

Beaver Damage Management In North Carolina

Thirtieth Summary Report



July 1, 2021 through June 30, 2022

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Executive Summary



43

Counties
Participated



872

Projects
Worked



1,649

Beaver Dams
Removed



\$2,065,459

In Services
Provided

\$9,394,643

In Prevented
Damage

For every

\$1 spent,

\$4.55 in property and
infrastructure were
saved.



BMAP provided services to an additional **489** adjacent landowners at no cost to them.



Cost to the Landowner

\$25 per site visit

\$125 per dam removed

Beaver Management Assistance Program

Background

The North Carolina Beaver Management Assistance Program (BMAP) was created by state legislative action in 1992 with the express purpose of helping manage ever-increasing problems caused by beaver on private and public lands. BMAP was structured to be flexible, fair, and feasible. Since its inception, the program has grown more than tenfold from four participating counties during its pilot version to 43 participating in 2021-2022. Because of practical and ecological considerations, the program's goal is to address specific beaver damage problems rather than to eliminate beaver from the state. Beaver are present in all North Carolina counties. Their population is considered stable or slightly increasing and is conservatively estimated to be near 500,000. BMAP-related beaver removals account for about 0.5% of the total beaver population annually and around 17% of the total known annual beaver harvest (including recreational trapping and nuisance removals). Even if the combined recreational and nuisance beaver take was as much as 20,000 annually (or 4% of the estimated statewide population), this would have little to no effect on the beaver population. The program instead prioritizes activities first that remove threats to public health and safety, and secondly on assistance to landholders experiencing beaver damage.

BMAP is implemented by USDA Wildlife Services (WS) through Cooperative Service Agreements with the NC Department of Transportation (DOT), NC Wildlife Resources Commission (WRC), participating counties, and private landholders through a cost-share system. The Cooperative Service Agreements between WS, DOT, WRC, and counties in this summary report cover activities from July 1, 2021 through June 30, 2022.

Information about the program can be found on the main BMAP webpage: www.ncwildlife.org/bmap

A 3-minute video about the program can be viewed on YouTube at:
<https://www.youtube.com/watch?v=3Qrg6WInozc&feature=youtu.be>.

Beaver Damage Control Advisory Board

The Beaver Damage Control Advisory Board is composed of representatives from nine State/Federal agencies and non-governmental organizations. It meets annually to review the previous year's accomplishments and to make recommendations for the coming year to the Executive Director of the WRC.

Falyn Owens (Chair)	NC Wildlife Resources Commission
Tim Sherrill	NC Department of Transportation
Davis Brinson	NC Association of County Commissioners
Eric Galamb	NC Division of Soil and Water Conservation
Joseph Hudyncia	NC Department of Agriculture and Consumer Services
Barry New	NC Forest Service
Anne Coan	NC Farm Bureau Federation
Samantha Long	NC Forestry Association
Todd Menke	USDA-APHIS-Wildlife Services

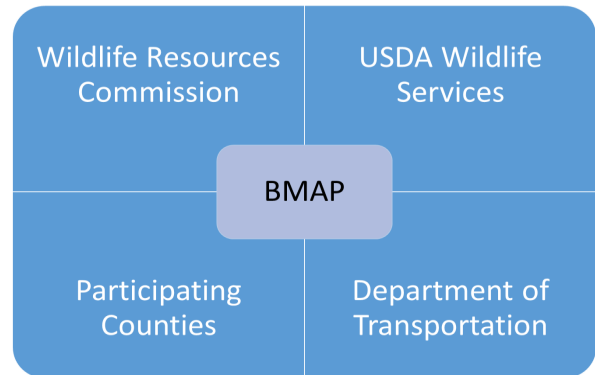


Joey Smith USDA Wildlife Services—Herman Lane Road, Wayne County, May 5 and 13, 2022. A beaver dam built in front of a DOT culvert was pushing water onto the road’s shoulder and threatening its structural integrity. BMAPS’s beaver damage management activities restored normal water drainage, preventing damage to the roadway, saving nearby timber, and protecting the driving public.

Program Structure

BMAP is composed of 4 major entities, each with its own expectations and guidelines.

NC Wildlife Resources Commission (WRC) funds beaver damage management activities as part of a cost-share program with participating counties and landholders within those counties. Activities are conducted to reduce water levels that threaten private roadways, timber, agricultural crops, and general property. Administrative authority for the BMAP rests with the WRC but enabling legislation and cooperative agreement allows WRC to transfer program implementation to USDA Wildlife Services.



NC Department of Transportation (DOT) funds beaver damage management activities to provide services along state-maintained road rights-of-way in all 100 counties. Activities are conducted to reduce flooding that impacts state roads and threatens roadway infrastructure as well as human health and safety.

Individual counties have the choice to participate annually in the BMAP at various levels. Participation levels range from no participation to baseline participation, and counties have the option to provide additional funding to support expanded program services.

USDA Wildlife Services provides at least \$25,000 annually to facilitate program implementation, and its staff conduct all beaver damage management activities.

Funding Sources and Expenditures

Program funding by source and expenditures from July 1, 2021 through June 30, 2022 are summarized below:

Expenditure Type	Expenditures (a) by Funding Source (b, c)						Total Costs
	NCWRC	DOT	Counties (Baseline)	Counties (Additional)	Wildlife Services	Landowner Collections (d)	
Personnel Costs	\$270,308	\$493,156	\$163,841	\$387,258	\$0	\$54,861	\$1,369,424
Vehicle Usage (fuel, maintenance, repair)	\$25,558	\$54,596	\$5,577	\$31,963	\$0	\$0	\$117,694
Other Services (phone, data lines, non-vehicle repairs & maintenance)	\$84	\$480	\$28,433	\$9,589	\$25,000	\$0	\$63,586
Supplies (waders, tools, explosives)	\$5,719	\$33,965	\$5,059	\$24,746	\$0	\$4,227	\$73,716
Equipment (traps, laptops, printers)	\$1,123	\$7,657	\$0	\$1,676	\$0	\$0	\$10,456
Pooled Job Costs	\$33,307	\$64,884	\$22,320	\$50,076	\$0	\$0	\$170,587
Indirect Costs to NCWS	\$33,307	\$64,884	\$22,320	\$50,076	\$0	\$6,500	\$177,087
Indirect Costs to APHIS	\$15,594	\$30,378	\$10,450	\$23,444	\$0	\$3,043	\$82,909
Total Expenditures (e)	\$385,000	\$750,000	\$258,000	\$578,828	\$25,000	\$68,631	\$2,065,459

(a) Expenditure figures are subject to adjustment.

(b) Funding sources:

NCWRC	NCDOT	43 Counties (Baseline)
\$385,000	\$750,000	\$258,000

Counties that provided additional funding for expanded services (totaling **\$578,828**)

Bladen \$54,000; Brunswick \$28,976; Duplin \$185,000; City of Fayetteville \$33,798; Fayetteville PWC \$3,683; Harnett \$5,000; Johnston \$5,000; Lenoir \$17,800; Robeson \$89,553; Sampson \$67,500; Wayne \$67,000; Wayne SCWD \$12,992; Wilson \$8,526

(c) USDA Wildlife Services contributed \$25,000 to fund the BMAP in FY 2021/2022. USDA Wildlife Services provided additional indirect support to administer the program that is not included in the \$25,000.

(d) BMAP cost-share collections by USDA Wildlife Services from landowners, municipalities, and other sources. As of July 1, 2022, \$1,850 in outstanding landowner cost-share invoices were over 90 days past due.

(e) All funds provided for the program by each funding source were spent in full, with an end-of-year balance of \$0.

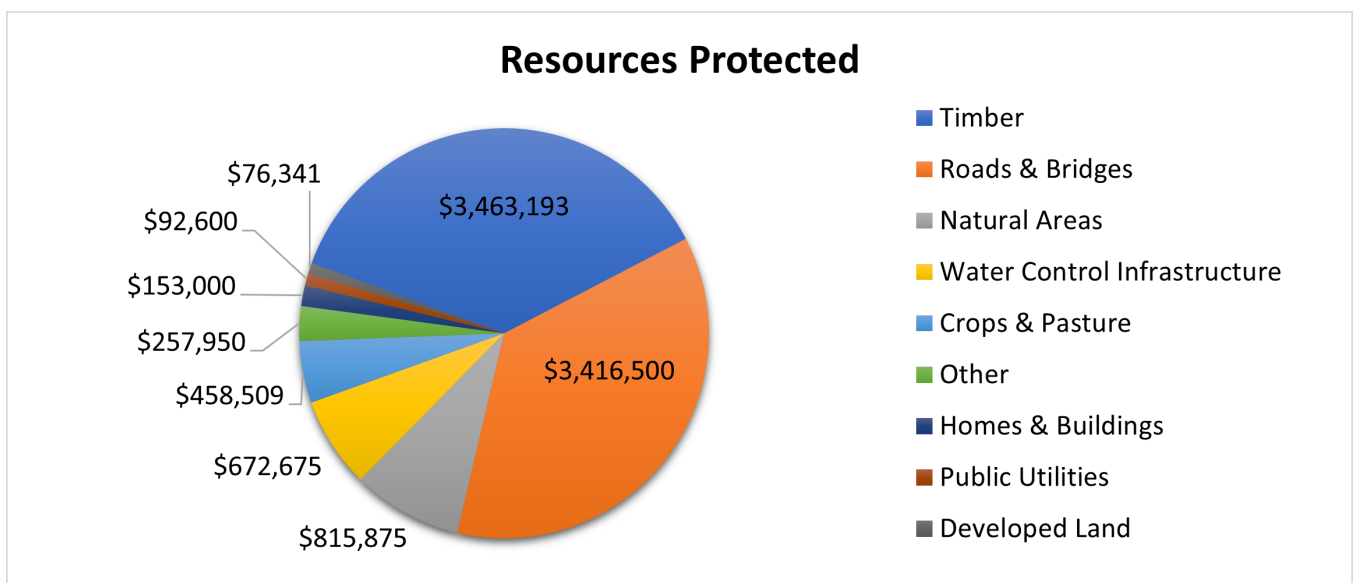
Program Statistics in Summary

The Cooperative Service Agreements between WS, DOT, WRC, and participating counties resulted in a total of 872 projects worked from July 1, 2021 through June 30, 2022. An additional **489 adjacent landholders benefitted from BMAP services at no cost to them.**

Projects Worked	Dams Removed w/Explosives	Dams Removed Manually	Beaver Removed
872	480	1,169	3,200

Economic Impact of BMAP

USDA Wildlife Services staff and cooperators reported that BMAP services prevented the impending loss or repair expenditures of an estimated \$9,394,643 in roads and bridges, timber and other agricultural resources, railroad trestles, dams and ditches, city and county sewer systems and water treatment facilities, landscape plantings, and other resources such as homes, airport runways, and golf courses. Comparing BMAP expenditures to savings, the estimated cost benefit ratio was 1 to 4.55. In other words, for every \$1.00 spent, \$4.55 in resources were saved. Also, the benefits of BMAP services reported by the DOT does not include projected future savings estimates, which can be significant. Furthermore, the cost-benefit ratio does not include the benefits of educational activities such as training individuals to address their own beaver damage problems. It also does not include any state revenue generated from taxes on timber sales that otherwise would have been lost had beaver destroyed the timber, or indirect losses due to agriculture from farmers being prevented from planting or using land that is flooded or saturated.



In the chart above, **Natural Areas** include undeveloped areas that are not considered “working lands” (e.g., wetlands and restoration sites). **Developed Land** includes golf courses, landscaped areas, cemeteries, airport runways, yards, etc. **Water Control Infrastructure** includes dams, dikes, ditches, and drainage systems. **Other** includes resources labeled as “general property” or equipment.

Beaver Damage Examples

Beaver damage can take many forms, but the situations depicted below are typical.

Erik Bufmeyer/Brandon Emert USDA Wildlife Services—High Pine Church Road, Randolph County, February 15, 2022. The photos below show a hayfield/pasture land and two roads affected by seven beaver dams. BMAP services restored normal water drainage, preventing further damage and benefitting multiple local landholders.



Joey Smith USDA Wildlife Services—Hwy. 903/Dog Pond Road, Lenoir/Wayne County, August 24 and September 13, 2021. In the photos below, a corn field and two roads were damaged due to five beaver dams in a drainage ditch. BMAP activities prevented further damage and allowed the farmer to harvest the corn.

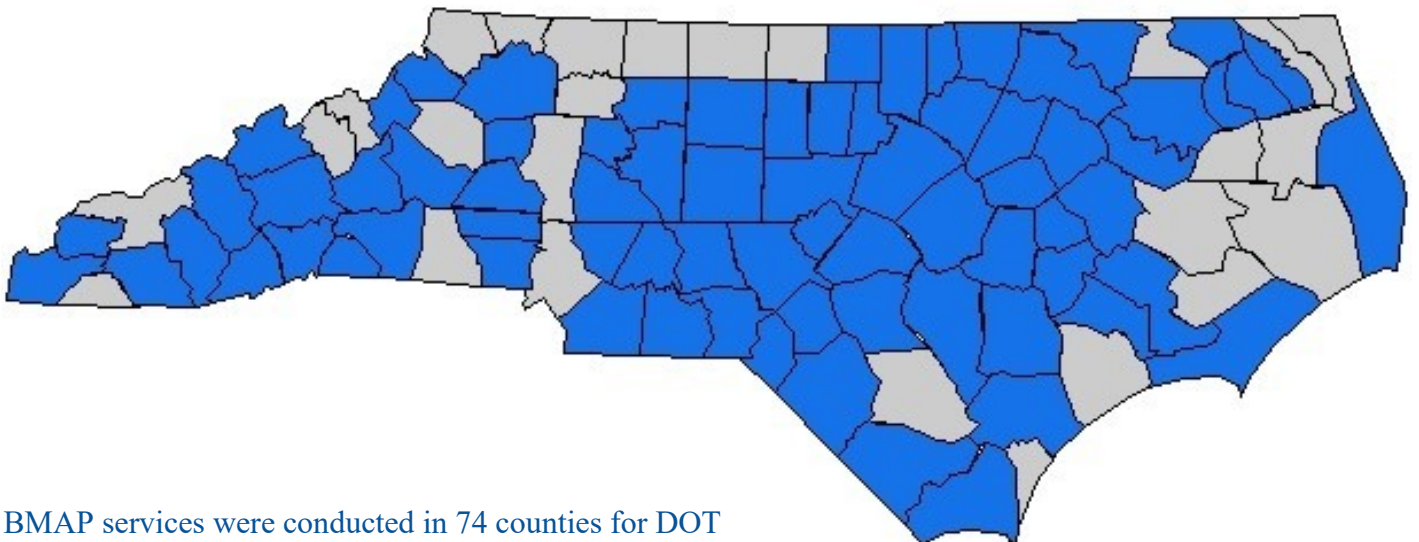


Erik Bufmeyer USDA Wildlife Services—Fire Tower Road, Richmond County, December 8 and 10, 2021. The photos below show a road that had to be closed and culverts replaced due to beaver completely plugging the culverts and causing significant damage to the road bed and culverts. BMAP services prevented additional threats to the driving public.



NC Department of Transportation

Beaver management services to the North Carolina Department of Transportation (DOT) were available in all 100 counties regardless of a county’s participation in the program. Due to health and safety concerns along roadways, DOT agreements continued to receive priority, but response to these projects was balanced against any backlogged requests on public and private lands. DOT received on average 4 to 6 completed agreements in counties where DOT work was done. Services were provided based on demand and the program’s ability to meet those demands at current funding levels. Counties that did not participate in BMAP during this fiscal year received services on DOT rights-of-way where requested. There were no additional cost-share charges to the DOT relating to beaver damage management along state-owned highways, roads, and bridges throughout North Carolina. When beaver damage management work was conducted on adjacent properties to resolve a problem affecting DOT rights-of-way, those landholders were not charged for services.



BMAP services were conducted in 74 counties for DOT

Beaver damage management activities were conducted on NC Department of Transportation property in 74 of North Carolina’s 100 counties. DOT received a total of 352 completed projects, resulting in the removal of 1,201 beaver and 624 dams. In addition, WS worked with 399 adjacent landholders who benefitted from these services at no cost to them.

Projects Worked	Dams Removed w/ Explosives	Dams Removed Manually	Beaver Removed
352	125	499	1,201

Shane Smith USDA Wildlife Services—Morphus Bridge Road, Wake County, January 4, 2022. The photos below show an emergency roadway situation following 3 inches of rain due to a culvert being completely plugged by beaver. Immediate BMAP services restored normal drainage, protecting the driving public.

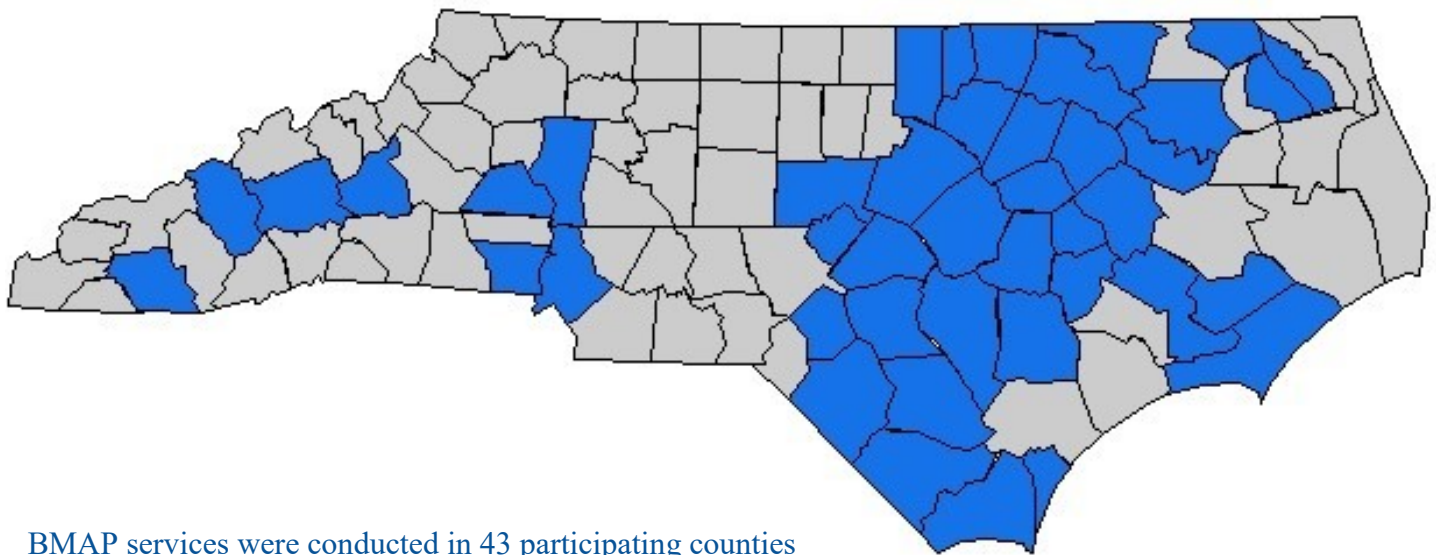


Joey Smith USDA Wildlife Services—Oakdale Road, Greene/Wayne County, December 21 and 27, 2021. In the photos below, a beaver dam had caused water to nearly overflow a road bridge. BMAP activities restored normal water flow, preventing damages to the road and bridge, and protecting the driving public.



NC Wildlife Resources Commission

The North Carolina Wildlife Resources Commission (WRC) funds beaver damage management activities as part of a cost-share program with participating counties and landholders within those counties. County participation is required before any direct beaver damage management assistance is provided to landholders. Participation in the program is open to all North Carolina counties. Participating counties received 80– 112 site visits (32-48 DOT, 48-64 non-DOT) each, on average. Services in each county were provided based on demand and the program’s ability to meet those demands at current funding levels.

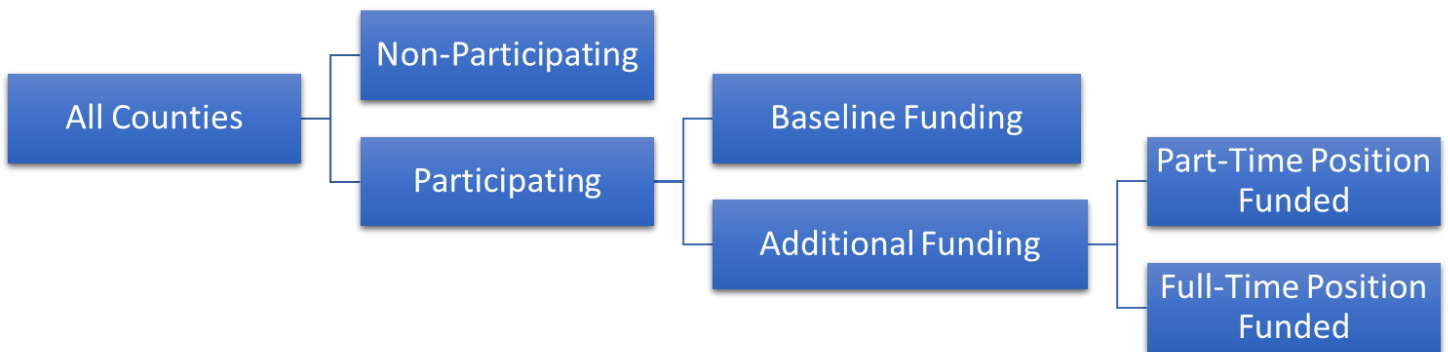


BMAP services were conducted in 43 participating counties

Beaver damage management activities were conducted in 43 participating counties with combined funding provided by WRC, participating counties, and individual landholders. A total of 373 projects were completed and resulted in the removal of 1,411 beaver and 725 dams. In addition, WS worked with 55 adjacent landholders who benefitted from these services at no cost to them.

Projects Worked	Dams Removed w/ Explosives	Dams Removed Manually	Beaver Removed
373	254	471	1,411

Individual Counties



Individual North Carolina counties are invited to participate in the BMAP on an annual basis and must opt in each year. Counties can choose several levels at which to participate, from baseline coverage to funding a full-time, dedicated BMAP professional in that county (see diagram above).

Non-participating counties – Landholders in non-participating counties have access to beaver damage management services through USDA Wildlife Services if requested. They are not eligible to receive services at the BMAP cost-share rate and must pay full market cost for services rendered.

Participating counties at Baseline Funding – In FY 2021-22, counties could participate in BMAP for a \$6,000 fee. A county’s participation fee is combined with funding provided by the NC Wildlife Resources Commission to offset the cost of beaver damage control services to landholders in that county. Landholders in participating counties were eligible for services at a reduced cost-share rate of \$25 per visit and \$125 per large dam. The 43 counties listed below participated at the baseline level during FY 2021-22.

Bertie	Craven	Greene	Lenoir	Pamlico	Warren
Bladen	Cumberland	Halifax	Macon	Pasquotank	Wayne
Brunswick	Duplin	Harnett	Martin	Perquimans	Wilson
Buncombe	Edgecombe	Haywood	McDowell	Pitt	
Carteret	Franklin	Hoke	Mecklenburg	Robeson	
Catawba	Gaston	Iredell	Nash	Sampson	
Chatham	Gates	Johnston	New Hanover	Vance	
Columbus	Granville	Lee	Northampton	Wake	

Services Provided through Additional Funding

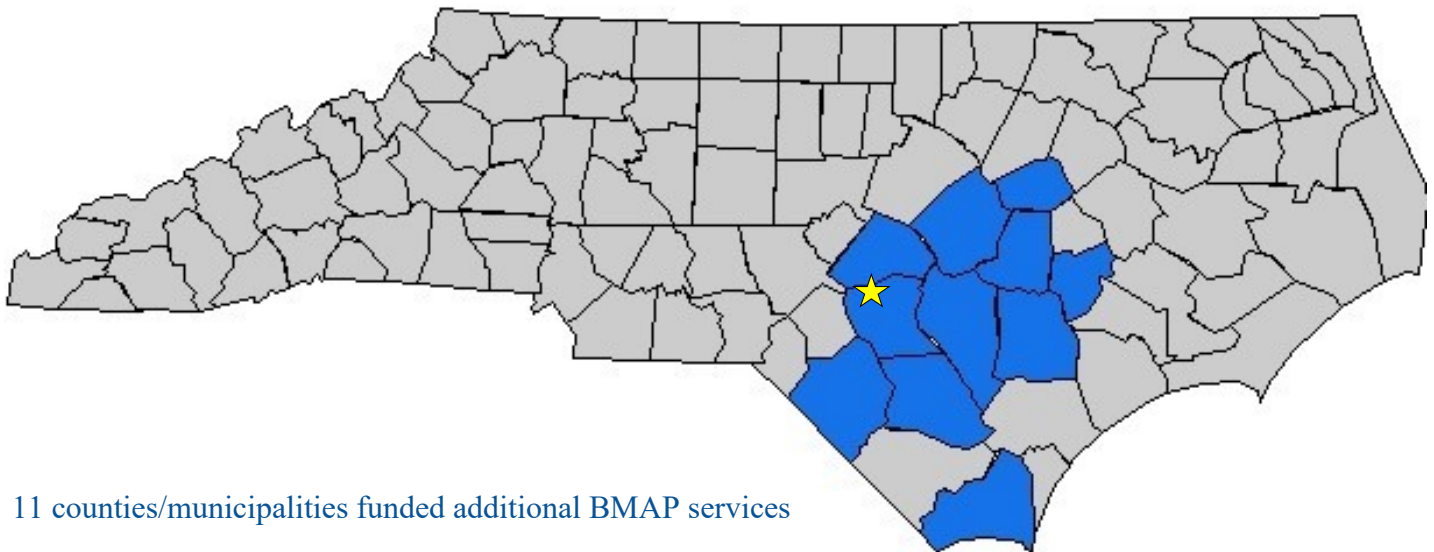
Participating counties occasionally request expanded BMAP services in addition to those received under the cost-share program at baseline. Generally, requests for additional assistance require hiring additional experienced personnel, which is inherently difficult, especially if such a request is for seasonal or less than full time work. If USDA Wildlife Services is able to accommodate such requests, any additional work provided to landholders in the county follows BMAP policies and procedures. Cost share fees paid by landholders are used to support the overall BMAP. Any county requesting additional assistance pays full program costs (labor, vehicle usage, supplies and equipment, etc.). In addition, both landholders and the DOT will receive services. To receive additional services, a county must enter into a cooperative service agreement with USDA Wildlife Services with payment going directly to USDA Wildlife Services.

Participating counties with additional funding – 10 counties and 1 city opted to provide funding beyond the baseline \$6,000 participation fee, totaling \$578,828 worth of additional service to those areas. These counties/city provided this additional funding directly to USDA Wildlife Services to cover the remaining expenses of a part-time, full-time or sometimes multiple full-time beaver damage management specialists. Counties/cities that participated at one of these levels included:

Multiple full-time personnel - Duplin (\$185,000) and Robeson (\$89,553) Counties

Single full-time personnel – Bladen (\$54,000), Sampson (\$67,500), and Wayne (\$79,992) Counties

Part-time personnel – City of Fayetteville (\$37,481), Brunswick (\$28,976), Harnett (\$5,000), Johnston (\$5,000), Lenoir (\$17,800), and Wilson (\$8,526) Counties



A total of 147 projects were worked resulting in the removal of 588 beaver and 300 dams.

Projects Worked	Dams Removed w/ Explosives	Dams Removed Manually	Beaver Removed
147	101	199	588

Educational Activities

Advice and information (technical assistance) were provided to landholders statewide through on-site visits, written/telephone consultations, and educational programs and exhibits. USDA Wildlife Services distributed thousands of leaflets to landholders and the general public on how best to address beaver damage on their property. The BMAP strives to educate landholders and others about both positive and negative aspects of beaver activity so they can make informed decisions about management options on their land. If landholders decide to address a beaver damage problem themselves, whether by lethal or non-lethal means, they are always given the option to do so with direction and training provided by USDA Wildlife Services at no cost.



State Fiscal Year 2022-2023

BMAP continues to be popular among landholders, counties, municipalities, businesses, and the DOT. Landholders who request BMAP services are often faced with significant losses as a result of beaver activity. The severity of these losses is evident by sustained demand and support for the program. As in previous years, BMAP participants continued to show little interest in conducting damage management activities themselves, which is most likely due to lack of ability and/or time. USDA Wildlife Services specialists will, however, continue to make concerted efforts to encourage individuals to solve their own problems through on-site training and damage management workshops.

Estimated Funding Sources for State FY 2022-23

NC Department of Transportation	\$1,000,000
NC Wildlife Resources Commission	\$385,000
49 Participating Counties	\$294,000
USDA Wildlife Services	\$25,000
Private Cost-Share (estimated)	\$72,000
Counties Providing Additional Funds	\$730,000
Total	\$2,506,000

Obtaining Services

How Counties Participate

All counties were eligible to participate in FY 2021-2022 through an annual participation fee of \$6,000 per county. Individuals residing in these counties could obtain assistance with beaver damage by contacting their county Cooperative Extension Service or Soil and Water Conservation District office. Statewide assistance with beaver damage problems was also provided to the DOT. All requests for assistance received an immediate response, but the start of direct assistance activities varied based on the workload of USDA Wildlife Services personnel at the time of the request.

Cost Share

Landowners in participating counties paid a small cost-share fee for services. There was no charge for time spent discussing the program or signing paperwork. During this assessment, USDA Wildlife Services personnel discuss both the positive and negative impacts of beaver with the landholder and recommend the best course of action. If damage management activities are recommended, time and costs are estimated before work begins. Landholders wishing to conduct their own work were provided individualized training at no cost. The cost-share fee for individuals in participating counties was \$25 for each visit to their property, with no charge for travel time. There was also a \$125 charge per large dam removal. USDA Wildlife Services personnel average about 10 visits over a 30-day period to resolve a beaver problem. After 15 visits to a landholder's property in any one year, costs to the landholder increase to the full market value of beaver removal services.

Assistance Priorities

Requests for assistance are handled on a first-come, first-served basis with top priority given to projects that address threats to public health and safety, particularly along highway rights-of-way and county-owned property. Work for individual landholders is next, followed by work for soil and water conservation districts, municipalities, corporate landholders, and others.

Additional Information

For additional information about the BMAP please call or write:

USDA Wildlife Services, 6213-E Angus Drive, Raleigh, NC 27617, 1-866-487-3297

- OR -

NC Wildlife Resources Commission, Wildlife Management Division at 1722 Varsity Drive, Raleigh, NC 27699, 1-919-707-0050.

NC Beaver Management Assistance Program

OBTAINING SERVICES

Since beavers were successfully reintroduced to North Carolina in 1939, this native species has thrived, benefitting wildlife and people by creating wetland habitat, reducing erosion, and improving water quality across the state. Damages caused by beaver activity, however, can be substantial and costly. The Beaver Management Assistance Program (BMAP) aims to help manage beaver-related problems on private and public lands. Because of practical and ecological considerations, the program is not designed to eradicate beaver populations; rather its aim is to assist the NC Department of Transportation, local governments, and private landholders in addressing specific beaver damage issues.



BMAP specialists work to educate customers about a variety of beaver management strategies, such as exclusion, pond levelers, and other nonlethal techniques. When deemed necessary, they will remove beaver and/or dams using humane and environmentally acceptable techniques.

In 2019-2020, BMAP services prevented the impending loss or repair costs of an estimated \$8.95 million in roads, bridges, timber and other agricultural resources, railroad trestles, dams, sewer systems, water treatment facilities, landscape plantings, homes, airport runways, and golf courses. Comparing the costs of BMAP to its savings, for every \$1.00 spent, \$5.82 in resources were saved.

County Cost-Share

Counties are invited to participate each year by contributing a \$6,000 participation fee, which grants them access to additional funding provided by the NC Wildlife Resources Commission. Landholders experiencing beaver damage in these counties may reach out to their county's BMAP contact to receive assistance.



Landholder Cost-Share

Landholders pay the following cost-share fees for services:

- \$25 per site visit
- \$125 per dam removed

Initial damage assessments are provided at no charge. Beaver management specialists average 10 visits over a 30-day period to resolve the problem. Costs to the landholder increase after 15 visits to the full market value of beaver management services.

Landholders willing to conduct beaver management activities themselves are provided individual training at no cost.

Service Priorities

Requests for assistance are handled on a first-come, first-served basis. However, projects that address threats to public health and safety receive top priority.

BMAP County Contacts: July 1, 2021 – June 30, 2022

Bertie	252-794-5317	Johnston	919-989-5100
Bladen	910-862-6700	Lee	919-775-5624
Brunswick	910-253-2515	Lenoir	252-526-9799 x3
Buncombe	828-250-4788	Macon	828-349-2045
Carteret	252-222-6360	Martin	252-789-4300
Catawba	828-465-8240	McDowell	828-652-4434
Chatham	919-542-8228	Mecklenburg	980-721-3760
Columbus	910-642-2196 x3	Nash	252-459-4116 x3
Craven	252-633-0397	New Hanover	910-798-7129
Cumberland	910-321-6860	Northampton	252-534-2711
Duplin	910-296-2120 x3	Pamlico	252-745-5064 x3
Edgecombe	252-823-8187 x3	Pasquotank	252-338-3954
Franklin	919-496-3344	Perquimans	252-482-4127 x3
Gaston	704-922-2152	Pitt	252-902-3250
Gates	225-357-2411	Robeson	910-671-3022
Granville	919-603-1350	Sampson	910-592-7161
Greene	252-747-3705 x3	Vance	252-438-8188
Halifax	252-583-3481 x3	Wake	919-250-1050
Harnett	910-893-7584	Warren	252-257-3640
Haywood	828-452-2741 x3	Wayne	919-731-1650
Hoke	910-875-3461	Wilson	252-237-5147 x3
Iredell	704-873-6761		



Beaver activity was causing flooding and threatening home septic systems in Lenoir County.



BMAP professionals removed the beavers and dams, resolving flooding issues and preventing damage to homes.

Photos: Nicole Lynch
USDA Wildlife Services



Additional Information

Learn about BMAP online at www.ncwildlife.org/BMAP.

Statewide Contacts:

USDA Wildlife Services
6213-E Angus Drive, Raleigh, NC 27617
866-487-3297
todd.a.menke@usda.gov

NC Wildlife Resources Commission
1751 Varsity Drive, Raleigh, NC 27699
919-616-2208
falyn.owens@ncwildlife.org

Updated March 11, 2022

Beaver Research Continues

Fort Bragg Army Base, one of the largest military installations in the world, is home to approximately 57,000 military personnel along with an increasing beaver (*Castor canadensis*) population. The Saint Francis' satyr (*Neonympha mitchellii francisci*), an endangered butterfly only found at Fort Bragg and two federally endangered plants: rough-leaved loosestrife (*Lysimachia asperulifolia*) and American chaffseed (*Schwalbea americana*), are all closely correlated with beaver activity.



Yellow transmitter attached to tail.



The endangered St. Francis' satyr butterfly.

Engineering activities by beavers can negatively affect human activities and infrastructure while simultaneously creating and maintaining riparian floral and faunal habitats including for federally endangered species. The 28th Beaver Damage Management Summary Report in North Carolina (July 1, 2019 – June 30, 2020) included details about beaver research USDA Wildlife Services is conducting to quantify beaver movements, space use, and behavioral responses of beavers to non-lethal damage management practices (e.g. water control devices). Over 15,000 locations of radio-tagged beavers are currently being analyzed to estimate survival, construct home ranges, and conduct habitat use analyses. Results will help inform integrated management plans.



Photo Credits: David Turner USDA Wildlife Services—beaver deceiver installed in Tuckahoe Creek.

April 27 – April 30, 2021, the beaver research continued when fifty (50) additional beavers were fitted with a tail-mounted VHF transmitter. Data acquired will assist in improving watershed/forest management plans (including prescribed burning) that maximize biological diversity and minimize wildlife damage, which may negatively impact the intensity and frequency of military operational readiness. Where it is desirable to allow beaver to remain, but also reduce some damages, non-lethal water control devices may be utilized. These devices are often referred to by their catchy names from the people that pioneered them like the Clemson Pond Leveler, the Beaver Baffler, the Beaver Deceiver, and the Castor Master.