

**North Carolina Department of Natural and Cultural Resources  
State Historic Preservation Office**

Ramona M. Bartos, Administrator

Governor Roy Cooper  
Secretary Susi H. Hamilton

Office of Archives and History  
Deputy Secretary Kevin Cherry

April 27, 2017

Monica A. Stephenson  
Headquarters, US Army Garrison Command  
2175 Reilly Road, Stop A  
Ft. Bragg, NC 28310

Attn: Charles Heath

[Charles.l.heath.civ@mail.mil](mailto:Charles.l.heath.civ@mail.mil)

RE: Engineered Breach of McKeithan Pond Dam, Fort Bragg, Hoke County, ER 17-0719

Dear Ms. Stephenson:

Thank you for your letter of March 22, 2017 that we received on April 11, 2017. We have reviewed the information provided about the history, construction, and condition of the McKeithan Pond Dam and concur with your finding that the dam is not eligible for listing in the National Register of Historic Places under any of the Criteria for Listing. Thus, the proposed engineered breach will not affect a historic property.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or [environmental.review@ncdcr.gov](mailto:environmental.review@ncdcr.gov). In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

A handwritten signature in blue ink that reads "Renee Gledhill-Earley".

for Ramona M. Bartos



DEPARTMENT OF THE ARMY  
US ARMY INSTALLATION MANAGEMENT COMMAND  
HEADQUARTERS, UNITED STATES ARMY GARRISON, FT BRAGG  
2175 REILLY ROAD, STOP A  
FORT BRAGG NORTH CAROLINA 28310



May 2, 2017

SUBJECT: Engineered Breach of McKiethan Pond Dam, Fort Bragg, Hoke County,  
North Carolina (FA-23007-17), ER 17-0719

Ms. Renee Gledhill-Earley  
State Historic Preservation Office  
Department of Natural and Cultural Resources  
4617 Mail Service Center  
Raleigh, North Carolina 27699-4617

ER 17-0719

Dear Ms. Gledhill-Earley,

Thank you for your letter of April 27, 2017 concurring with our determination that McKiethan Pond Dam is not eligible for listing in the National Register of Historic Places. We are transmitting a bound copy of the final report for your records.

If you have questions, please contact Mr. Charles L. Heath, Architectural Historian, at (910) 908-4284, email [charles.l.heath.civ@mail.mil](mailto:charles.l.heath.civ@mail.mil), or Mr. Paul G. Humphrey, Chief, Environmental Management Branch, at (910) 396-6518, email [paul.g.humphrey2.civ@mail.mil](mailto:paul.g.humphrey2.civ@mail.mil).

Sincerely,

Monica A. Stephenson  
Director of Public Works

Enclosure

**McKiethan Pond Dam, Fort Bragg, Hoke County, North Carolina:  
Determination of Eligibility for the National Register of Historic Places**



**Jessica R. French**

**Cultural Resources Management Program  
Environmental Management Branch  
Directorate of Public Works  
Fort Bragg, North Carolina**

**March 2017**

**Final**

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## Introduction

The Fort Bragg Cultural Resources Management Program (CRMP) is responsible for the identification and evaluation of cultural resources located at Fort Bragg, North Carolina (NC). Fort Bragg Military Reservation includes Pope Army Airfield, Simmons Army Airfield and one satellite installation, Camp Mackall. Under Section 106 and Section 110 of the National Historic Preservation Act (NHPA), the CRMP staff initiated a project to evaluate the McKiethan Pond Dam for eligibility for inclusion on the National Register of Historic Places (NRHP). The dam breached during Hurricane Matthew in October 2016. Because this dam is located in an ordnance impact area and is no longer used for either training or recreation, the dam will not be repaired. Instead, an engineered breach will be executed in order to further draw down the lake so that the dam does not need to be maintained in the future. In a 2012 dam safety inspection report, McKiethan Dam was given a “poor” rating, with numerous deficiencies noted.<sup>1</sup>

McKiethan Pond Dam impounds a section of Juniper Creek on Fort Bragg Military Reservation in Hoke County, North Carolina. The dam was built ca. 1936 by the United States Army, south of a previous mill pond and dam also known as McKiethan Pond on Juniper Creek, and later modified ca. 1960. The dam is located approximately 700 meters north of Chicken Road and is currently in the McPherson Impact Area. The Army-built dam likely increased the size of the previous pond for training purposes. The dam has not been previously evaluated for inclusion on the NRHP. Fieldwork was initially conducted by Charles Heath in 2013, and by Jessica French in 2016 with assistance from Jonathan Schleier.

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<sup>1</sup> Dawn M. Wetzel and Debra Miller, “Periodic Dam Inspection Report, McKiethan Lake Dam, Fort Bragg, North Carolina,” USACR-ERDC, 2012.

## Historic Context

Near the end of World War I (1914–1918), the U.S. War Department authorized the development of Camp Bragg, near the town of Fayetteville in Cumberland and Hoke Counties, North Carolina. The camp initially served as a temporary field artillery training camp for the U.S. Army (Army). From September 1918 through the end of 1922, the War Department purchased some 120,000 acres of land to form Camp Bragg. Camp Bragg was designated as a permanent Army post in April 1922 and renamed the camp Fort Bragg in September 1922.

McKiethan Pond Dam (alternatively spelled in pre-Fort Bragg records as McKethan or McKeithan) is located on tract 443 of the land purchase, consisting of approximately 290 acres that belonged to Annie E. Cameron and her mother Mary Blue in Hoke County.<sup>2</sup> A small mill pond dam was located on the tract. The pond was colloquially known as McKiethan Pond, after the previous owner Daniel McKeithan, who sold the land to Cameron's husband, John A. Cameron, in 1901.<sup>3</sup> Cameron and her husband did not have a house site on the land, but instead lived in the town of Raeford in Hoke County.<sup>4</sup> The Cameron and Blue families were major landowners in Hoke County and were active in Sandy Grove Presbyterian Church.<sup>5</sup> In addition to tract 443, Annie E. Cameron and Mary Blue sold about eight other tracts of land to the War Department during the 1922 purchase. Some were held jointly by Cameron and Blue, while others were owned individually by each woman.<sup>6</sup>

The mill pond dam on the property dated back to at least 1884. The McDuffie map of Cumberland published that year recorded the flow of Juniper Creek near the McKeithan property as generating "25 horse power." Few alterations seem to have been made to the dam between 1884 and the Army purchase in 1922. The general shape and size of the pond recorded on the 1884 McDuffie map are reflected in the 1918 Hoke County Soils map (Figure 1) and a 1920 aerial image of Camp Bragg.<sup>7</sup>

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<sup>2</sup> United States of America, Vs. Vance Blanton et al., Book 29, Page 379, deed, 1 December 1921, Hoke County Register of Deeds.

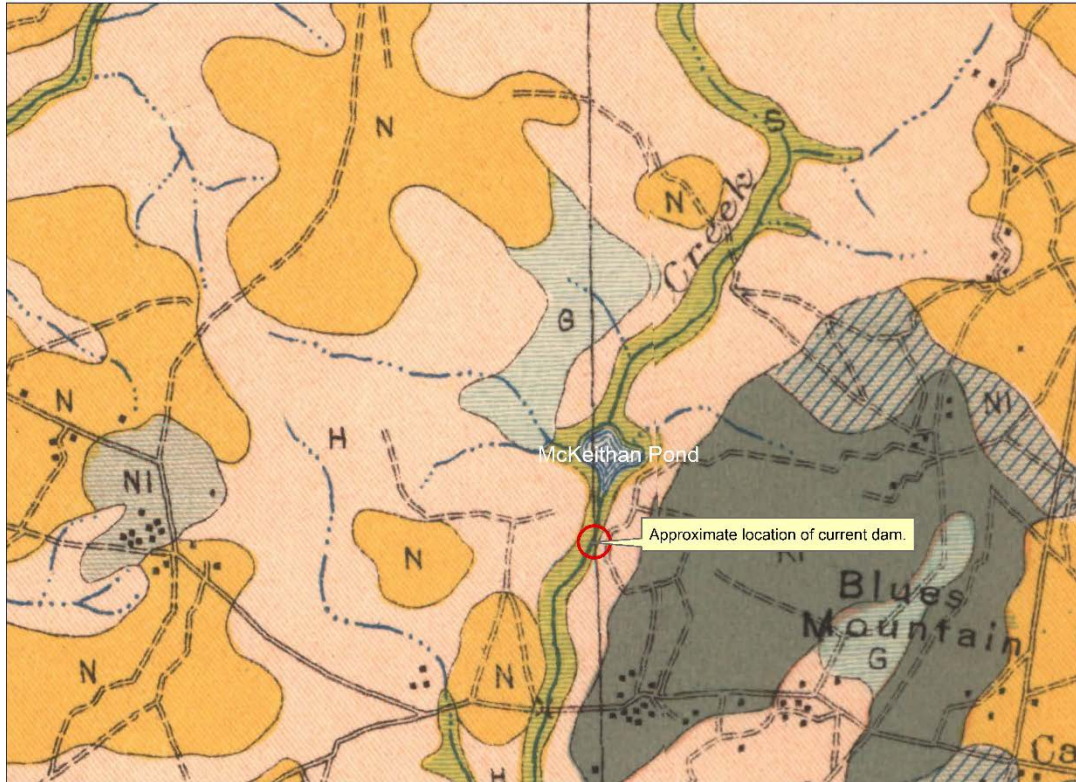
<sup>3</sup> H. McD. Robinson and H. L. Cook, commissioners to John A. Cameron, deed, 10 May 1901, Book 113, Page 230, Cumberland County Register of Deeds.

<sup>4</sup> "Murders Most Foul" *The News-Journal 2011 Hoke Centennial*, 18.

<sup>5</sup> M. A. Patterson and A. D. Carswell, *History of Sandy Grove Presbyterian Church*, Hoke County, North Carolina: Members of Sandy Grove Church, 1925, 58-59; Beverly A. Boyko and William H. Kern, et al., eds., *Historic Cemeteries of Fort Bragg, Camp Mackall and Pope Air Force Base, North Carolina*, Eighth Edition, Department of the Army, XVIII Airborne Corps and Fort Bragg Directorate of Public Works, Fort Bragg, North Carolina, 2010, 138-139.

<sup>6</sup> J. E. Serrine, Property Map, Artillery Range, Camp Bragg, Hoke County, North Carolina, 1919.

<sup>7</sup> Hoke County Soil Map, 1918, United States Department of Agriculture, Bureau of Soils and North Carolina Department of Agriculture; John Howry, Aerial Photographic Mosaic of Military-Reservation Camp Bragg, NC, 1920.



**Figure 1.** Excerpt from the 1918 Hoke County Soils map. Note that the pre-1936 Daniel McKeithan Pond was further north on Juniper Creek and impounded a smaller area than the current dam.

Few, if any improvements were made to the dam between 1922 and ca. 1936, when the Army built a new dam in the vicinity of the former Daniel McKeithan dam. The new dam was built further south on Juniper Creek and increased the pond size of the previous dam. The original pond covered approximately 12 acres, while the current pond covers approximately 85 acres. The new dam likely created a larger lake area to be used for military training that may have included swimming exercises, small boat operations, and other water activities.

During the 1930s, the Army was undertaking a large-scale project to improve the Fort Bragg training lands. Between 1933 and 1942 numerous Civilian Conservation Corps (CCC) camps were located on Fort Bragg to help transform the post to a modern Field Artillery training center. It is possible that the ca. 1936 dam was built as part of a CCC project. The CCC was a joint enterprise involving the Departments of Labor, War, Agriculture, and Interior. Initially, the Department of Labor was tasked with recruiting for the program, while the Department of War mobilized the small, post-World War I Army to provide leadership and logistics for the recruits. In turn, the Departments of Agriculture and Interior provided projects for CCC camps and oversight over the technical aspects of camps' work.<sup>8</sup>

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<sup>8</sup> Harley E. Jolley, *"That Magnificent Army of Youth and Peace": The Civilian Conservation Corps in North Carolina* (Raleigh, NC: Office of Archives and History, North Carolina Department of Cultural Resources, 2007), 11-12.

Fort Bragg was the site of a conditioning camp, where recruits from across the region spent two weeks undergoing physical conditioning to prepare for their work assignments. In addition to the conditioning camps, between 1933 and 1938 four CCC companies were assigned to camps located on Fort Bragg. This initial group of companies engaged in natural resources conservation work similar to much of the work assigned to the CCC across North Carolina in the various national and state parks, as well as on private lands. Landscaping, infrastructure construction, and forestry operations in the post's training areas constituted much of the early work of the Fort Bragg CCC camps.<sup>9</sup>

Between 1938 and 1940, no CCC camps were active on Fort Bragg. The previous companies were reassigned to other projects in the state. However, by 1940, when the United States' began building up defenses in response to World War II, CCC camps returned to Fort Bragg, this time under the administrative responsibility of the National Parks Service. In total, seven companies were reassigned to the installation for emergency defense work between 1940 and 1942. Rather than working on general improvement projects in the post's training areas, the new set of companies engaged specifically in national defense preparations. For example, Company 5424 was assigned to landscape the new Field Artillery Replacement Training Center complex, while Company 1497 was engaged in all of the work necessary to construct a new rifle range. Other companies also cleared land for firing ranges, built range structures, and cut firebreak roads for both range access and wildfire control.<sup>10</sup>

A memo from the commanding general of Fort Bragg, Brigadier General William Bryden, to the War Department Chief of Engineers in 1939 indicates that dam construction was part of the scope of CCC activities. Bryden requested a new terrain map of Fort Bragg to account for the extensive changes the training lands underwent as a result of CCC activity: "A number of firing areas have been cleared, dams built, new Ranger stations built and the old ones destroyed, fire lanes cleared, and other improvements made."<sup>11</sup>

Camp Inspection reports for Companies 410, 1497, and 1499 detail the types of work performed by the CCC camps including road and bridge construction, fire break construction, ranger station construction, and other forestry projects.<sup>12</sup> There is no mention of dam construction in any of these camp reports, although a brief mention of "reservoir clearing" by Company 1497 indicates that the company was preparing the site for the eventual installation of

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<sup>9</sup> Ibid., 16, 104-105; Camp Inspection Reports, 1933-1942, Box 156, RG 35 Records of the Civilian Conservation Corps, National Archives and Records Administration, Washington, DC.

<sup>10</sup> Camp Inspection Reports, 1933-1942, Box 158, RG 35 Records of the Civilian Conservation Corps, National Archives and Records Administration, Washington, DC.

<sup>11</sup> William Bryden, Brigadier General, U.S. Army to The Adjutant General of the Army, memo, January 20, 1939, 061.1 "Revision of the Fort Bragg, NC Map." Box 2983, Army Adjutant General Central File, 1926-1939, RG 407 Adjutant General's Office, National Archives and Records Administration, Washington, DC.

<sup>12</sup> Camp Inspection Reports, 1933-1942, Boxes 156 and 158, RG 35 Records of the Civilian Conservation Corps, National Archives and Records Administration, Washington, DC.



a dam when it was inspected in late 1937.<sup>13</sup> Oral histories of the ranger program at Fort Bragg indicate that a CCC encampment near Plank Road built Mott Lake.<sup>14</sup> Company 1497 was nicknamed Finlayson, likely after Finlayson Mountain located on the northeast side of Mott Lake.

The original spillway at Mott Lake was completely replaced in 1986, so comparison between it and the McKiethan Dam spillway is not possible. However, another CCC company could have built the McKiethan Dam. No inspection reports have been retained for Company 1496, which was located on Fort Bragg from 1935 through 1936. The types of projects that particular company engaged in are unknown, but could have included dam construction.

Another possibility is that McKiethan Dam was built by troop labor. Until about 1940, Fort Bragg did not have any dedicated grounds maintenance crews. Any repairs or improvements to the landscape were undertaken by soldiers.<sup>15</sup> Various Fort Bragg units repaired mill pond dams that had been converted to swimming areas during the early years of Fort Bragg's existence. McFadyen and Reinor Ponds were designated for use by enlisted soldiers and McKellars Pond was for officers' use.<sup>16</sup> In August 1922, Battery A of the 5<sup>th</sup> Field Artillery Regiment spent a month at McKellars Pond repairing damage to the dam after a heavy rainfall event. The dam was damaged and repaired again several months later in October 1922, this time by members of the garrison's Signal Corps unit. Members of Battery B of the 17<sup>th</sup> Field Artillery Regiment spent October 1922 repairing McFadyen Pond, which was damaged in the same storm as McKellars.<sup>17</sup>

At least two dams on Fort Bragg were built as part of troop training exercises in the early 1940s. Young Lake was built in 1941 by the 41<sup>st</sup> Engineers for use by black soldiers as a swimming pond until Fort Bragg facilities were later integrated in 1948.<sup>18</sup> Smith Lake was built ca. 1943 by soldiers from the 16<sup>th</sup> Battalion of the Field Artillery Replacement Training Center and was used for military training through the 1940s and 1950s.<sup>19</sup> Additionally, troop labor

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<sup>13</sup> Camp Report, December 15, 1937, NC Army-3 Fort Bragg, Camp Inspection Reports, 1933-1942, Box 156, RG 35 Records of the Civilian Conservation Corps, National Archives and Records Administration, Washington, DC.

<sup>14</sup> Transcript, Estelle Rowland, Oral History Interview, 27 January 2006, by Jeff Irwin and Heather McDonald, 19-20; Transcript, Dennis and Dorothy Wilson, Oral History Interview, 08 November 2005, by Jeff Irwin and Heather McDonald, 1.

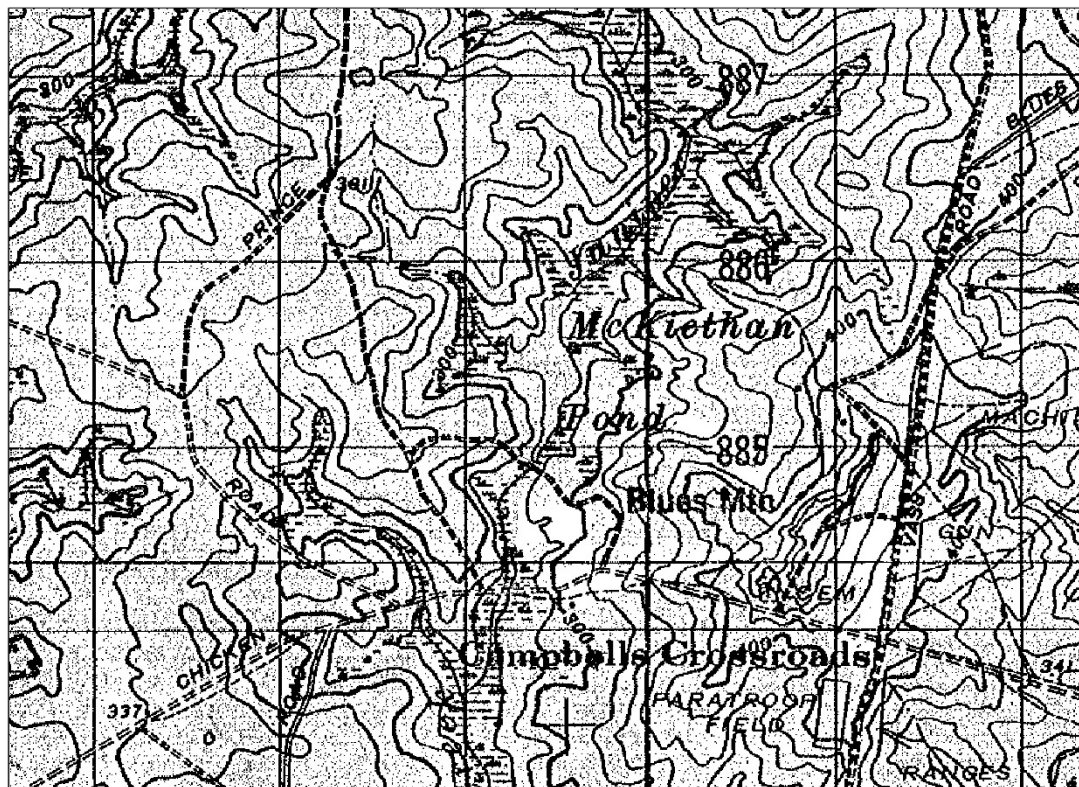
<sup>15</sup> "Conservation and Beautification Report," Directorate of Facilities and Engineering, Land Management Branch, Fort Bragg, NC, 1970, 7.

<sup>16</sup> "Private Lakes for Enlisted Men" *Fayetteville Observer*, 28 June 1922, 6.

<sup>17</sup> "A Battery Now Preparing to Come Back Home" *Fayetteville Observer*, 11 August 1922, 6; "Signal Corps Men are to Repair Dam at Lake" *Fayetteville Observer*, 3 October 1922, 6; "B Battery is Still Working on Project at McFadyen's Pond" *Fayetteville Observer*, 6 October 1922, 6.

<sup>18</sup> *Butner Road Chapel and Young's Lake Determination of Eligibility for the National Register of Historic Places, Fort Bragg, North Carolina*, Fort Bragg Cultural Resources Management Program, 2008.

improved five designated swimming areas by adding swimming platforms, bathhouses, and other amenities ca. 1941 to improve recreation on post during WWII.<sup>20</sup>



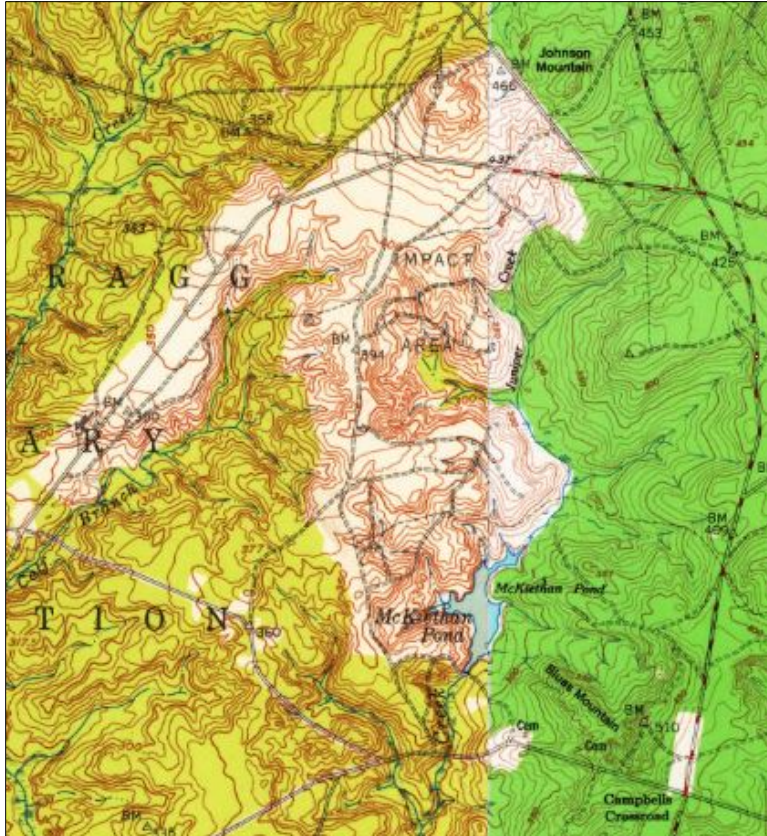
**Figure 2.** The new McKiethan Dam with larger pond area can be seen on the 1948 Topographic map. A drop zone was located to the south and east of the pond below Chicken Road and a machine gun range was located to the east of Vass Road.

McKiethan Pond was located in an active, live-fire range area from WWII on, but hunting and fishing were allowed in and around the pond until ca. 1990 (Figures 2, 3 and 4). Over time the size, bounds and definition of ordnance impact areas has changed on Fort Bragg. In 1948, the impact area near McKiethan Pond was narrowly defined, including area to the west of Juniper Creek and north of the McKiethan dam. By 1977, a larger area was designated off-limits to most military and civilian traffic, but the impact area was a smaller, defined polygon with a larger safety buffer around the boundary known as a danger area (Figure 4). Although McKiethan Pond was located in the off-limits danger area, fishing was still allowed with permission from Fort Bragg Range Control and the grounds around the lake were occasionally opened to hunting.<sup>21</sup>

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<sup>19</sup> Jessica French, *Smith Lake Dam Fort Bragg, Cumberland County, North Carolina: Determination of Eligibility for the National Register of Historic Places*, Fort Bragg Cultural Resources Management Program, 2015.

<sup>20</sup> Jacob L. Devers, Major General, U.S. Army to Commanding General, Fourth Corps Area, Post Office Building, Atlanta, Georgia, memo, March 26, 1941, 618.2 "Improvement of Recreational Facilities at Fort Bragg, NC." Box 4418, Army Adjutant General Unclassified Central Decimal Project Files, 1940-1945, RG 407 Adjutant General's Office, National Archives and Records Administration, Washington, DC.

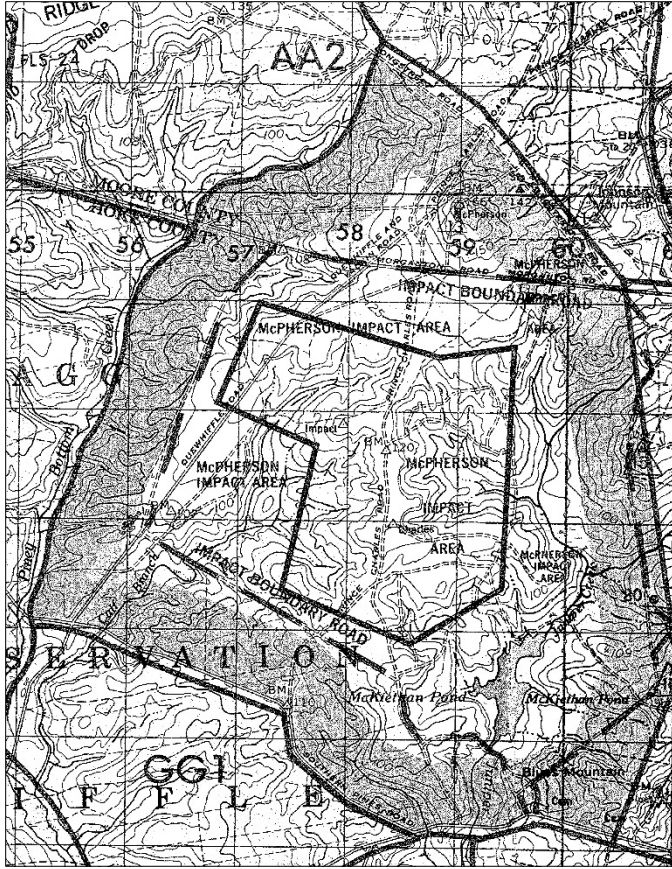


**Figure 3.** Excerpts from the 1948 Southern Pines USGS Quad Map and the 1948 Cliffdale USGS Quad Map shows McKiethan Pond near the eastern and southern boundaries of the early, ca. 1940s impact area.

Because of its remote location, few improvements were made to the area surrounding the pond. Unlike other lakes built on Fort Bragg before and during WWII, no bathhouses, swimming piers, or other recreational structures were built at McKiethan Pond. The dam was altered ca. 1960 likely as part of an improvement to the unpaved training road that crosses the dam. The height of the concrete retaining walls of the spillway, along with the center concrete pier and the downstream concrete wingwalls was increased. A distinct line can be seen running across the spillway, distinguishing the original ca. 1936 concrete from the new. The height of the dam's earthwork was also increased. However, these alterations did not increase the storage capacity of the dam, but were probably undertaken as part of the 1960s efforts to improve firebreaks on Fort Bragg.<sup>22</sup>

<sup>21</sup> "Conservation and Beautification Report," Directorate of Facilities and Engineering, Land Management Branch, Fort Bragg, NC, 1970, 63; Phone conversation with Alan Schultz, Fort Bragg DPW Wildlife Branch Chief.

<sup>22</sup> "Conservation and Beautification Report," Directorate of Facilities and Engineering, Land Management Branch, Fort Bragg, NC, 1970.



**Figure 4.** Excerpt from the Fort Bragg West Range Overprint, 1977. Note that McKiethan Pond is outside of the Impact Area polygon, but is located in the off-limits danger area.

## Setting

McKiethan Pond Dam is located in a central section of Fort Bragg Military Reservation in Hoke County, North Carolina. The dam is north of Chicken Road and west of Raeford Vass Road in the McPherson Impact Area. Stands of mature trees, mainly long leaf pine, surround the pond and dam on all sides. A narrow, unimproved training road crosses the dam and connects to Chicken Road. Because it is now located near the target zone of McPherson Impact Area, no structures or maintained firebreaks are located in the immediate vicinity around the dam and pond.

## Architectural Description

McKiethan Pond Dam consists of a 220 ft. long earthen embankment with a reinforced concrete, over-flow stepped spillway. A low level outlet is located to the east of the principal spillway. The dam construction is typical of small-to-medium sized water storage projects of the 1930s and 1940s consisting of a homogenous earthen embankment and a simple reinforced concrete spillway.<sup>23</sup> Currently a wooden bridge, built ca. 1960, crosses the spillway (Figures 8 and 10). The spillway is of a basic design, simply engineered to serve as both the inlet and outlet works for the dam. The upstream and downstream sides of the dam feature reinforced concrete wingwalls. The downstream side of the spillway is sloped, with four steps running horizontally across the slope to slow the velocity of water as it exits the spillway (Figure 9).

The spillway and embankment were modified ca. 1960, likely as part of an improvement to the road that crosses the dam. A clear delineation between the original ca. 1936 concrete and the newer ca. 1960 concrete is evident on the spillway (Figure 9). The height of the two side retaining walls and the center support was raised to support a new vehicle bridge. In addition, the height of the two downstream wingwalls was raised to accommodate the additional earth fill. The concrete on the original part of the spillway matches the composition and style of concrete found on other ca. 1930s and 1940s dams on Fort Bragg.<sup>24</sup> Marks from the wooden forms are clearly visible on the lower part of the spillway and overtime the coarse aggregate used in the concrete mix typical for that period has been exposed. In contrast, the upper part of the spillway is darker in color, has a smoother finish, and aggregate that has been exposed by weathering is smaller than that of the older portion of the spillway.

## Integrity

McKiethan Pond Dam retains integrity of location and setting. The original ca. 1936 Army-built spillway and earthwork remain in their original location. The area surrounding the dam has remained relatively austere. No other structures were built around the dam or lake at the time of its construction and that has remained the case. Because the dam is located in an impact

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<sup>23</sup> Perry Augustus Fellows, *Low Dams: A Manual of Design for Small Water Storage Projects*, (Washington, DC: U.S. Government Printing Office, 1939).

<sup>24</sup> French, *Smith Lake Dam Fort Bragg, Cumberland County, North Carolina*, 2015; Jessica French, *Little Muddy Lake Dam at Camp Mackall, Scotland County, North Carolina: Determination of Eligibility for the National Register of Historic Places*, Fort Bragg Cultural Resources Management Program, 2015.

area since the early 1940s, development around the pond has been kept to a minimum. The mix of mature pine trees and hardwoods surrounding the pond is likely similar to the environment when the dam was built.

However, McKiethan Pond Dam lacks integrity of design and association. The ca. 1936 dam was altered ca. 1960, to increase the height of the earthwork and add support for a new vehicle bridge across the spillway. While these alterations did not change the capacity of the lake, they did change the original design and appearance of the spillway and earthwork. The dam no longer conveys association with either military training activities or military recreation. Neither activity is allowed on the pond anymore. Access to the dam and pond-area is strictly limited because of the risk of unexploded ordnance.

### **Recommendation of Eligibility**

McKiethan Pond dam is recommended as not eligible for inclusion in the National Register of Historic Places. The dam is not eligible under Criterion C for Architecture or Engineering. The structure is a standard earthen embankment dam with basic concrete chute spillway of typical design and materials for the period of construction.<sup>25</sup> It does not represent a significant engineering innovation, nor is it representative of the work of a master. Moreover, both the dam spillway and earthwork have been altered since their original construction and no longer retain integrity of design.

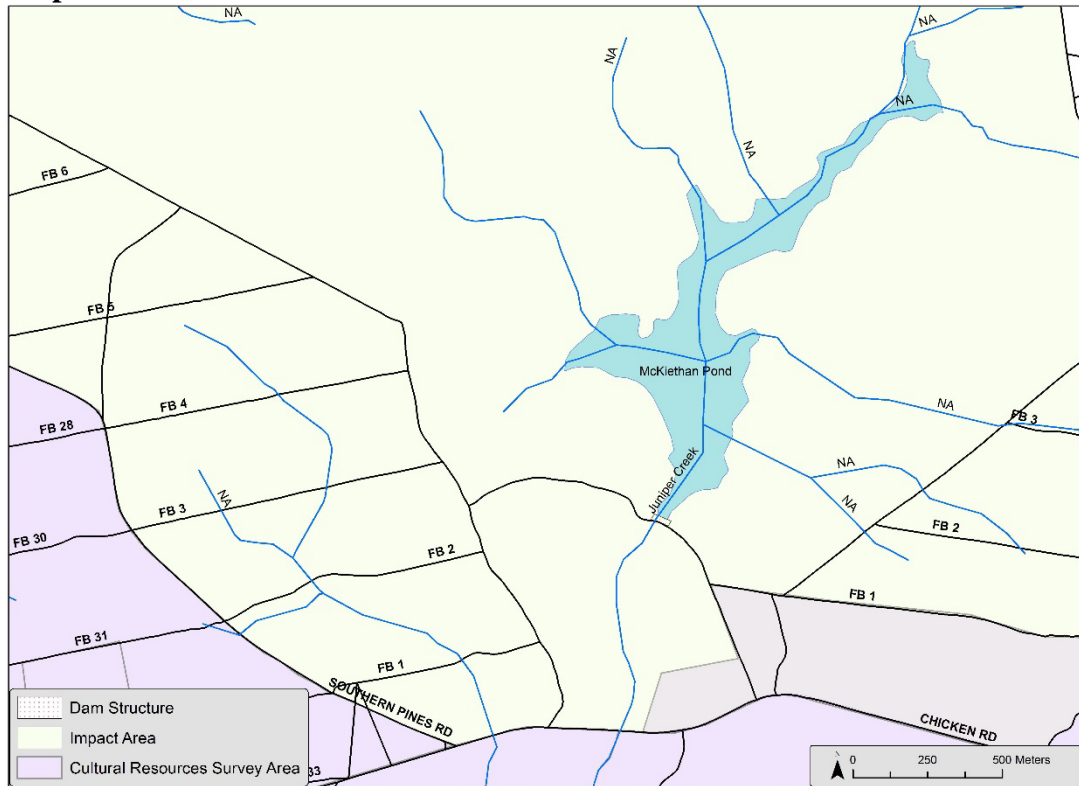
The dam is also not eligible under Criterion A for Military Community Planning and Development or Politics and Government. While the dam could have been built by CCC labor or by Army troop labor, extant records do not confirm that either is the case. The dam was likely built to create a large lake for training purposes and was subsequently also used as a recreation area. However, no evidence of any significant training exercises or unit activities on the lake exists in documents archived at Fort Bragg or contemporary local newspapers. Several other dams built during the 1930s and 1940s on Fort Bragg, including Smith Lake Dam and Little Muddy Lake dam have been determined ineligible because of their lack of historical or architectural significance.<sup>26</sup>

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<sup>25</sup> Fellows, *Low Dams: A Manual of Design for Small Water Storage Projects*.

<sup>26</sup> French, *Smith Lake Dam Fort Bragg, Cumberland County, North Carolina*, 2015; French, *Little Muddy Lake Dam at Camp Mackall, Scotland County, North Carolina*, 2015.

## Maps



**Figure 5.** Thematic map of McPherson Impact Area showing roads, firebreaks (FB), creeks, lakes, and other features.

**Photographs: Current Conditions**



**Figure 6.** View of McKiethan Pond looking north from the crest of the dam.



**Figure 7.** View downstream (south) from the crest of the dam above the spillway.





**Figure 8.** View of spillway looking west from the downstream bank.



**Figure 9.** View of the spillway from downstream. Note the defined line running horizontally on each of the spillway walls and the center pier, separating the older concrete spillway, from the ca. 1960 concrete addition, built to raise the road and support the bridge across the spillway.



**Figure 10.** View of the downstream spillway wingwall on the east side of the dam. The seam between the ca. 1936 spillway and the newer ca. 1960 alteration is evident.



**Figure 11.** The dam's low-level outlet is located to the east of the principal spillway.



**Figure 12.** View of the upstream side of the spillway and vehicle bridge.

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