Implementation strategy for Recovery Action 4:

Develop controlled propagation plan for the SAFE population to optimize reproduction and reduce mortality to reach a minimum of 400 Red Wolves, and sustain a healthy population. (Priority 3)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
4.1	Continue to work with AZA's Population Management Center (PMC) to produce an annual breeding and transfer plan based on genetics, demographics, and needs for releases to existing and new Red Wolf populations.	This allows for maintenance of genetic diversity and demographic health; integrate release plans for existing and new recovery populations as they are developed to determine needed pups and adults for release.	SAFE, PMC	Ongoing
4.2	Develop strategies and protocols to increase readiness within the SAFE population for pup fostering opportunities.	Need a better understanding of timing trends for whelping in wild and SAFE populations.	FWS, SAFE	1-2 years
4.3	Identify research priorities for mortality, reproduction, husbandry, health, and nutrition.	These priorities are to be selected in the context of how they impact SAFE population viability and producing behaviorally appropriate Red Wolves for release. For example, research on mate preference to improve pair-bonding and reproductive output, and how husbandry relates to reproduction can be used to optimize reproduction in SAFE population, reducing mortality in breeding age Red Wolves within the SAFE population, and how diet affects gastrointestinal health to improve release.	SAFE	1 year
4.4	Assess genetic and reproductive limitations affecting long-term viability of the SAFE and wild Red Wolf populations.	Identify and prioritize genetic, demographic, reproductive, or health related challenges that may limit conservation of genetic variation and species integrity, and achievement of recovery goals. Determine whether existing management approaches are sufficient to address those challenges.	SAFE, FWS	1 year
4.5	Inventory and conserve Red Wolf genetic resources.	This activity may include developing and maintaining an inventory of Red Wolf genetic resources, assessing capacity for their long-term conservation, and ensuring their availability for conservation, research, assisted reproduction, and future recovery needs.	FWS, SAFE	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
4.6	Evaluate opportunities to conserve and recover Red Wolf genetic diversity.	Evaluate available genetic, genomic, taxonomic, and evolutionary information to identify opportunities for conserving or recovering underrepresented or lost Red Wolf genetic diversity and assessing their potential contribution to recovery objectives.	Scientific researchers	5 years
4.7	Assess the conservation significance of newly identified Red Wolf genetic diversity.	Assess the contribution, of confirmed Red Wolf genetic variation to genetic diversity, representation of founder lineages, population viability, adaptive potential, and recovery objectives and evaluate the functional significance.	Scientific researchers	5 years
4.8	Determine whether additional genetic management is needed to achieve recovery objectives.	Evaluate expected effects of newly identified Red Wolf genetic variation on genetic diversity, population viability, adaptation, species integrity, and long-term recovery outcomes.	FWS	1 year
4.9	Develop a framework for evaluating genetic management approaches.	Establish a science-based process for assessing potential management approaches to address identified genetic and reproductive needs (4.4). This assessment should include conservation benefits, biological necessity, feasibility, cost, risks, impacts to animal welfare, effects on genetic diversity, effects on species integrity, regulatory considerations, and likelihood of improving recovery outcomes.	FWS, SAFE	1 year
4.10	Identify and evaluate genetic management approaches.	Apply the evaluation framework (4.9) to assess available management approaches for conserving, recovering, or incorporating underrepresented, lost, or newly confirmed Red Wolf genetic diversity. Make recommendations regarding potential applications for Red Wolf recovery.	FWS, SAFE	2 years
4.11	Assess assisted reproductive and advanced genetic technologies.	Evaluate the feasibility, effectiveness, risks, and conservation value of these technologies to improve reproductive success, preserve genetic diversity, and support population management where a clearly identified conservation need exists.	SAFE, FWS	2 years

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
4.12	Develop a Red Wolf Genetics Management Plan as a component of the controlled propagation plan.	A genetics management plan is based on accepted scientific principles and procedures, and documents the scientific basis, management objectives, decision framework, evaluation criteria, approved genetic management approaches, implementation protocols, monitoring requirements, and adaptive management process for maintaining or improving the genetic health of SAFE and wild Red Wolf populations.	SAFE, FWS, PMC	1 year
4.13	Identify ideal behaviors for release and develop behavioral evaluation.	Utilize past releases and lessons learned. Assess suitability of adults for release, integrate into selection criteria for release, and test its use.	FWS, SAFE	1 year
4.14	Assess how husbandry and facility conditions affect ideal behaviors for release and success of Red Wolf releases.	Identify factors in SAFE facilities that are promoting ideal behaviors and contributing to successful releases of Red Wolves.	FWS, SAFE	7-10 years
4.15	Develop and implement management criteria that promote ideal behaviors and support release efforts.	This will include habitat and best-practices husbandry recommendations.	SAFE	1-2 years
4.16	Assess how social structure and pairing of released adults affects success of release.	Assess release of SAFE individuals, pairs, family groups, and SAFE/wild pairings. Integrate findings into selection criteria for release.	FWS	7-10 years
4.17	Identify and integrate findings from other predator release programs to assess release criteria, behavioral evaluation, and techniques for pre-release care and conditioning of adult animals.		FWS, SAFE	2 years for initial review of programs; ongoing
4.18	Assess selection criteria for release relative to success of adult releases, update selection criteria for release candidates, as needed.	Define success of releases, assess/monitor via behavioral evaluations, social structure and pairing and pup fostering.	FWS, SAFE	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
4.19	Develop process for early identification of adult individuals for release.	Ideally, selection should occur several years in advance of release so that they can experience pre-release conditioning.	SAFE, FWS, PMC	2 years
4.20	Develop, implement, and evaluate pre-release conditioning techniques for increasing successful release of adult Red Wolves.	To include opportunities for hunting prey and avoidance of vehicles and people.	FWS, SAFE	2 years

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Table 5. Implementation strategy for Recovery Action 5:

Organize and maintain Red Wolf teams (RWT) for each population to work towards recovery. (Priority 1)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
5.1	Organize RWT core group	Define participating agencies, Tribes, and other contributors. Each RWT will consist of at least FWS and State wildlife agency representatives. Each entity identifies representatives with the appropriate expertise, authority, and commitment to contribute effectively to the RWT's objective.	FWS, State wildlife agencies	1 year
5.2	Assess need to engage a facilitator to support team collaboration and enhance communication.		RWT	1 year
5.3	Convene in-person to establish the foundation for the RWT.	Meet to clearly define the team's purpose and objectives. This involves outlining the mission, goals, and expected outcomes of the collaboration to ensure all parties have a shared understanding and commitment.	RWT	5 days

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
5.4	Develop MOU, or similar document, to establish the population-specific RWT.	This shared document may include but is not limited to the scope of action the team will take, decisions the team will make, agency decision and review authority, clear communication channels and protocols, methods for information sharing, clear expectations for collaboration, roles, etc. to ensure effective and efficient collaboration.	RWT	1-2 years
5.5	Develop public interest and desire to join a large landscape reintroduction prior to any Red Wolves being released.	Continue work, as appropriate, from Activities 2.3 and 2.4. Identify and engage with contributors, particularly landowners and community members.	RWT, other Contributors	2-3 years
5.6	Develop the regulatory vehicle (10(j), Conservation Benefit Agreement, etc.) for each future reintroduction site.	The regulatory vehicle used will be determined by FWS and contributor preference, particularly the State wildlife agency and local community for that new population. Prior to the reintroduction of any Red Wolves, how “take”, as defined under the ESA, will be handled must be codified.	RWT, Contributors	6 months to 5 years

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Table 6. Implementation strategy for Recovery Action 6:

Develop and implement mechanisms for formal participation of all contributors for each population to ensure engagement of all perspectives in Red Wolf recovery. (Priority 1)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
6.1	Utilize facilitator, if needed, to co-develop and implement with community members and other contributors an effective approach for contributor engagement and input for each Red Wolf population.	This may be a continuation or expansion of Activities 2.3, 2.4, 2.5, and 5.5. It will be important for individuals and groups to align toward shared goals and problem-solving. This process includes evaluating legitimacy, desired level of engagement, and desired role of contributors, as well as determining preferences for timing of participation. Framework may include a governance document and defined decision space for contributors.	Facilitator, RWT, Contributors	2-3 years
6.2	Collaboratively develop and implement a section 7(a)(1) conservation agreement with Federal agencies whose authorities, lands, programs, or activities may contribute to implementation of population-specific recovery strategies.	A section 7(a)(1) agreement is a strong example of a formal participation mechanism available under the ESA and can support many recovery actions simultaneously by formalizing conservation commitments, promote proactive management, habitat conservation, research, monitoring, and other activities that advance recovery goals.	FWS, other Federal agencies	2 years
6.3	Identify and understand social conflict that may be present and reconcile or prevent conflict.	Any present conflict around Red Wolves must be addressed for effective conservation. Transform conflict into opportunities for growth.	Facilitator, RWT, Contributors	Ongoing
6.4	Understand and address local rural community needs.	Incorporation of community needs (e.g. landscape-level, recreational, economic, etc.) into conservation planning is needed for lasting results.	Facilitator, RWT, Contributors	Ongoing
6.5	Seek input from Tribal Nations to incorporate TEK into conservation planning.	TEK is the evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years.	RWT, Tribes	Ongoing
6.6	Seek and understand Tribal cultural importance of the Red Wolf and incorporate into conservation planning and recovery efforts, as appropriate.	Incorporating TEK and cultural values enhances Red Wolf conservation by ensuring a more holistic approach.	RWT, Tribes,	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
6.7	Establish scheduled adaptive management (lessons learned/benchmarking) meetings as additional populations are established.	Focus on creating Best Practices and learning between and among groups.	RWTs	1 month

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Table 7. Implementation strategy for Recovery Action 7:

Develop and implement population-specific strategies and recommendations for each population with contributors (Priority 1), to include:

- *Reintroductions and techniques*
- *Initial population targets*
- *Habitat and prey needs and management*
- *Research and adaptive management*
- *Identification of site-specific threats*
- *Strategies to address site-specific threats*
- *Community engagement*
- *Monitoring of:*
 - *Key population demographics*
 - *Genetic diversity and integrity*
 - *Long-term trends and movement*
 - *Specific causes of mortality*
 - *Threats*

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
7.1	Organize RWT and implement mechanisms for formal participation of contributors, particularly local landowners, and other community members, for each population as outlined in Actions 5 and 6.		From Actions 5 and 6	See Actions 5 and 6
7.2	Establish framework for clear, regular, and consistent communication between all levels of contributors to Red Wolf recovery. Revise as needed.	Have clear communication among all: RWT, field crews, SAFE, other contributors, public, etc. This may include a strategic communication plan. In addition, ensure lessons learned from previous sites are incorporated into new plans (See Activity 6.2).	RWT, Contributors	3 months

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
7.3	Set timeline for draft and final population-specific strategies and recommendations.		RWT	1 month
7.4	Using the framework for formal participation of all contributors (Action 6), develop reintroduction and canid population management strategies and recommendations in coordination with contributors and identify methods to share information.		RWT	1-2 years
7.5	Coalesce all existing information on Red Wolves to guide discussions of strategies and recommendations.		RWT	
7.6	Identify and gather site-specific information necessary to develop reintroduction and canid population management strategies and recommendations.	To include, but not limited to, social surveys at the county or regional level, local ecological data like canid densities, genetics, survival, reproduction, and mortality risks.	RWT	6-12 months
7.7	Identify knowledge gaps regarding climate change, Red Wolf life history (e.g., pup survivorship, movements, habitat use), and population processes (e.g., reproduction, mortality, and immigration/emigration).	For example, how do changes to micro-climate conditions (e.g., increased heat stress) affect Red Wolf reproduction and survival.	RWT	6-12 months
7.8	Conduct research to address identified knowledge gaps (7.7) and how management could improve those factors.		Scientific researchers	
7.9	Identify standardized metrics that will be monitored.	The goal is to collect data that can be compared and utilized over many years and by different study efforts across Red Wolf populations. Monitoring of this data may also be used in regular evaluations (7.13) to measure the performance of the strategies and recommendations against population objectives and success criteria, assess conservation impacts, and provide scientific data to support decisions.	All RWTs	6-12 months

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
7.10	Draft and finalize population objectives and reintroduction and canid population management strategies and recommendations.	It is anticipated that each RWT will work collaboratively to implement Red Wolf and other canid management strategies and recommendations, including monitoring standardized metrics (7.9) and coyote sterilizations and removals (see Action 8 activities), as appropriate for each Red Wolf population area. Each agency on the RWT will maintain decision authority for their respective species (e.g., Red Wolves, coyotes).	RWT	1-2 years
7.11	Develop success criteria for each Red Wolf population and how the criteria will be used to guide decisions.		RWT	6-12 months
7.12	Develop and conduct an assessment of the population-specific strategies and recommendations every 5 years.	This assessment will evaluate the performance of the population-specific strategies and recommendations toward population objectives and whether the population is/is not meeting success criteria. If not, an evaluation of potential causes for criteria not being met will be conducted. Whether criteria are being met or not, the assessment may lead to adjustments, such as revising objectives or success criteria, adapting management strategies and recommendations, cessation of reintroduction and canid management strategies and recommendations, or discontinue the population if data indicates investing further resources is no longer justified. Five years aligns with the 5-year review framework under the ESA.	RWT	6 months
7.13	Identify and engage/employ social scientists to integrate social science into recovery efforts.	Interdisciplinary approach is needed for lasting success. Social science can be integrated into on-the-ground management, reducing threats, and communication.	RWT, other contributors in coordination with RWT	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
7.14	Hire Community Engagement Specialist to develop and maintain productive relationships and partnerships with neighboring communities, landowners, and partner groups and programs.	Position builds and maintains trusting relationships with neighboring communities, assesses and addresses social conflict and community needs, and builds social receptivity to conservation goals.	RWT, other contributors in coordination with RWT	1 year to hire; Ongoing
7.15	Release and foster SAFE-born Red Wolves.	Establishing and growing wild populations will require releases of Red Wolves from the SAFE population and fostering of SAFE-born Red Wolf pups into wild litters.	FWS, SAFE	Ongoing
7.16	Maintain a breeding pair on an island propagation site.	Island propagation sites allow Red Wolves to breed in the wild in a somewhat controlled, but natural, environment (e.g., no paved roads, no residences, limited hunting, etc.) to give them wild experience.	FWS, SAFE	Ongoing
7.17	Translocate Red Wolves from island propagation site to wild Red Wolf populations.	Island propagation sites provide a source of Red Wolves with wild experience for release into wild populations.	FWS, SAFE	Ongoing
7.18	Conduct landscape monitoring of radio-collared Red Wolves.		FWS	Ongoing
7.19	Conduct landscape monitoring of radio-collared coyotes.		FWS, State wildlife agency	Ongoing
7.20	Investigate the role, if any, of fox preserves in Red Wolf mortality.		RWT	Ongoing
7.21	Investigate other sources of mortality, both human-caused and natural.		RWT, scientific researchers	Ongoing

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Table 8. Implementation strategy for Recovery Action 8:*Sterilize or remove coyotes to minimize hybridization and facilitate establishment of Red Wolf populations. (Priority 1)*

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
8.1	Identify and address knowledge gaps regarding coyote life history (e.g., movements, home range, diet, survivorship, population density) of sterilized and intact coyotes.	Research on coyote ecology and the sterilization program in the ENC RWP area has already been conducted. In addition to research conducted within new areas, future research could cross-validate past research efforts.	RWT	2 years
8.2	Identify best methods to determine wild canid densities and genetics	e.g., radio-collaring/monitoring, cameras, hunter and trapper records, non-invasive surveys, etc.	RWT, scientific researchers	Ongoing
8.3	Conduct necessary survey(s) to determine canid density at reintroduction sites and presence of any remnant Red Wolf genetics at newly identified reintroduction sites(s) (see also 4.6 and 7.6), if this information is lacking, prior to any Red Wolf reintroduction(s).		RWT, scientific researchers	2 years
8.4	Determine if and/or how many coyotes need to be sterilized and/or removed prior to Red Wolf reintroduction(s) and during population establishment.	Targets may be developed or revised based on recommendations provided in a PVA and/or field research, including density estimates and genetic results from 8.3. An existing PVA may be updated with site-specific information obtained through 8.3.	RWT, scientific researchers	1 year
8.5	Develop education and outreach tools to inform potential partners and the public about coyote biology, populations, and management efforts, including sterilization and lethal removal.	Coordinate with landowners on creating and disseminating information; annual public informational meeting to discuss coyote management.	RWT, other contributors in coordination with RWT	1 year
8.6	Develop adaptive strategies for coyote sterilization and removal efforts.	Identify areas of focus for sterilization and removal efforts. Monitor metrics in relation to coyote sterilization and removal targets (8.2) and state management plan.	RWT	2 years

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
8.7	Identify techniques and strategies that may increase the ability to sterilize the recommended percentage of coyotes.	This may include research on sterilization techniques and success. An increase in current capacity may be needed to meet coyote sterilization and removal targets (8.2).	RWT, other Contributors in coordination with RWT	Ongoing
8.8	Identify methods and strategies that may increase the ability to remove the target percentage of non-sterile coyotes.	An increase in current capacity may be needed to meet removal target (8.2).	RWT, other Contributors in coordination with RWT	Ongoing
8.9	Identify potential partners and strategies to assist with sterilization and removal efforts (e.g., hunting, trapping, agency removal).	e.g., increase land access and public participation to meet targets (8.2); share information from coyote monitoring with public	RWT, other contributors	Ongoing
8.10	Identify potential funding sources to assist with sterilization and removal efforts and research.	Increase and secure funding (internal and external) to help meet targets (8.2).	RWT, other contributors	Ongoing
8.11	Implement canid sterilization and/or removal.	If determined necessary based on 8.4 for pre-release and population establishment.	FWS, State wildlife agency, Federal agencies, Tribes, veterinarians, landowners, and other contributors	Within 12 months prior to release and ongoing with reintroductions
8.12	Assess, adjust, and continue coyote control based on site-specific population assessment.		RWT	Ongoing

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 9. Implementation strategy for Recovery Action 9:

Conduct outreach, engagement, and school programs on Red Wolf conservation within local communities associated with Red Wolf populations to improve hunter, trapper, landowner, and global public awareness of Red Wolves and garner support for Red Wolf conservation at local and regional levels. (Priority 2)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
9.1	Identify potential funding sources.	Stabilized, predictable funding will allow for longer-term management and programming	Any contributors	Ongoing
9.2	Identify and engage/employ a social scientist to assist with integrating social science into outreach, engagement, and school programs and materials.	Human dimensions are important for successful engagement with key partners. See 7.14.	RWT, other contributors in coordination with RWT	Ongoing
9.3	Conduct conservation marketing study to inform communication/messaging strategies to better reach communities.	Evaluate efficacy of different communication/ messaging strategies to improve communications.	FWS, State wildlife agency, scientific researchers	2 years
9.4	Develop a Red Wolf marketing/ communications plan.	The goal is unified agency messaging and outreach; each partner should be respectful of others and convey shared values and priorities	RWT, scientific researchers,	1 year
9.5	Develop and deliver outreach to local public organizations.	Examples include fire departments, churches, agricultural organizations, etc.	Any contributors	Ongoing
9.6	Develop program curriculum for sharing with schools.	Curriculum should be vetted by RWT to ensure public acceptance of the information developed (e.g., credibility).	Any contributors	Ongoing
9.7	Assess the economic value of Red Wolves and the positive and negative economic impact of increased visitation to area.	Red Wolves can be a driver of ecotourism and agritourism in the area. Challenges of ecotourism, such as increased visitation, can have negative impacts on wildlife and residents, including closed roads due to harassment of wildlife, increased traffic, and trespassing on private land. These impacts need to be addressed; therefore, it is important to encourage collaboration between Red Wolf managers and local landowners.	FWS, State wildlife agency, other Federal agencies, Tribes	1-2 years

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Table 10. Implementation strategy for Recovery Action 10:

Develop, with State wildlife agencies and other appropriate government entities, a management plan for transition of management authority for each population to ensure the population retains viability. (Priority 3)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
10.1	Develop a vision and plan defining success criteria for retaining viability.		RWT	1 year
10.2	Develop or revise a PVA to validate assumptions of the “recovered population” definition once recovery has been reached.		RWT	1-2 years
10.3	Engage social scientists in developing and implementing wild canid resource management messaging.	A state management plan should be developed prior to delisting.	State wildlife agency	1-2 years
10.4	Ensure a coyote management plan is in place.	This plan must be in accordance with existing statutes. Additional statutes may be necessary to account for more than one wild canid population.	State wildlife agency	1-2 years

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 11. Implementation strategy for Recovery Action 11:

Gather information needed to assess adequacy of existing management, long-term commitments, and regulatory mechanisms in mitigating or eliminating threats to the Red Wolf in each population. (Priority 3)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
11.1	Develop standardized metrics for monitoring (See 7.9).	Metrics should include scale and time. Standardized monitoring is needed to ensure consistency and the ability to compare data across time.	RWT	5 years
11.2	Regularly assess the adequacy of regulations concerning the Red Wolf.	Loss or modification of regulations may have an impact on Red Wolf populations.	RWT	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
11.3	Monitor genetic diversity of populations and work with SAFE and other populations for potential future releases and translocations.	It is likely that future populations will not have natural genetic exchange. We will need to ensure that a decline of individual populations is mitigated by targeted future releases and translocations between wild populations.	FWS, SAFE	Ongoing
11.4	Assess the need to establish scheduled lessons-learned/benchmarking meetings.	See also Activity 6.6. Feedback loops and continuous improvement will allow the teams to remain relevant to partners and meet species recovery needs. This is a proactive structure for improvement.	RWTs	Ongoing
11.5	Survey RWT members and other contributors/partners on a 5-year basis, ensuring that needs are being met and addressing items, as needed, to meet partner expectations.		RWTs	Ongoing
11.6	Ensure monitoring sensitivity is designed to detect rapid or substantial changes in Red Wolf population size or structure.	Species managers must be able to address declines in numbers of breeding pairs	RWT, scientific researchers	Ongoing
11.7	Monitor landscape-scale changes, such as climate change, land use, environmental degradation, and public perception as they may impact discrete Red Wolf populations.		Any contributors	Ongoing
11.8	Conduct monitoring as outlined in the population-specific strategies and recommendations for each population (7.7).		FWS, State wildlife agencies, Tribes, other Federal agencies, researchers	Ongoing

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 12. Implementation strategy for Recovery Action 12:*Revise recovery plan to include site-specific recovery actions for new Red Wolf populations. (Priority 3)*

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
12.1	Convene a recovery team tasked with updating the recovery plan to include the new population(s). Identify site-specific team members.		FWS	6 months
12.2	Identify information needed to revise the recovery plan.	e.g., site-specific threats and challenges, canid population dynamics, etc.	Recovery Team	3 months
12.3	Assess the need to revise an existing PVA or develop a new PVA to inform recovery actions and/or revise recovery criteria.		Recovery Team	3 months
12.4	Revise an existing PVA or develop a new PVA, as determined in 12.3.		Recovery Team	1 year
12.5	Complete revised recovery plan		Recovery Team	1-2 years

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 13. Implementation strategy for Recovery Action 13:*Maintain or restore habitat within the ENC RWP area to provide sufficient resources to support a viable population. (Priority 1)*

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
13.1	Identify and address knowledge gaps regarding habitat use and preference by Red Wolves and coyotes.	Identify limiting habitat and prey resources for Red Wolves on the landscape; additional information would provide the best available data to implement activities under this action.	RWT	1-2 years

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
13.2	Determine impacts climate change (e.g., increasing temperatures and sea level rise) may have on habitat availability and shifts in Red Wolf range.	Climate models predict sea level rise that may reduce suitable habitat for Red Wolves (and other species).	Scientific researchers	1-2 years
13.3	Determine proportion of the AP that is suitable for Red Wolves or could be suitable with habitat improvement.		Any contributors	1-2 years
13.4	Identify lands where agencies and potential partners could have access to canids.	Access is necessary to capture Red Wolves, manage coyotes, and/or provide habitat recommendations to landowner.	RWT, landowners	Ongoing
13.5	Identify and implement habitat management techniques and modifications to improve habitat for Red Wolf prey on private and public lands.		Any contributors	Ongoing
13.6	Identify and convey benefits to private landowners of habitat management for Red Wolves.	Create outreach opportunities regarding how Red Wolf habitat management interfaces with abundant prey base (e.g., rabbits, deer), water management, and other landowner goals.	Any contributors	1 year
13.7	Create new and utilize existing habitat incentive programs for private landowners.	Maintain and increase partnerships and collaboration to promote incentive programs (e.g., Prey for the Pack).	Local landowners, other community members, RWT	2-3 years

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 14. Implementation strategy for Recovery Action 14:

Implement and monitor strategies to reduce gunshot mortality in the ENC RWP to achieve the target 50% reduction of mortality, as detailed in Miller et al. 2023 PVA, to facilitate an increase in the Red Wolf population. (Priority 1)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
14.1	Re-examine current State regulations regarding coyotes to identify potential needed changes to regulations.		RWT	1 year
14.2	Develop training methods to increase/ensure proper identification by the public of Red Wolves, particularly Red Wolves that may not be marked.		RWT	1 year
14.3	Identify techniques to mark young Red Wolves for identification purposes.	Enable better differentiation of young, yet to be collared, Red Wolves from adult coyotes	Any contributor	Ongoing
14.4	Engage with local landowners and community members to develop strategies for reducing gunshot mortality.		RWT	
14.5	Increase law enforcement presence and coordination in ENC RWP area (See Action 16)		FWS, WRC, other contributors	Ongoing
14.6	Engage with local landowners and community members to explore strategies for encouraging positive collaboration with law enforcement.	Identify ways to enhance community involvement in addressing potential illegal activity.	RWT	Ongoing
14.7	Identify ways to improve the ability to detect illegal activity and collect evidence.		FWS, WRC	Ongoing
14.8	Explore other techniques that may help reduce gunshot mortality (both legal and illegal [intentional and accidental]).	Identify areas and time periods to focus enforcement activity; use of technology such as cameras and acoustic recorders.	FWS, WRC, other contributors	Ongoing
14.9	Utilize law enforcement to increase visibility and provide information to the public about identifying Red Wolves, including the marking/tagging applied to Red Wolves for identification purposes.		FWS, WRC	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
14.10	Continue existing and identify new techniques pre-and post-release that will make captive Red Wolves averse to humans and human development.		FWS, SAFE	Ongoing
14.11	Incorporate information from previous and on-going social values and human attitudes research on Red Wolves and coyotes.	Increase community engagement to improve relations between FWS and the community and acceptance of Red Wolves.	Any contributor	Ongoing
14.12	Explore civil penalties in cases involving the killing a red wolf where criminal charges may not prevail.	While preventing shootings through improved identification, outreach, communication, regulatory approaches, and voluntary compliance (14.1-11) is preferred and likely to be more effective, civil penalties may provide an additional accountability mechanism in situations where Red Wolves are unlawfully killed and criminal prosecution is not feasible.	FWS, DOI, DOJ	Ongoing
14-13	Identify strategies that may increase successful prosecution in cases involving the illegal killing of a Red Wolf.	Reducing gunshot mortality is expected to be most effectively achieved through proactive prevention measures (14.1-11). However, effective investigation and prosecution remain important components of a comprehensive strategy to deter unlawful take and support recovery objectives.	FWS, DOI, DOJ, WRC	Ongoing

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 15. Implementation strategy for Recovery Action 15:

Implement and monitor strategies to reduce vehicle strikes in the ENC RWP to achieve the target 50% reduction of mortality, as detailed in Miller et al. 2023 PVA, to facilitate an increase in the Red Wolf population. (Priority 1)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
15.1	Continue to document where Red Wolf vehicle strikes occur.	Provide law enforcement with identified problem locations for more localized presence.	FWS	Ongoing

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
15.2	Identify and implement methods to consistently remove all roadkill to reduce road attractants.		RWT, NCDOT	6 months
15.3	Identify potential partners to generate innovative ideas on reducing vehicle mortality.		Any contributors	1 year
15.4	Increase community awareness through outreach on vehicle mortality.		Any contributors	Ongoing
15.5	Implement, monitor, and assess targeted strategies that address road safety risks, including on National Wildlife Refuge lands.	This may include the installation and maintenance of signage and electronic message boards, monitoring and enforcement of speed limits, monitoring and enforcement of road closures, and use of remote cameras or speed tracking tools to evaluate compliance and Red Wolf activity near roadways.	FWS, WRC, County and State Law Enforcement	Ongoing
15.6	Increase knowledge of Red Wolf movements to predict movements in relation to infrastructure in the AP.		FWS, scientific researchers	Ongoing
15.7	Assess road infrastructure in the ENC RWP to identify high risk areas for improvement.		Any contributors	1-2 years
15.8	Incorporate information and recommendations from previous and on-going road ecology research on Red Wolves and coyotes into management actions.	Examples include closing feeder roads, fencing, crossing structures, habitat modifications, speed reduction.	RWT	Ongoing
15.9	Utilize funding programs, such as Wildlife Crossings Pilot Project, to implement recommendations in high-risk areas.		RWT, NCDOT	Ongoing
15.10	Maintain current techniques while exploring new techniques that may help reduce vehicle-caused mortality.	Identify new technology to increase awareness of Red Wolves in proximity to roads.	FWS, other contributors	1-2 years

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
15.11	Continue existing and identify new techniques pre- and post-release that will make captive-born Red Wolves averse to roads and vehicles.		FWS, SAFE, scientific researchers	Ongoing

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

Table 16. Implementation strategy for Recovery Action 16:

Increase law enforcement presence in ENC RWP area to assist in public outreach, deter illegal killing, investigate Red Wolf mortalities, enforce existing regulations, and coordinate with law enforcement from other agencies. (Priority 2)

Recovery Activity ID Number	Recovery Activity	Additional Information (As Needed)	Potential Partners*	Time Estimate
16.1	Identify avenues for increasing law enforcement funding and involvement within the ENC RWP.		Any contributors	Ongoing
16.2	Create full-time enforcement officers for the ENC RWP that are focused on Red Wolves.		FWS, WRC, NGOs	1-2 years
16.3	Identify opportunities to increase coordination between and engagement with law enforcement entities on the AP.		RWT, County	Ongoing

* Activities identified in this RIS will be implemented consistent with the respective authorities, responsibilities, and decision-making discretion of the agencies and entities involved.

APPENDIX A.

In 2021, FWS established a new Recovery Team tasked with developing a revised recovery plan for the Red Wolf. The team was composed of 53 individuals representing various agencies and organizations. Below are the members of that team and their affiliation.

Name	Organization
Adams, Jennifer	University of Idaho
Agan, Suzanne	Kennesaw State University
Benjamin, Pete	U.S. Fish and Wildlife Service
Beyer, Art	U.S. Fish and Wildlife Service
Brzeski, Kristin	Michigan Technology University
Butfiloski, Jay	South Carolina Department of Natural Resources
Casillas, Angelina	Formerly Conservation Centers for Species Survival
Cherry, Michael	Texas A&M University-Kingsville
Clegg, David	Tyrrell County, North Carolina
Davis, Kelly	Hyde County Landowner/North Carolina Wildlife Resources Commission
Davis, Natalie	Point Defiance Zoo
DeWan, Amielle	Impact by Design Inc.
Faust, Lisa	Lincoln Park Zoo
Fies, Mike	Virginia Department of Wildlife Resources
Flock, Brian	Tennessee Wildlife Resources Agency
Gese, Eric	Utah State University
Gillikin, Mike	Florida Fish and Wildlife Conservation Commission
Gwin, Pat	Cherokee Nation
Gwynn, Becky	Virginia Department of Wildlife Resources
Harrison, Becky	U.S. Fish and Wildlife Service
Hinton, Joey	Wolf Conservation Center
Holderman, Dave	Texas Parks and Wildlife
Johnson, Amy	Smithsonian National Zoo & Conservation Biology Institute
Karelus, Dana	Texas Parks and Wildlife
Keith, Jason	U.S. Fish and Wildlife Service
Kendall, Corinne	North Carolina Zoo
Lasher, Chris	American Red Wolf SAFE Program
Long, Sarah	Independent Consultant
Lorenz, Nicole	Louisiana Department of Wildlife and Fisheries
Madison, Joe	U.S. Fish and Wildlife Service
Mitchell, Leigh	Upper Mattaponi Tribe
Moore, Nicholas	Florida Fish and Wildlife Conservation Commission
Mossotti, Regina	Saint Louis Zoo; American Red Wolf SAFE Program
Nordsven, Ryan	U.S. Fish and Wildlife Service
Olfenbittel, Colleen	North Carolina Wildlife Resources Commission
Phillips, Mike	Turner Endangered Species Fund
Pollak, Kaleigh	Monacan Indian Nation
Rankin, Duke	U.S. Department of Agriculture Forest Service
Risch, Tom	Rutgers University

Ruder, Mark	University of Georgia
Rutledge, Liz	North Carolina Wildlife Federation
Sacks, Ben	University of California, Davis
Seegars, Wes	Hyde County Landowner/North Carolina Wildlife Resources Commission
Shipley, Andrea	North Carolina Wildlife Resources Commission
Songsasen, Nucharin	Smithsonian National Zoo & Conservation Biology Institute
Toivonen, Lauren	U.S. Fish and Wildlife Service
Valenta, Aaron	U.S. Fish and Wildlife Service
vonHoldt, Bridgett	Princeton University
Waddell, Will	Point Defiance Zoo (Retired)
Wayne, Robert	North Carolina Wildlife Resources Commission
Weller, Emily	U.S. Fish and Wildlife Service
Wheeler, Kim	Red Wolf Coalition

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