



To ensure that Marine Corps Base Camp Lejeune units are combat ready, certain areas on the Base are used to train military personnel in the use of munitions. For safety purposes, each munitions training range is associated with a safety buffer area, called a surface danger zone (SDZ).

Several years ago, Camp Lejeune discovered that portions of some SDZs had been located outside the surveyed Base boundary during specific timeframes dating back to the 1940s.

Although there has been no indication that a safety risk exists, it is possible that munitions or munition fragments may have inadvertently landed beyond the boundaries of the Base.

The purpose of this investigation is to:

1. Determine if military munitions or munitions-related debris are present in off-base areas;
2. Identify any potential safety or environmental risks; and
3. Determine if any further action is necessary to protect human health and the environment.

The initial SDZ investigation recommended that an additional, focused investigation be conducted within the area. The initial investigation report, along with the additional investigation work plan, is available to the public in two local libraries (see page 5).

Off-Base Areas Investigated

Figure 1 shows the off-base areas that may have been affected. The largest area consists of the SDZ for Rocket Range Number 1, which has not been used for more than 50 years.

The initial investigation area, which is mostly marsh land, includes three private properties, totaling approximately 301 acres; the southwestern tip of Bear Island (182 acres of Hammocks Beach State Park); state-owned salt marshes that lie between Bear Island and the mainland; state waters used for fishing and recreation, including portions of Bear Creek; and shallow water areas of the Atlantic Intracoastal Waterway.

Initial Investigation Completed

From October 2009 through May 2010, Camp Lejeune conducted an investigation of properties along the southeastern boundary of the Base.

The site investigation work consisted of:

- Digital geophysical mapping (DGM) using magnetic sensors that detect metal objects. Sensors were mounted on helicopters flying over water and wetlands, and were hand-carried on land (where accessible).
- Investigating the southwestern tip of Bear Island (part of Hammocks Beach State Park), where objects detected by DGM were dug up to evaluate if they were munitions-related.
- Sampling soil, water, and sediment to evaluate if munitions-related contamination was present.

Digital geophysical mapping surveys use magnetometers to locate and create a digital map of magnetic anomalies—metal objects submerged under water or buried under the ground—that might be munitions. The instruments can be hand-carried, towed behind a boat, or mounted onto aircraft. The resulting data are used to select areas for further evaluation.

Aerial Geophysical Survey

Helicopters flew over the entire 1,593 acre investigation area to locate and create a digital map of metallic debris, called magnetic anomalies. The anomalies could be munitions-related material submerged under water or buried under the ground or unrelated metallic objects, such as anchors, crab pots, soda cans, pipes, and signs.

The aerial survey identified 2,059 magnetic anomalies. Most of the magnetic anomalies were found where general (non-military) metallic debris would normally be expected: along beaches, waterways, and recreation areas on islands. Metallic items were most densely clustered at the mouth of Bear Inlet, where Bear Creek and the Intracoastal Waterway

come together, and along a main channel through the east-central portion of the survey area (Figure 2).

Data from the aerial and terrestrial DGM surveys only show whether or not metal is present. They do not distinguish between munitions and other metallic objects.

Terrestrial Digital Geophysical Mapping

Portions of accessible land were investigated using magnetometers to identify specific locations that might contain buried munitions-related items. The terrestrial investigation covered 27 acres of land, including upland areas, intertidal zones (land that is exposed at low tide), sandbars in Bear Inlet, seven islands made up of material dredged from the Intracoastal Waterway, and other areas where land was exposed above the water.

Because the coastal environment is sensitive, only the minimum amount of vegetation was cleared to allow DGM equipment to pass through and environmental samples to be collected.

An intrusive investigation includes digging up some or all of the metallic objects identified by a geophysical survey to find out if they are munitions-related.

Intrusive Investigation of Bear Island

In November 2010, a combined geophysical survey and intrusive investigation was conducted within 200 acres of the historic Rocket Range 1 SDZ at the southern tip of Bear Island. The purpose was to determine if military munitions or munitions-related debris were present in the area. The investigation was conducted during the off-season to minimize any disruption to recreational users at Hammocks Beach State Park. All metallic items identified on Bear Island by aerial and terrestrial geophysical surveys were excavated by hand digging.

No munitions or explosives of concern were discovered,



Aircraft flare found on Bear Island



Helicopter during aerial survey

but some munitions-related debris was found and removed: one empty rocket fuel tank, three dummy bombs, and one 25-millimeter cartridge case.

During the environmental sampling conducted on Bear Island in January 2010, an aircraft flare was discovered in a heavily vegetated area. The flare was moved to a disposal pit about 75 feet away and destroyed by controlled detonation.

Environmental Sampling

For the environmental investigation, the team collected samples from soil, surface water, groundwater, sediment and pore water (water that is between sediment particles).

The samples were analyzed for explosives residues, perchlorate (a constituent in rocket propellant), and metals, to evaluate whether contamination related to the former range activities was present.

Explosives residues were not detected in any samples. Perchlorate was detected in groundwater samples at low levels, which were well below the regulatory screening level.

When concentrations of chemicals are below the screening levels defined by environmental regulatory agencies, it is generally agreed that little or no risk to human health or the environment is likely.

Based on the results of the environmental sampling, there is no unacceptable risk to humans or the environment at the site from exposure to soil, surface water, groundwater, pore water, or sediment. Therefore, no further environmental sampling is needed.

Next Steps

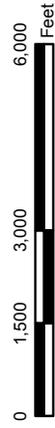
Except at Bear Island, the investigation thus far has not included intrusive investigation of the geophysical anomalies identified by the aerial and terrestrial surveys. Since an aircraft flare and some other munitions-related debris were discovered on Bear Island, it is possible that some of the other anomalies are munitions-related items. Therefore, an expanded investigation is planned to further evaluate the presence or absence of munitions and munitions-related debris in terrestrial or coastal wetland areas.

An expanded investigation of anomalies that were identified during the aerial and terrestrial surveys will identify the types of metallic objects and potential



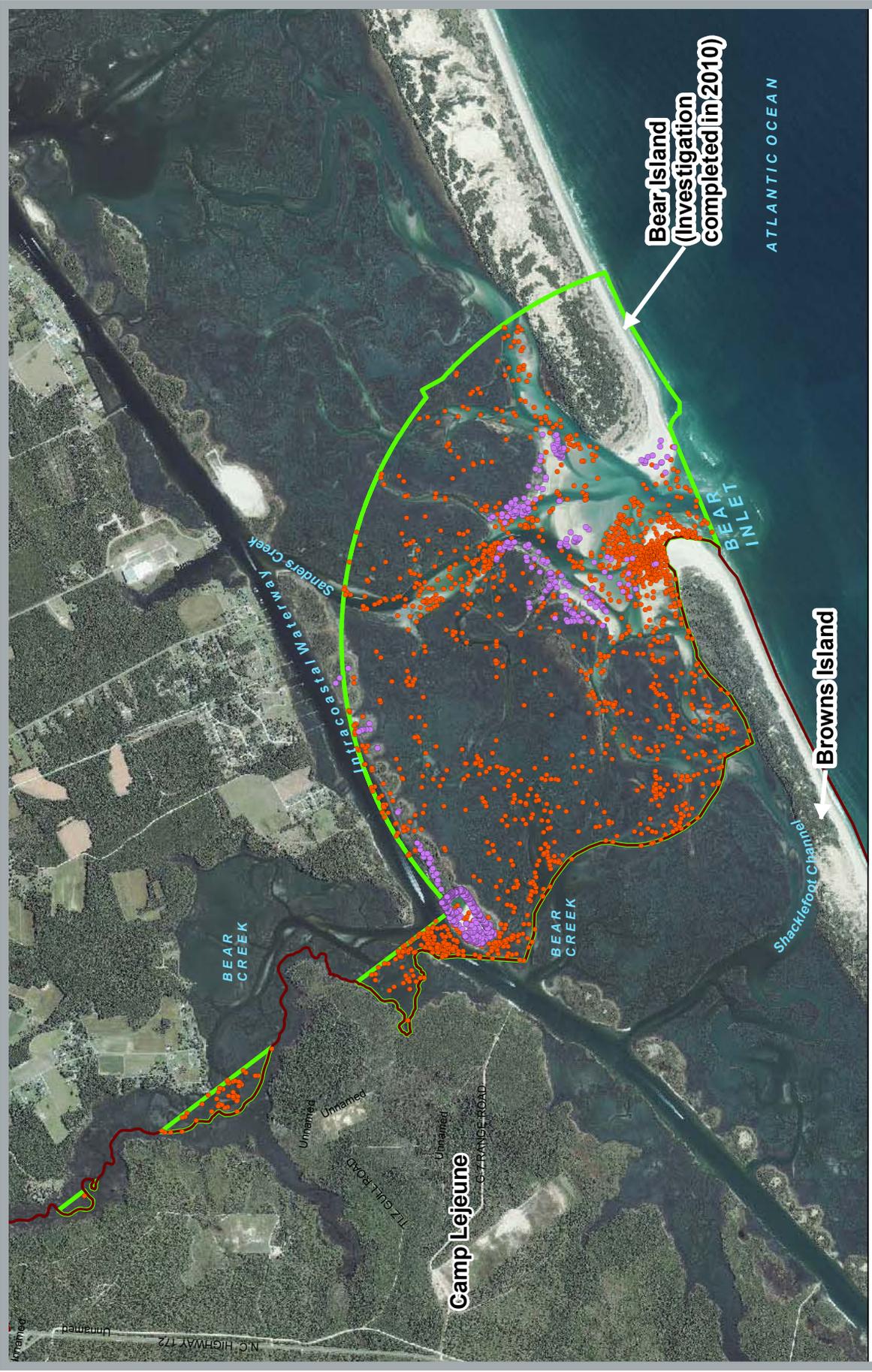
Legend

- Installation Boundary
- Land-Based Investigation Area
- Jurisdictional Wetlands
- Coastal Wetlands
- Off-Base SDZs



1 inch = 3,000 feet

Figure 1 – Former Off-Base Surface Danger Zones



Legend

- Terrestrial DGM Anomalies
- Aerial Survey Anomalies
- Off-Base SDZs
- Installation Boundary

Note: Anomalies are not to scale.

The anomalies could be munitions-related material or unrelated metallic objects.

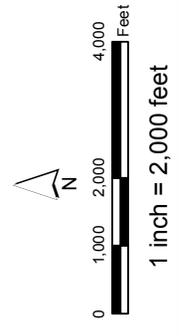


Figure 2 — Digital Geophysical Mapping Results



Typical topography within the proposed investigation area



hazards that are present in the former SDZs. Anomalies selected for investigation were generally located in areas more accessible to the public or closer to the former range target areas. The investigation team will use hand-held magnetometers and metal detectors to locate the objects and will dig them up by hand.

This comprehensive investigation will focus on areas where the public is likely to go, areas near known ranges, privately owned property, and areas where the earlier investigation identified higher concentrations of anomalies. The findings from the intrusive investigation will be used to determine if follow-up actions are needed and, if so, to plan those actions.

The intrusive investigation work is expected to begin in March 2013 and is anticipated to be completed by June 2013.

How to Find More Information

Restoration Advisory Board

You can learn more about the SDZs investigation work online at:

<http://www.lejeune.usmc.mil/sdz/siteinspection>

You also can learn more about Camp Lejeune's environmental cleanup and munitions response by attending meetings of the Restoration Advisory Board (RAB). The best way to get involved in the process is to become a RAB member.

The RAB is made up of community members, along with representatives of federal and state regulatory agencies, Camp Lejeune, and the Navy. The RAB acts as a focal point for exchanging information between Camp Lejeune and the local community about environmental restoration and

munitions response activities.

The RAB meets quarterly at the Coastal Community College, in Jacksonville, North Carolina. The date, time, and place of RAB meetings are advertised in the *Jacksonville Daily News*, the *Globe*, and the *Rotovue* newspapers. The public is always welcome to attend RAB meetings and membership is encouraged.

Administrative Record

Marine Corps Base Camp Lejeune compiles and makes available to the public a complete record of documents that were used to make investigation and cleanup decisions, called the Administrative Record File.

The Administrative Record File and other information about Camp Lejeune's Environmental Restoration and Munitions Response Programs is available online at: <http://go.usa.gov/TWs>.

Final reports are also available on CDs in the Reference Room at:

Onslow County Public Library
58 Doris Avenue East
Jacksonville, NC 28540
Phone: 910-455-7350

For your convenience, reports and fact sheets about the Off-Base SDZs investigation are available at:

Swansboro Branch Library
1460 West Corbett Avenue
Swansboro, NC 28584
Phone: 910-326-4888

Marine Corps Base Camp Lejeune has been investigating off-base areas that might have been affected by munitions training in the past.

The purpose of the investigation is to find out if military munitions or munitions-related debris are present in the area, if they pose an unacceptable safety or environmental risk, and whether or not further action is needed. The investigation is proactive, not because of any incident or discovery of munitions.

This newsletter describes the results of the investigation and the additional investigation that is planned.

A previous newsletter (June 2009) provided more information about the historic training areas that are being investigated. It can be found online at: http://www.lejeune.usmc.mil/sdz/information/SDZ_Factsheet_060309.pdf

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