Letterkenny Army Depot Bobwhite Quail Focus Area
Management Plan
2017-2027

Bobwhite Male **– David Lanier**

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PURPOSE

This plan has been created in conjunction with the newly formed partnership between Letterkenny Army Depot (LEAD), the Pennsylvania Game Commission (PGC), and Quail Forever (QF) in order to restore wild northern bobwhite quail to Pennsylvania at the Letterkenny Army Depot, northcentral Franklin County, Pennsylvania. A 3,679 acre Bobwhite Quail Focus Area (BQFA) has been established within the boundaries of the depot (Appendix A.) This plan will serve as a guiding tool for managers of this project. It provides a summary of the project, habitat and management objectives, and a proposed timeline for completion spanning the initial 11 years of the project.

GOAL

To establish a self-sustaining wild northern bobwhite quail population at Letterkenny Army Depot.

OBJECTIVES

- Establish at least 1,500 acres of year-round suitable quail habitat within the focus area as expeditiously as resources will allow to accommodate translocation.
- Maintain established suitable habitat through 2027.
- Translocate wild quail from partner state(s) for release into the focus area once sufficient suitable habitat has been established.
- Measure project progress and success through monitoring vegetation, quail population dynamics, and other similar habitat specialist surveys (American woodcock, grassland passerines, etc.).
- Answer research questions that benefit the greater good of the species and contribute to the overall understanding of bobwhite quail ecology and quail management.

FOUNDATION

1. Memorandums of Understanding
   A Memorandum of Understanding (MOU) will be developed between LEAD and the PGC. A separate MOU will also be developed between PGC and QF. These MOU's will outline the general responsibilities of each party in implementing quail restoration work within Pennsylvania. Once reviewed and approved these MOU's will be signed by all listed parties. There are several points within the LEAD/PGC MOU that should be highlighted within this document:
   - Prohibition of wildlife species release excepting wild bobwhite quail within the focus area
   - Prohibition of dog training within the focus area
   - Prohibition of quail and pheasant hunting within the focus area

2. Project Management Plan (this document)
   This plan will include initial planning, habitat management surveying, general translocation, monitoring, and a proposed timeline of tasks, accomplishments,

monitoring, and reporting. This plan will provide specific habitat management objectives and strategies for the life of the project. The plan will be developed in close coordination with LEAD personnel and reviewed by both internal and external partners.

3. Cover Mapping
   A series of habitat cover or resource conditions maps will be developed to assist with monitoring and habitat management planning. Initially a general map will be developed using desktop resources to identify broad habitat categories. Ultimately, a dynamic finer-scale map will be developed through on-the-ground surveying. This map will permit measuring habitat management progress throughout the project.

4. Habitat Assessment
   The use of cover mapping and habitat surveys conducted at random points throughout the focus area will enable managers to assess and monitor habitat suitability throughout the life of the project. This will inform decisions regarding translocation and assist in determining the feasibility of its timing.

SURVEYS & MONITORING

1. Monitoring Points (Pre- & Post-Release)
   Monitoring will be based upon the National Bobwhite Conservation Initiative's (NBCI) Coordinated Implementation Program (CIP) manual (http://bringbackbobwhites.org/download/nbci-coordinated-implementation-program-2016/) , a successful protocol that has already been instituted with positive results on project areas in other states. Monitoring points, and adjacent habitat measurements, will allow for evaluation of monitoring habitat changes throughout the life of the project. Habitat evaluation will be conducted using a combination of resources, but will likely rely on external partners for implementation. Vegetation sampling will occur within a 250-m radius of the spring call count survey locations (Appendix B). Additional monitoring locations may be established dependent upon available resources.

   Photo points will also be established throughout the focus area to visually represent change in habitat through time and provide relative changes to previous vegetative structure. A minimum of 65 photo points will be established with at least one found within each management unit.

2. Fall Covey Call Counts (Reference Points Pre- & Post-Release)
   Using a minimum of 4 randomly selected points within the LEAD focus area, annual fall covey call count surveys will be conducted between late-September and early-November, as recommended by NBCI CIP protocol. Survey methods will follow NBCI protocol within the CIP manual. Primarily LEAD & PGC staff will conduct fall surveys although this responsibility may shift if external partner resources become available.

3. Spring Call Counts (Reference Points Pre- & Post-Release)
   Using a minimum of 15 randomly selected points within the LEAD focus area, annual spring call count surveys will be conducted within the peak calling period (approximately June) as recommended by NBCI CIP protocol. Survey methods will follow NBCI

protocol within the CIP manual. Primarily LEAD & PGC staff will conduct spring surveys although this responsibility may shift if external partner resources become available.

4. Post-Release Survival and Mortality
   Radio telemetry will be conducted post-release to monitor or quantify survival, nesting habitat use, nesting habitat relations, nest success, sources of mortality, dispersal and home range. Methods or protocols used for telemetry will follow current best management practices to ensure optimal bird health and survival success. Telemetry will be conducted through a combination of resources, but with a focus on finding an external funding and personnel source such as academia, grant funding or a partnership funded position.

5. Multi-Species Monitoring
   Additional surveys will be implemented annually to measure effects of habitat change on other species and evaluate habitat quality. The two primary surveys to be completed are Breeding Bird Surveys (BBS) to measure non-game passerines (Eastern Meadowlark, Grasshopper Sparrow, etc.) as well as an American Woodcock Singing Ground Survey (SGS) route. A second SGS route is established outside of the focus area for comparison (Appendix B). Woodcock SGS routes will follow current US Fish & Wildlife Service protocol. A pre-existing BBS survey route will continue to be surveyed for the life of this plan. In addition, and dependent upon available resources, Breeding-bird point-counts will be completed at the 15 random points established for quail surveys. Primarily LEAD & PGC staff will conduct these surveys although this responsibility may shift if external partner resources become available. Other surveys such as pollinator, herpetofauna, or small mammal surveys could be conducted should they complement project objects and additional resources would become available. Continued hunter harvest surveys of both white-tailed deer and wild turkey will also occur.

   [Note: Survey protocols will be provided separately from this document.]

TRANSLOCATION

Note: See *Letterkenny Army Depot Bobwhite Quail Focus Area Translocation Plan* for additional specific details on translocation.

1. Planning & Strategy
   Prior to translocation, all current research pertaining to the subject will be closely considered as well as consulting with experts within this field in order to carefully craft a plan and/or strategies to increase the likelihood of long-term success.

2. Request Packet
   A generic request packet will be drafted by PGC Bureau of Wildlife Management and approved by the PGC Executive Office. This packet will include a request letter, along with supporting documentation such as the site-specific management plan and translocation plan.

3. Source States
   PGC staff will contact state agencies within the quail range that might be willing and able to provide a source of wild quail for translocation. Negotiations will occur in order to determine timelines, resource needs, and other requirements of the source/donor agency. If source states have available resources to assist with trapping and translocation those will be considered.

4. Timeline
   A prospective timeline will be developed for each potential donor state. This will be dependent on current population levels within the donor state, resource availability, and the suitability of habitat within the LEAD focus area.

5. Quantity & Timing
   The total number of wild quail translocated from any given location will largely be dependent on focus area habitat suitability and resource requirements by the donor state as well as their population levels at that time. According to past research (Guthery et al. 2000, Martin et al. 2017), a minimum starting number of 800 quail is recommended for a self-sustaining population. To account for annual losses (65% mortality in GA), an additional number of birds released (>200) is recommended. There is some confusion on whether these birds should be released in a single year or could be released over multiple years. It's suggested that regardless of when birds are released, as long as the minimum target (800 birds) is reached by the end of translocation effort. The current state of quail populations range wide being what it is, acquiring 800-1000 birds in a single year could be at best a herculean effort, at worst impossible. For Pennsylvania's efforts, a more realistic approach may be between 200-340 birds annually translocated within 3-4 years until 800-1000 have been released, although if possible it would be preferable to translocate in a single year. Multiple donor states should be pursued each year to ensure greater success in reaching translocation goals and increasing genetic diversity of resulting progeny. A minimum release period of 3 consecutive years should be anticipated.

HABITAT MANAGEMENT

Property History

The land that now makes up the 18,486 acre parcel known as Letterkenny Army Depot was once used primarily for cropland and pastureland. Originally 20,508 acres were acquired in 1942 for the construction of the Letterkenny Ordinance Depot (now Letterkenny Army Depot). Over time some land was transferred to various state agencies for public use. A portion of that land was turned over to the Pennsylvania Game Commission and now makes up State Game Lands 235.

Land Use

Land use within the depot has changed over time, but the primary usage is semi-subterranean weapons storage facilities. A small portion is an industrial/developed area with large above-ground parking areas for vehicle storage. The majority of the property is a mixture of forested areas with agricultural field openings and some brushy areas. Many of the agricultural fields are

currently under lease agreements with local farmers. Most of the leased cropland is comprised of perennial hay operations. A minority of the fields and openings are managed by LEAD Natural Resources staff for wildlife food and cover. In one area of the base, open ground persists as this is used for munitions destruction. There are currently two zones making up the LEAD facility. The first, Zone 1, is the inner most area which is surrounded by fence and is highly secure and inaccessible. Zone 2 surrounds Zone 1 and although permission is needed, this area is open to recreation such as hunting and fishing on a limited basis.

Focus Area

Approximately 3,679 acres of Zone 1 has been selected and designated as the Letterkenny Army Depot Bobwhite Quail Focus Area. The location and size of the focus area was selected based primarily on a combination of habitat type and lands available to management. The focus area is situated on the western portion of the facility, at the base of the North Mountain. The focus area encompasses a variety of habitat types including reverting fields, woodlands, ponds and watercourses, as well as some buildings and the demolition area. The focus area is largely bounded by existing roads, but in some cases the boundary is not clearly distinguished without the aid of a map. It is located furthest from the developed area, and is least utilized, with the exception of the demolition area.

Habitat Categorization

Landcover has been evaluated at a cursorily level through desktop satellite imagery analysis and classified into 7 fields or types (Appendix C). Acreage is approximate and some overlap occurs. Percentages of these are as follows:

Cover Type	Acres	Percentage
Woodland	1,936	54%
Leased Ag Fields	555.97	16.7%
Food Plots	71	2.1%
Open	637	18%
Roads	186	5%
Urban	168	5%
Ponds	3	<1%

The *Woodland* cover type represents a vast collection of differing stand types and sizes. It is defined as being greater than 12 feet in height and having anywhere crowns are in contact with other crowns forming a canopy that inhibits light from reaching the ground. It should be noted that this definition is often used when describing 'Forestland', but in this case the terms 'Forestland' and 'Woodland' are used interchangeably. *Leased Ag Fields* cover type represent openings that have been cleared of rocks and stumps and are being manipulated in some way through agricultural production or mowing. *Food Plots* are fields cleared of rocks and stumps and are being planted annually with unharvested crops to be utilized by wildlife. *Open* areas are those open spaces having grass, forbs, or early successional woody growth cover less than 12 feet in height. The *Roads* cover type is any area where pavement or black top has been laid for travel or vehicle storage. *Urban* cover type includes buildings, mowed areas around buildings

and the demolition area. The *Pond* cover type accounts for two small ponds found within the focus area.

Detailed cover maps currently are unavailable, therefore, it is difficult to determine how much suitable habitat is currently available. Habitat suitability within the focus area has not been measured or assessed. As the project begins, we will conduct intensive habitat monitoring to answer that question using partnership resources. Following National Bobwhite Conservation Initiative (NBCI) habitat monitoring protocol, we will measure current suitable habitat and continue monitoring throughout the life of the project to ensure management objectives are being met. Habitat monitoring will occur annually if external funding or personnel resources can be obtained. If this is not the case than habitat monitoring will occur years 1, 5, and 10 which is the minimum effort found in the CIP manual.

Habitat Management Practices/Techniques

1. Prescribed Fire
   Prescribed fire will be used as a habitat management tool with multiple objectives. The two primary objectives will be to control invasive vegetation and to thin and maintain native grass stands and perennial and annual forb stands. Opening stands at ground level is critical for quail movement. Another benefit will be to reduce coarse woody debris left over from tree clearing. Slowing succession is a vital role for prescribed burning. Prescribed burning will be conducted primarily by PGC personnel with close cooperation and participation by LEAD staff. In concert with additional habitat inventories, a prescribed fire cover map (Appendix D) will be used to identify areas currently suitable for the application of controlled burns and other areas requiring mechanical or other preparatory treatments prior to fire.

2. Disking
   The use of disking to manage and enhance habitat for bobwhites has been used successfully throughout the species range. Disking will be used to thin stands of native grasses and promote forb growth within fields or along border edges. Disking will be conducted by LEAD staff and their designated volunteers.

3. Chemical Application
   Herbicide use within the focus area will assist in the creation and maintenance of quail habitat by controlling undesirable plants while establishing native forbs and grasses. Chemical application will be conducted by LEAD staff and their designated volunteers.

4. Mechanical Management
   Mechanical means (not including discs) will be used within the focus area to manage bobwhite habitat. These tools will be used primarily to remove overstory, maintain shrub cover, and control non-native vegetation. Both heavy machinery, and hand tools will be used by contractors, LEAD staff and their designated volunteers. Commercial timber harvest would also fall under this category.

5. Plantings & Regeneration

Both planting and allowing natural regeneration will be used within the focus area for suitable quail habitat establishment. These strategies will focus primarily on annual/perennial forbs, native warm-season grasses, and shrubs. Plantings will primarily be led by LEAD staff and designated volunteers, but may receive external funding or volunteer resources.

Desired Future Resource Condition

The overall habitat management goal is to establish, manage, and maintain a mixed mosaic of early successional habitats that incorporate the three primary habitat needs of bobwhite quail:

1. Nesting Cover – Suitable nesting habitat shows a lot of variation, as quail have the ability to nest in a variety of habitat types. Typically, this nesting habitat consists of clump or bunch grasses where females can burrow underneath and use the grass for overhead protection. Native warm-season grass varieties generally are considered ideal for this cover, but spacing is important. Best spacing for clumps should be one 12 inch bunch per four square feet with a height of 6-18 inches. Warm-season grasses interspersed with some forb stands provide most of the resources needed for a nesting female and her newly hatched brood. Nesting cover is best provided broadly as opposed to linear stands to enhance nest success and reduce nest predation.

2. Brood Habitat – Brood habitat in Pennsylvania has historically consisted of old -field growth. Fallow fields support a diversity of native forbs that provide food throughout the year for quail. Many legume type forbs attract insects in the summer when young chicks need large amounts of protein. An important aspect of brood cover is the amount of vegetation at ground level. This means 25-75% bare ground is needed under a largely herbaceous canopy which allows for quail chick movement while utilizing the overhead concealment. [Note: Throughout fall and winter, many seed-producing forbs provide an important food staple for quail when other food sources are unavailable.]

3. Protective Habitat – Often referred to as the 'Headquarters', shrubs offer many benefits to bobwhites throughout the year. Headquarters provide escape cover from predators, cool areas for loafing and rest during the summer, and cover that they can be used to avoid snow and ice throughout the northern winters. In some parts of the bobwhite's range, multiflora rose and *Rubus spp.* may serve as headquarters. To provide optimal protective habitat for bobwhite, these areas should include woody shrubs along fence rows and field borders. Because of this, historically most shrubby cover has been found in a linear array, but things such as loose brush piles or islands of shrubs can also provide this important habitat type. Density is important when considering what suitable shrub cover for quail is. Protective habitat must be thin enough to allow quail to fly in and through, but dense enough to keep out most avian predators such as coopers hawks or goshawks and discourage terrestrial predators such as fox, raccoons, and skunks. A dense upper

level with an open understory is best when considering shrub cover. Where brushy cover is primarily saplings, management is required to keep succession at that level or earlier.

Not only is understanding the makeup of the three core quail habitat types crucial, but the placement and relative location of these different habitat components in relation to one another and their interspersion is extremely important. Ensuring these elements are found adjacent to each other and dispersed throughout the focus area will provide secure cover increasing survival and reproductive success. The NBCI CIP manual focuses specifically on habitat structure and should be referenced continuously throughout the establishment and maintenance of habitat within the focus area. Brood habitat should comprise the majority of the existing habitat, followed by nesting habitat and then protective habitat. All are equally important however, and without one type, the focus area would not be suitable for quail survival and success.

Desired future cover within the focus area can be seen in Appendix E. To provide a more precise figure for habitat management objectives, urban and road (353.6 acres) cover types were removed from projected potential habitat (3,325.4 acres). It is broken down in the following table by acreage and percentage:

Cover Type	Acreage	% Cover
Forbs/Annual Weeds	1,923.85	57.9
Leased Ag. Fields	555.97	16.7
Shrubs	387	11.6
Warm Season Grass	292.8	8.8
Food Plots	71	2.1
Oak Savannah	52	1.6
Woodlands	42.8	1.3

Forestlands:

The overall goal for this habitat type is to maintain and enhance mature forest stand structure and long-term integrity of forest ecosystem processes.

Two primary forested habitats are desired within the focus area. The first is an Oak Savannah type system where basal area is reduced and a strong herbaceous component is allowed to grow within the understory. This system will provide both a hard mast food source as well as nesting and brood habitat within the understory. The second is found along stream corridors and riparian areas, providing shade needed to maintain important water temperatures to support a variety of aquatic life. Forestland management will affect only a small amount of acreage within the focus area but is nonetheless important.

Strategy 1: Conduct silvicultural treatments that include clearing to open canopy and allow sunlight to the forest floor promoting herbaceous growth to create nesting and brood rearing habitat. Implementation of treatments will depend on stand analyses through periodic habitat surveys.

Implementation Action 1: Use commercial or, if applicable, non-commercial felling to cut oak stands to reduce and maintain a basal area of 20-40 sq. feet/acre to achieve less than 30% canopy closure. This treatment should be implemented once in each compartment during this 11-year planning cycle. Following treatment, stands will be re-evaluated for future management.

Units (Appendix F):

Years 2017-2020: n/a

Years 2021-2024: Compartment K: K5a, K6a; designated portions of K7, K8, K9

Years 2025-2027: n/a

Implementation Action 2: Use prescribed fire to control woody growth and to promote native warm season grass and annual forb growth within forest understory. Prescribed fire should be conducted during dormant season when fuel load is heaviest or during growing season although timing may be dependent on weather, available fuels, and vegetation growth.

Units:

Years 2017-2020: Compartment K: K5a, K6a; designated portions of K7, K8, K9

Years 2021, 2024 & 2027: Compartment K: K5a, K8

Years 2022 & 2025: Compartment K: K6a, K9

Years 2023 & 2026: Compartment K: K7

Shrublands: The overall goal for this habitat type is to increase and enhance shrubland acreage along forested stand edges, surrounding agricultural fields, and throughout both native warm-season grass and forb stands. Shrub habitat within the focus area provides escape cover, thermal cover, and loafing areas for quail throughout the year. Existing shrub habitat beneath the current canopy will be utilized when considering the below strategies.

Strategy 1: Use commercial or non-commercial tree felling and mulching techniques to enhance, increase, or delineate existing shrub cover for bobwhite quail and other associated species adjacent to brooding and nesting cover. Maintenance of shrub habitat is crucial to continued efficacy. Shrublands should be maintained through mechanical treatment as well as prescribed fire throughout the life of the project. The use of herbicide to control invasive shrub species and promote native trees and shrubs should also be considered as an effective tool.

Implementation Action 1: Use commercial or non-commercial felling, dozing, or mulching techniques along designated 50’ shrub corridors in order to remove 80-

100% of forested overstory canopy to allow for early successional shrub layer. Follow with herbicide treatments if necessary.

Units:

Years 2017-2020: Compartment K: all units **except** K16; Compartment F: F1, F2, F3; Compartment G: G0, G1, G2, G3, G4, G5

Years 2021-2024: Compartment F: F0, F8, F9, F11, F13; Compartment G: G6, G7, G8, G9, G10, G11; Compartment C: C0, C1, C2, C3, C4, C5, C8

Years 2025-2027: Compartment H: all units except H7, H13

Implementation Action 2: Use commercial or non-commercial felling, dozing, or mulching techniques along designated forest stand edges to cut back 30-50' from edge removing 80-100% of forested overstory canopy. Half the cut-back area nearest the forest should be established in shrubs while the other half closest to the field should be established in forbs/annual weeds (See *Terrestrial Herbaceous Openings, Strategy 2, Implementation Action 3* below). Follow with herbicide treatments if necessary.

Units:

Years 2017-2020: Compartment K: K5a, K6a, K7, K8, K9,

Years 2021-2024: Compartment F: F0

Years 2025-2027: Compartment H: H1

Implementation Action 3: Use commercial or non-commercial felling, dozing, or mulching techniques within designated shrub patches or 'thickets' to reduce forested overstory canopy by 80-100%. Follow with herbicide treatments if necessary.

Units:

Years 2017-2020: Compartment K: K1, K4, K5b, K6b, K7, K12; Compartment F: F4

Years 2021-2024: Compartment F: F0; Compartment G: G9, G11; Compartment C: C8

Years 2025-2027: n/a

Herbaceous Openings: The overall goal for this habitat type is to create and maintain herbaceous openings to provide a mosaic of both nesting and brood rearing habitat. The two

primary herbaceous cover types are native warm season grasses and annual/perennial forbs. Two additional types found within the focus area are food plots, which will be managed to provide annual winter forage, and the agricultural leases.

Strategy 1: Warm Season Grasses. Establish, maintain and enhance warm-season grass habitat structure and vigor as well as control invasive species through disking, prescribed fire, mowing, herbicide treatment and/or reestablishment plantings.

Implementation Action 1: Establish warm season grass stands through commercial or non-commercial felling, dozing, or mulching techniques to remove 100% of the canopy and woody cover. Slash or coarse woody debris associated with the removal of woody cover can be used in creating loose brush piles or linear rows (wind rows) to provide temporary shrub habitat and protective cover for quail. Other options would be piling for burning or cutting and allowing to lay where felled.

Units:

Years 2017-2020: Compartment K: K15; Compartment F: F1; Compartment G: G0, G1, G2, G3, G14

Years 2021-2024: Compartment G: G9 Compartment F: F8, F9

Years 2025-2027: Compartment H: H3, H4, H5, H6, H11

Implementation Action 2: Establish warm season grass stands through the removal of cool season grass/fescue by way of prescribed fire, heavy disking, or herbicide treatment. These units should then be followed with successive treatments to prevent cool season/fescue from returning and eventual plantings. Planting rates should follow current best management practices and/or research findings.

Units:

Years 2017-2020: Compartment K: K2, K3, K6b, K7; Compartment F: F1, F2; Compartment G: G3, G5, G6, G8, G12, G14

Years 2021-2024: Compartment C: C0, C3, C4

Years 2025-2027: Compartment H: H2, H3

Implementation Action 3: Maintain warm season grass stands through disking, prescribed fire, mowing, or selective herbicide treatments to reduce woody invasion, thatch layer, and high density of plants within the stand as well as increase bare ground at ground level (50-70% bare ground needed). Optimal density of warm season grass stands should maintain one 12 inch clump per 4

square feet. Prescribed fire and disking should be used within a 3 year rotation on designated warm season grass units. If disking is the primary technique, units should be broken into thirds, with a third being disked each year within the 3-year rotation. Any technique used should occur outside of the nesting season and between the months of October – March post-release of quail. Timing is of less concern pre-release.

Units (units will be placed in rotation as they become available):

Year 2017: Compartment G: G0, G1, G2, G3, G4; Compartment K: K16

Years 2018, 2021, 2024 & 2027: Compartment K: K7, K10; Compartment F: F8; Compartment G: G1, G14; Compartment H: H2, H5

Years 2019, 2022 & 2025: Compartment F: F1, F9; Compartment G: G2, G5, G8, G12; Compartment C: C4; Compartment H: H3, H6, H11

Years 2020, 2023 & 2026: Compartment K: K2, K3, K6b, K15, K16; Compartment F: F2; Compartment G: G0, G3, G6, G9; Compartment C: C3, C0; Compartment H: H4

Strategy 2: Annual/Perennial Forbs. Establish, maintain and enhance forb growth, habitat structure and vigor as well as control invasive species through disking, prescribed fire, mowing, herbicide treatment and fallowing.

Implementation Action 1: Establish forb stands through commercial or non-commercial felling, dozing, or mulching techniques to remove 100% of the canopy and woody cover. Slash or coarse woody debris associated with the removal of woody cover can be used in creating loose brush piles or linear rows (wind rows) to provide temporary shrub habitat for quail. Other options would be piling for burning or cutting and allowing to lay where felled.

Units:

Years 2017-2020: Compartment K: all units **except** K5a, K6a, K16; Compartment F: F1, F2, F3; Compartment G: G1, G2, G3, G4, G5

Years 2021-2024: Compartment F: F0, F8, F9, F11, F12, F13; Compartment G: G6, G7, G8, G9, G10, G11, G12, G13; Compartment C: C0, C1, C2, C3, C4, C5, C8

Years 2025-2027: Compartment H: all units

Implementation Action 2: Establish forb stands through the removal of cool season grass/fescue by way of prescribed fire, disking, or herbicide treatment. These units should then be followed with successive treatments if needed to prevent cool season/fescue from returning and fallowed to allow existing seeds to sprout.

Units:

Years 2017-2020: Compartment K: K0, K1, K2, K3, K5b, K6b, K7, K11, K12, K13; Compartment F: F1, F2, F3; F12; Compartment G: G1, G2, G3, G4, G5, G12, G14; Compartment H: H3, H4, H5, H6, H8, H9, H10, H11, H12

Years 2021-2024: As needed

Years 2025-2027: As needed

Implementation Action 3: Establish forb borders along field border cut-backs. Where tree removal has occurred along forested edges (See *Shrublands, strategy 1, implementation action 2* above), half of the cut-back area should be converted to forb stands nearest the field edge.

Units:

Years 2017-2020: Compartment K: K5a, K6a, K7, K8, K9,

Years 2021-2024: Compartment F: F0

Years 2025-2027: Compartment H: H1

Implementation Action 4: Maintain forb stands through disking, prescribed fire, or mowing to reduce woody invasion, thatch layer, and high density of plants within the stand as well as increase bare ground at ground level (25-75% bare ground needed). Prescribed fire and disking should be used within a 3 year rotation on designated forb stand units. If disking is the primary technique, units should be broken into thirds, with a third being disked each year within the 3 year rotation. Techniques used for maintaining this cover should be used late fall, through winter, and into early spring (March – April) post-release of quail.

Units (units will be placed in rotation as they become available):

Years 2018, 2021, 2024 & 2027: Compartment K: K0, K4, K7, K10, K13; Compartment F: F0, F3, F8, F12; Compartment G: G1, G4, G7, G10, G13; Compartment C: C2, C5, C8; Compartment H: H2, H5, H9, H12

Years 2019, 2022 & 2025: Compartment K: K1, K5b, K8, K11, K14; Compartment F: F1, F4, F9, F11; Compartment G: G2, G5, G8, G11, G12; Compartment C: C4, C1; Compartment H: H3, H6, H8, H11

Years 2020, 2023 & 2026: Compartment K: K2, K3, K6b, K9, K12, K15; Compartment F: F2, F10, F13; Compartment G: G3, G6, G9; Compartment C: C0, C3; Compartment H: H1, H4, H10, H13

Strategy 3: Food Plots. Maintain established non-leased agricultural areas as annual winter forage plots.

Implementation Action 1: Seed designated food plots on a rotational basis, with annual grains. Crops should be left standing, pushed over, or mowed >15" above ground level and not removed or tilled until immediately prior to replanting the unit. Suggested crop species are milo, sorghum, wheat, corn, soybeans, Egyptian wheat, German foxtail millet, sunflower, or proso millet. Limited herbicide usage should occur and only if absolutely necessary for the success of the crop. Insecticides should not be used. [Note: Examine past herbicide applications to assist in determining plantings due to potential carryover.]

Units:

All Years: Compartment K: K4, K5b; Compartment F: F4, F8; Compartment G: G9, G10, G11; Compartment C: C0, C1, C3, C8; Compartment H: H6

Strategy 4: Agricultural Leases. Because agricultural leases cannot be considered year-round quail habitat, any available habitat creation within these areas should be pursued such as field border edges through government set-aside programs.

Implementation Action 1: Evaluate all agricultural leases to determine eligibility to enroll lessees in FSA CP-33 field border practices. Investigate cropping history, natural resources concern, and lessee interest. If fields would qualify, enroll and establish maximum acreage of field borders (30 – 120' with 80' being optimal) within leased fields. Field borders should consist of native warm season grasses, and be managed as such under strategy one above. As leases expire, consider building in field border edges to successive lease. [Note: Examine past herbicide applications to assist in determining plantings due to potential carryover.]

Units:

Years 2017-2020: Compartment K: K0, K1, K2, K4, K5b, K7, K10; Compartment F: F0, F2, F3, F11

Years 2021-2024: Compartment C: C4, C5

Years 2025-2027: Compartment H: H2, H4

Strategy 5: Igloo Management. Munitions storage facilities, often referred to as 'Igloos' are built with 2' of concrete and then covered with 2' of soil. Igloo surface must be managed to prevent any and all woody growth from occurring. Currently igloos are largely covered with cool season grasses, with some having a mix of cool and warm season, while others have a mix of cool season and forbs. These areas are best managed as and utilized by quail as brood habitat.

Implementation Action 1: Igloo management should focus on 2-3 year rotational burning as the primary control of woody intrusion. If prescribed fire cannot be achieved within the needed rotation, then mowing or herbicide treatments should be used to set back woody succession. Treatments can occur any time pre-release but should be conducted between October and March post-release of quail.

Years 2018, 2021, 2024 & 2027: Compartment K: K4, K7, K10, K13; Compartment F: F3, F8; Compartment G: G1, G4, G7, G10; Compartment C: C2, C5

Years 2019, 2022 & 2025: Compartment K: K1, K5a, K5b, K8, K11, K14; Compartment F: F1, F4, F9; Compartment G: G2, G5, G8; Compartment C: C4, C1

Years 2020, 2023 & 2026: Compartment K: K2, K3, K6b, K9, K12; Compartment F: F2, F10, F13; Compartment G: G3, G6, G9; Compartment C: C3

RESOURCES

1. **Letterkenny Army Depot**
   - Staff (3 part time) & Volunteers (~12 part time)
   - Equipment (tractors, implements, skid steer w/forestry head, loader & dozer)
   - Expertise on federal land management & security
2. **Pennsylvania Game Commission**
   - Staff (1 part time)
   - Rx Fire (full complement of staff as well as needed equipment, fuel, etc.)
   - Limited funds for negotiating translocation
   - Expertise on species management & plan writing
   - Project coordination
3. **Quail Forever**
   - Staff (1 part time)
   - Expertise on habitat management & seed mix availability
   - Coordination of USDA set-aside programs
   - Chapter funding

[Note: Potential partnerships and associated resources exist such as academia, other NGO's, etc. and will be pursued for the life of the project.]

COST

(TBD – Cost will be determined throughout the life of the project this being the first focus area in PA)

CHALLENGES

1. **Translocation**
   - With the bobwhite range shrinking, donor states will be reluctant to provide quail
   - Although current bobwhite populations have recently increased within mid-western states, the future of those populations is unknown and could possibly reverse dependent upon weather and other factors.

   Solution: Continue open dialog with potential donor states and form a consortium of translocation experts to assist in project planning and strategy.

2. **Funding**
   - Due to financial constraints, neither agency will be able to provide a large amount of funding specifically for this project, beyond the personnel commitments outlined above. This may change in future years but would be most beneficial at its inception.

   Solution: Pursue both internal sources such as timber revenue and external partnership resources such as grants, academia, pollinator initiatives, and multi-species project funding.

3. **Competing Objectives**
   - Competing stakeholder interests could negatively impact implementation of this plan through:
     - The desire to release quail prior to the necessary establishment of suitable habitat.
     - The re-direction of resources during habitat establishment and translocation throughout the life of the plan.

   Solution: Continued communication and solicitation of input from stakeholders to encourage project ownership, collaboration, and commitment.

TIMELINE

- **Annually** (tasks completed every year - not listed under years below)
  - Conduct LEAD BQFA Partners Meeting (January)
  - Complete AMWO SGS (April)
  - Complete BBS surveys (May)
  - Complete spring call counts (June)
  - Complete photo point surveys within units following habitat management (June)

- Complete habitat circle vegetation surveys (July-August)
- Complete fall covey call counts (October)

- **2017**
  - Complete LEAD BQFA Management Plan (April)
  - Complete LEAD/PGC MOU & QF/PGC MOU (May)
  - Begin implementing habitat management practices on core area of focus area (April – in continuation)
  - Send translocation commitment request letters to potential donor agencies (Summer/Fall)
  - Complete initial Rx burn (Spring-Fall)

- **2018**
  - Begin planning & strategy coordination with translocation experts (January – in continuation)
  - Complete site-specific translocation plan (Summer/Fall)
  - Complete official requests for translocation from potential donor states (Fall/Winter)
  - Continue habitat management practices (January – in continuation)

- **2019**
  - Coordinate trapping effort in donor state(s) (Dependent on habitat suitability)
  - Continue habitat management practices (January – in continuation)

- **2020**
  - Coordinate trapping effort in donor state(s) (Winter – Dependent on habitat suitability)
  - Continue habitat management practices (January – in continuation)
  - Complete release of wild quail (March – Dependent on habitat suitability)
  - Complete telemetry monitoring of released quail (March – in continuation)

- **2021**
  - Continue habitat management practices (January – in continuation)
  - Complete release of wild quail (March – Dependent on habitat suitability)
  - Complete telemetry monitoring of released quail (March – in continuation)

- **2022**
  - Complete release of wild quail (March – Dependent on habitat suitability)
  - Complete telemetry monitoring of released quail (March – in continuation)
  - Continue habitat management practices (January – in continuation)

- **2023**
  - Complete release of wild quail (March – Dependent on habitat suitability)
  - Complete telemetry monitoring of released quail (March – in continuation)
  - Continue habitat management practices (January – in continuation)

- **2024**

- Continue habitat management practices (January – in continuation)

- **2025**
  - Continue habitat management practices (January – in continuation)

- **2026**
  - Continue habitat management practices (January – in continuation)

- **2027**
  - Continue habitat management practices (January – in continuation)
  - Evaluate project effectiveness and report
  - Complete revised management plan for the following time period

Note: This timeline represents the proverbial 'best case scenario' when considering the establishment of habitat and translocation timing. **Quail should <u>not</u> be translocated into the focus area until the needed amount of suitable habitat has been established.** Although presently pursuing additional external resources for the project, due to current project budget constraints there is the potential that all timeline objectives may not be reached, and the possibility is likely that some will need to be moved to future years. Original planning incorporated initial release in 2018, but the large majority of reviewers recommended 2019 at the earliest to allow additional planning and habitat establishment.

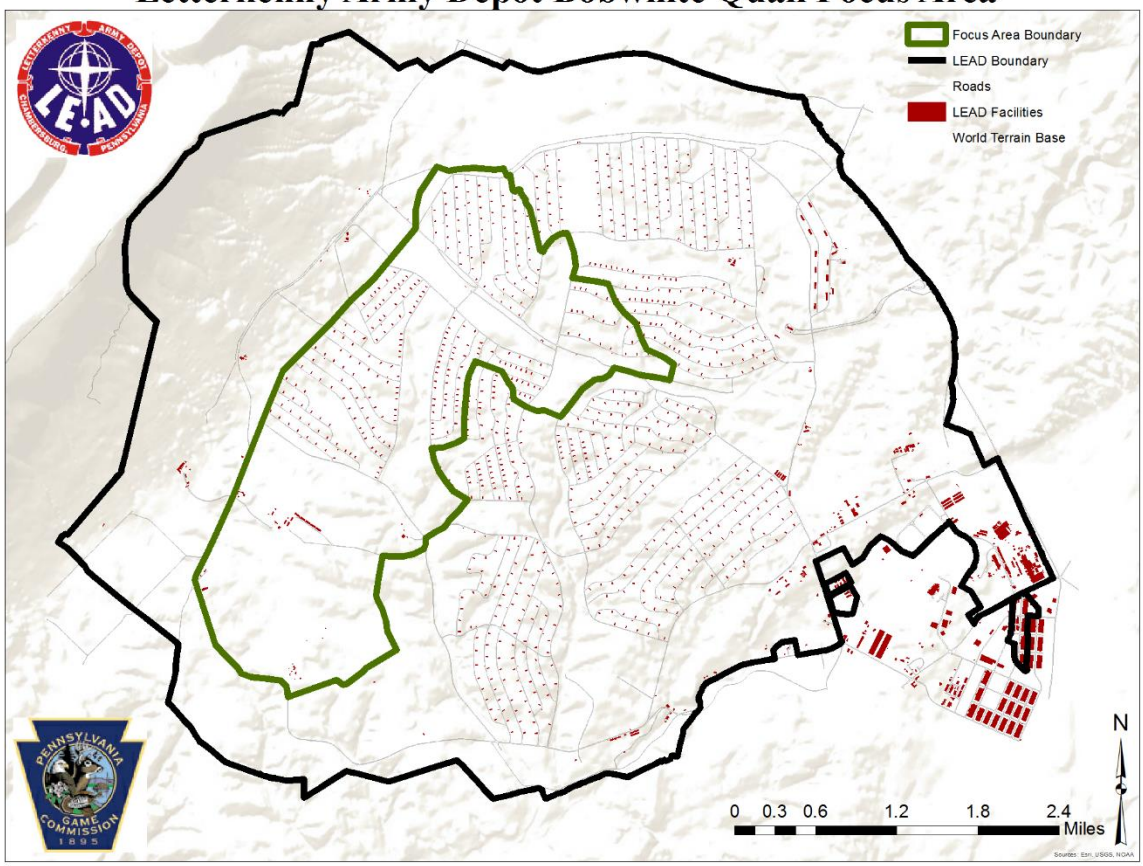
This timeline represents the initial 11 years of the project. Following year 2027 the project should be re-evaluated to assist in guiding it into the future. Should any party decide any part of the plan requires reconsideration or revision, that party should notify all other partners to begin discussions on such changes.

LIVING DOCUMENT

It is of great importance for users of this document to understand that although it should be used as a tool to help guide operations and management of the focus area, it is a living document and it must retain the ability to change throughout the life of the project in order to best reflect current conditions, and incorporate new tools, techniques, strategies, and information produced here and elsewhere concerning quail management. Changing resources, vegetation response, updated technology, and new information will all play a critical in guiding future management and in order to be successful, managers should maintain an attitude of flexibility, ingenuity, and continued dedication to the primary objectives.

Appendix A: LEAD BQFA Boundary Map. Background image is shaded relief imagery to highlight topographic details.

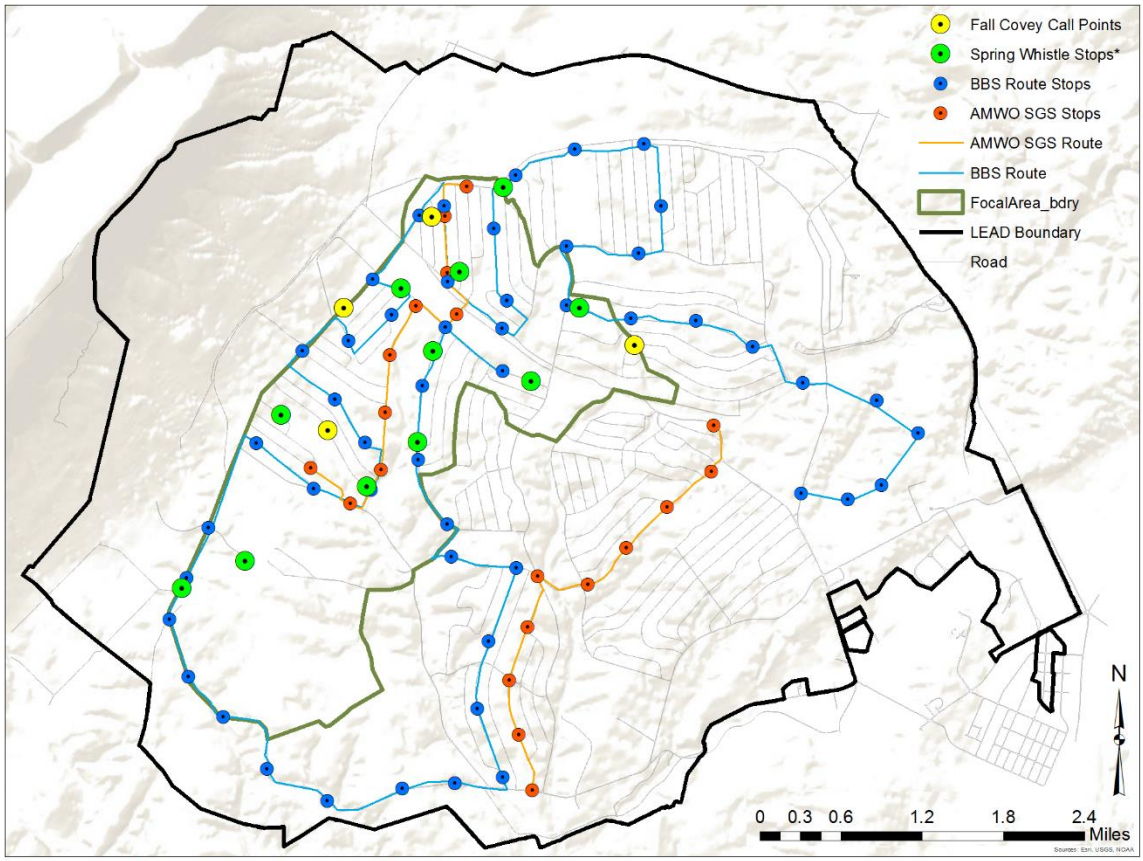
Letterkenny Army Depot Bobwhite Quail Focus Area



Focus Area Approximate Acreage = 3,680

Appendix B: Wildlife Survey & Monitoring Locations Map showing both current BBS survey route with stops, fall covey count, and planned spring whistle stops (call counts), and AMWO routes with stops.

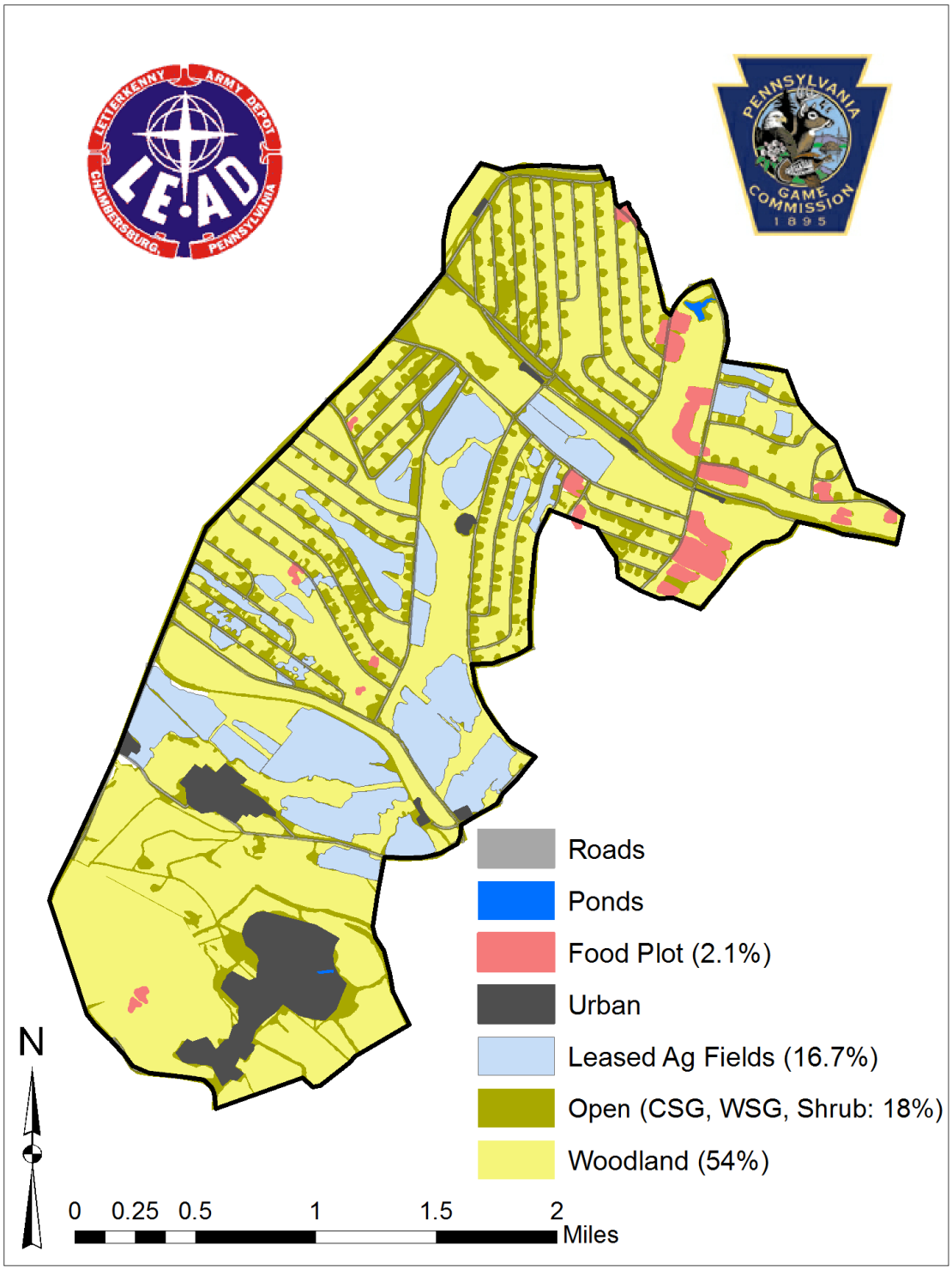
LEAD BQFA Wildlife Survey & Monitoring Locations & Routes



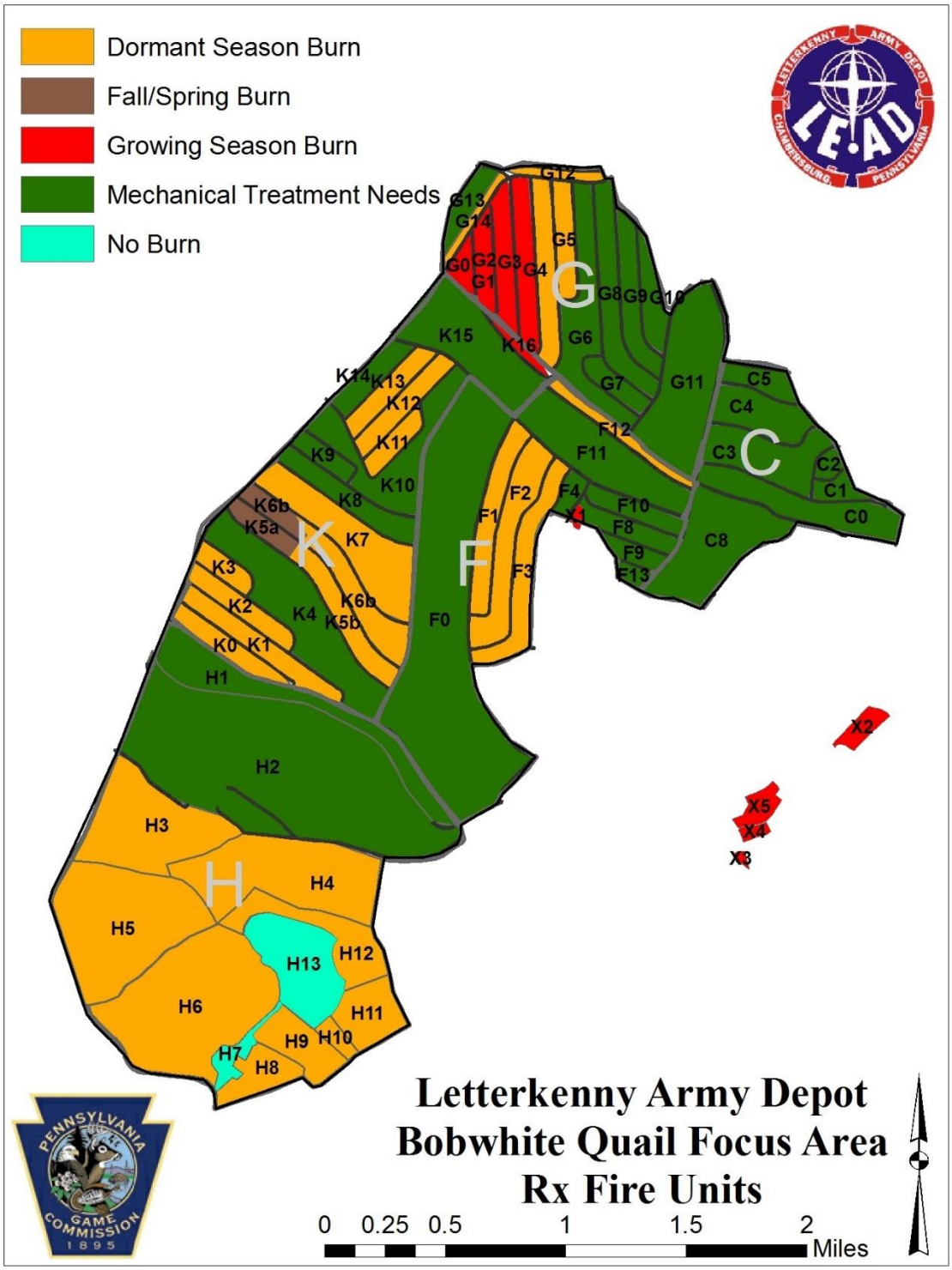
* Fall covey call count locations are also included within spring whistle stop survey.
Vegetation sampling locations will use spring and fall quail survey locations.

Appendix C: LEAD BQFA Current Resource Conditions Map showing cover types as of February 2017.

LEAD BQFA Current Resource Conditions Map (February 2017)

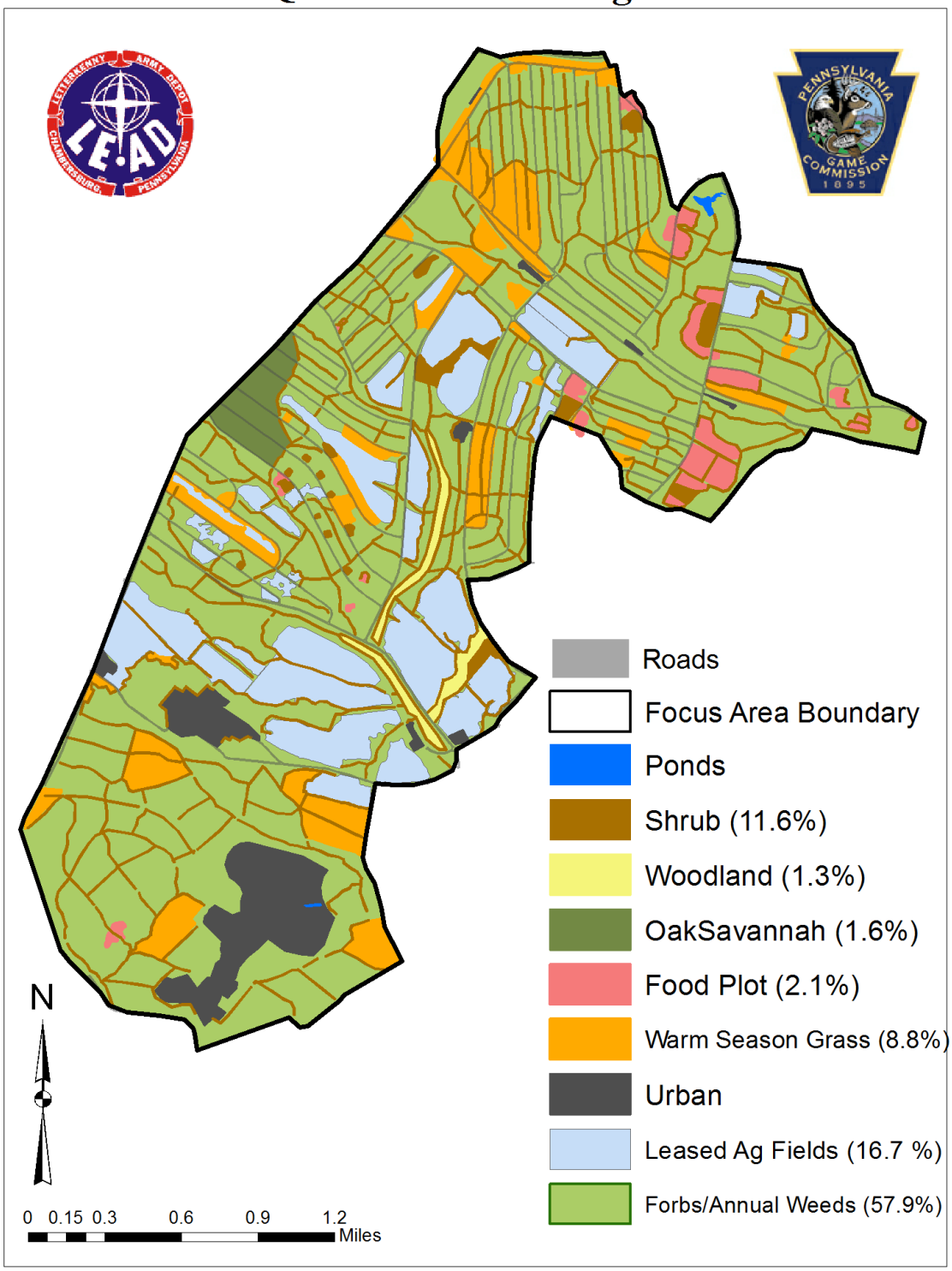


Appendix D: LEAD BQFA Prescribed Fire Management Map showing current fuel types with planned burn units.



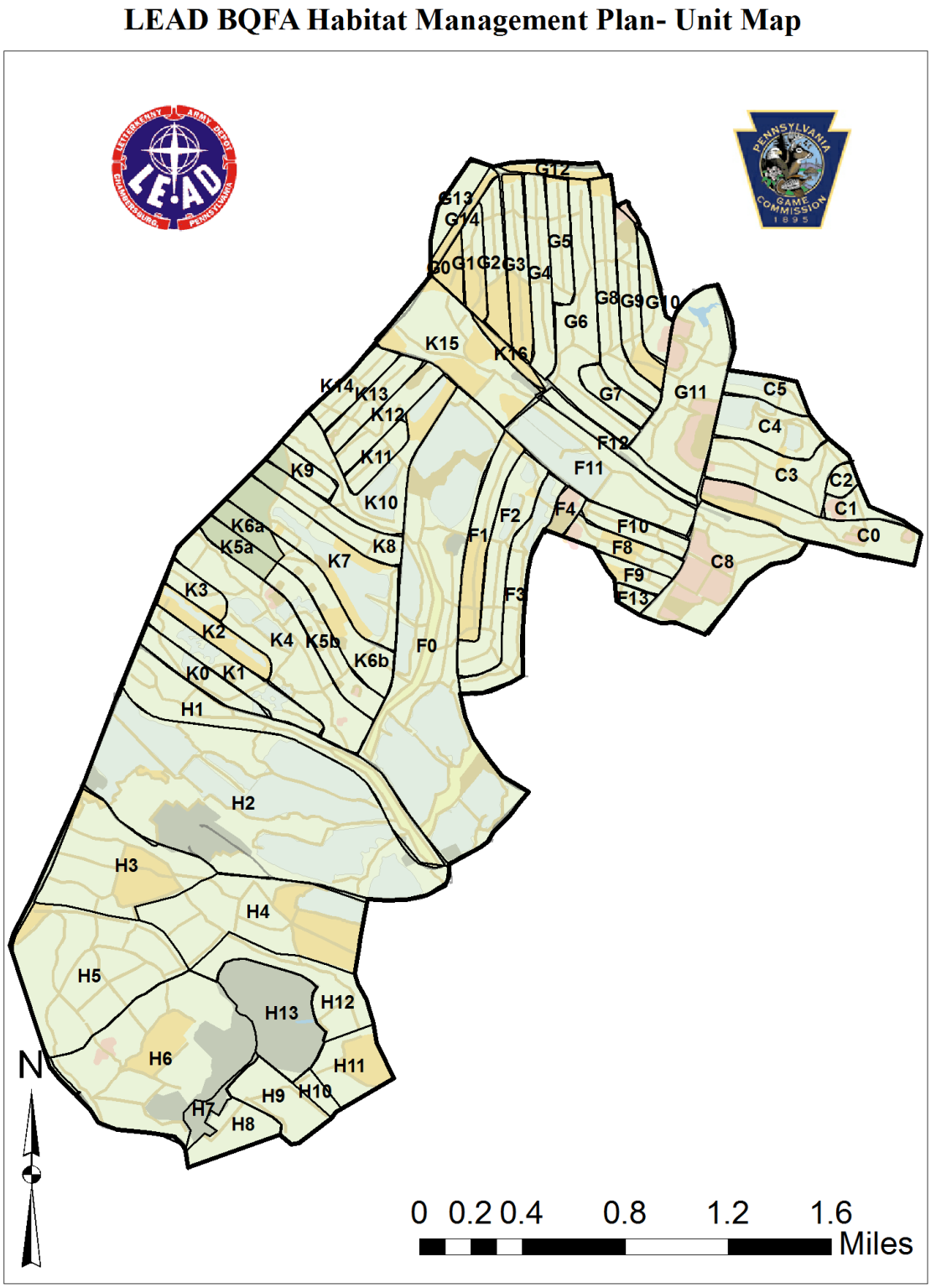
Appendix E: LEAD BQFA habitat management plan map detailing desired future conditions.

LEAD BQFA Habitat Management Plan



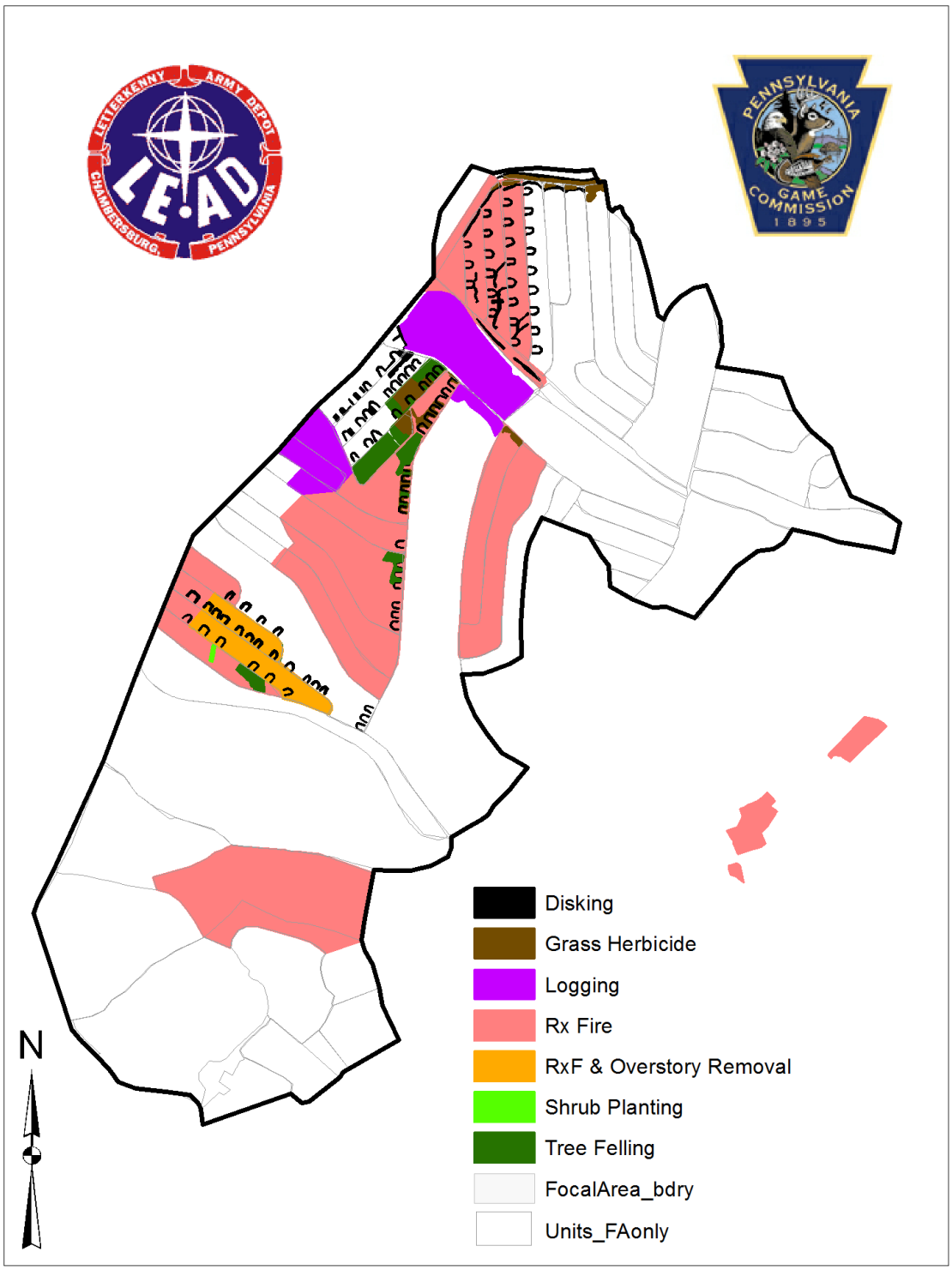
Total Acreage = 3,679 acres - Actual Habitat Acreage = 3,325.4

Appendix F: Habitat management unit map for bobwhite quail focus area.



Appendix G: Habitat management updated as of October 2018.

LEAD BQFA Habitat Management ending 10/2018



Focus Area = 3,680 acres