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Develop Resources for Natural Resource Managers to Integrate Downscaled SWAP Information with INRMPs: Case Study for Military Training Center Fort Pickett

Scott D. Klopfer and E. Austin Kane

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1.0 Establish an Installation Landscape

We identified an installation landscape in consultation with the natural resource manager (NRM) at Military Training Center (MTC) Fort Pickett, Virginia. MTC Ft. Pickett is approximately 41,000 acres and is located within the Piedmont region of Virginia. The surrounding area is a mix of agricultural and forested land mostly in private ownership.

1.1 Identify spatial units for the installation landscape

We defined the installation landscape as the boundary of the MTC Fort Pickett, and the extent of the 12-digit hydrologic units (i.e., HUCs) intersecting it. This encompasses over 184,000 acres divided into nine units (Figure 1). However, only five of these units (Tommeheton Creek, Butterwood Creek, Long Branch-Hurricane Branch, Red Oak Creek-Nottoway River, and Cedar Creek-Nottoway River) comprise significant area on the installation.

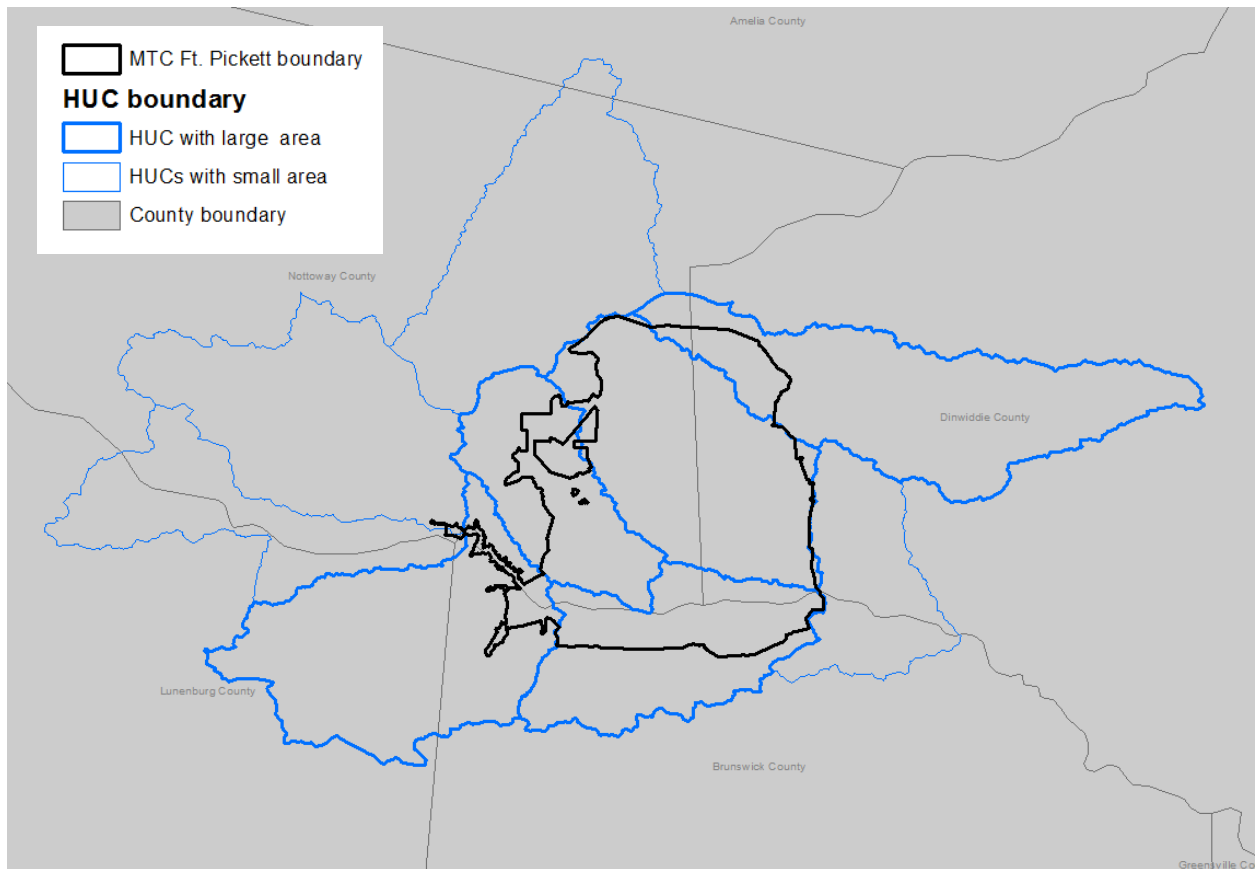


Figure 1. Map of the MTC Fort Pickett boundary and associated hydrologic units. Five of the HUCs comprise the majority of the installation.

MTC Fort Pickett spans multiple counties and three Virginia Planning District Commission (PDC) areas. These PDCs are the basis of Virginia's WAP. MTC Fort Pickett intersects the Commonwealth, Crater, and Southern PDCs.

1.2 Identify conservation partners and adjacent lands to consider in addition to the installation

The natural resource managers (NRMs) at MTC Fort Pickett have an active Army Compatible Use Buffer program. They are working with partners to identify the conservation benefits of specific parcels adjacent to the installation through this program. They opted to consider only the installation boundary as part of the landscape for this effort, along with the hydrologic units comprising the majority of the installation area.

1.3 Identify and obtain any existing or needed spatial data to define the installation landscape

The spatial information necessary to define the installation landscape is the boundary of MTC Fort Pickett and the 12-digit HUCs for the area. The boundary information was provided by the installation as a geospatial dataset, and the 12-digit HUC layer is a publically available spatial dataset (USGS Watershed Boundary; <https://water.usgs.gov/GIS/huc.html>).

2. Identify WAP SGCN and Associated Information

2.1 Retrieve and review relevant SWAP for your state

The Virginia Wildlife Action Plan (WAP) is accessible online at www.bewildvirginia.org. Virginia also provides an interactive tool through this site that allows users to easily identify a 12-digit HUC and identify the priority species of greatest conservation need (SGCNs). It should be noted that these are the **priority** species identified by Virginia from their SWAP process. The priority species are a subset of SGCN identified as occurring in the planning district commission (PDC) and associated HUCs.

2.2 Contact relevant state fish and wildlife office if needed

We communicated with the Virginia WAP Coordinator at DGIF about this project both at the proposal stage as well as throughout the process. Building a relationship with the state WAP contact is a very good idea. The Virginia WAP coordinator was familiar with MTC Fort Pickett but had never had direct interactions with NRMs or others working on the site.

2.3 Review list of WAP SGCN

We took the list of WAP SGCN and put all relevant information contained in the WAP about them into a spreadsheet (e.g., common name, scientific name, rankings, various state and federal rankings, etc.). The WAP has 883 species of greatest conservation need (SGCN), including species from all taxa known in Virginia. Over 70% of the SGCN are invertebrates and over 60% depend on the aquatic environment or nearshore environment for all or some of their lifecycles.

Clearly, MTC Fort Pickett does not harbor all of these species, so our objective was to identify which species are found on the installation and determine which of those can be effectively managed without encroaching on the military mission.

2.4 Review Habitat Classification and Descriptions

The Virginia WAP used the Northeast Terrestrial Habitat Model (NETHM) classification system to depict habitats spatially as a first step; however, Virginia's WAP borrows from a variety of habitat conservation models and tools and adapts their habitat data to best suit the needs of land and water managers. The WAP provides a crosswalk between the habitat definitions from the NETHM classification system to ensure this plan is useful to all conservation practitioners as well as to demonstrate how land managers can use the model classification. The WAP references and describes eight basic habitat types. Within these habitat types, several other habitat subcategories are described. Habitats in the WAP include:

- Beaches, Dunes, and Mudflats
- Tidal wetlands
- Non-tidal wetlands
- Freshwater aquatic and riparian habitats
 - Tidally influenced warm water streams and rivers
 - Coldwater streams and rivers
 - Non-tidal warm water streams and rivers
 - Blackwater streams and rivers
- Open habitats
 - Post-agricultural lands
 - Glades and barrens
 - Pine and oak savanna
- Mixed hardwood/ conifer forests
 - Young forests
 - North Atlantic coastal plain maritime forest
 - Central Atlantic coastal plain maritime forest
 - Southern Atlantic coastal plain upland longleaf pine woodland
 - Southern Appalachian low elevation pine forest
- Spruce fir forests
- Karst and subterranean habitats

These habitat types were identified based on the meetings with DGIF staff and conservation partners (see Methods Section of the Virginia WAP). Information about these habitats, factors that affect habitat quality, and actions that can be taken to address these threats at a statewide level are described below.

2.5 Review threat and conservation action information

Virginia's WAP includes threat and conservation action information at the habitat level in each local planning region summary. Local planning region summaries also include priorities for conservation action where available and relevant. This information will be necessary when reviewing the installation priority SGCN list to determine what actions are effective.

2.6 Obtain relevant spatial data if available

The spatial information required to conduct the downscale include a boundary for installation landscape, hydrologic units, species distributions, and habitat. The boundary for the installation landscape was provided by the installation. Information on the hydrologic units was available from the DGIF (and other outlets). Species distributions were not publically available, and a habitat map was not completed as part of the WAP process. Therefore, these would require additional work to synthesize for this specific downscaling project.

Information species occurring within each of the three PDCs, as well as species identified as priority SGCN, were available from the DGIF in the respective PDC reports. Tables include information on the presence of all SGCNs and the information supporting the designation for priority species. While not spatial, these data can provide good information for the NRM to use during their prioritization process.

3. Identify Species on Installation

3.1 Retrieve and review INRMPS from installation

The INRMP for MTC Fort Pickett contains information on the species known to occur on the installation as identified in surveys and through direct observation. This list was compared to the priority SGCN list from the SWAP. Overlapping species were identified and listed by common and scientific name (Table 1).

According to the INRMP, 29 priority SGCNs occur (or have occurred) at MTC Fort Pickett. These include birds (8), mammals (6, five of which are bats), fish (1 each), reptiles (1), and mussels (12). Other taxa, including insects and other invertebrates, have not been surveyed and do not appear in the INRMP.

This list represents those species known to occur within the installation; however, there may be some species that could be potentially found on the installation that were not detected by the surveys conducted. In addition, there may be species of SGCN detected on the installation that were not predicted to occur there, and were therefore not listed in the SWAP. We want to attempt to identify those as well.

Using the information contained in the WAP, we can examine the habitat used by each species and build potential distribution maps for both the state and installation landscape. With these, we can create a potential SGCN list and compare that to the list of known species above to determine if additional SGCNs may be found on the installation.

4. Identify WAP Priority SGCN that Occur on Installation

We want to use the information from the WAP to identify which SGCN occur within the installation landscape. Some questions we wanted to consider for MTC Fort Pickett were:

- *How many SGCN are predicted to occur within the installation landscape?*
- *How much of this species' habitat occurs within the installation landscape?*
- *Which habitats on the installation help the greatest number of SGCN?*

- What other factors are important for identifying a SGCN as a priority for this installation?

Table 1. List of SGCN known to occur on MTC Fort Pickett.

| Common name | Scientific name |
|--------------------------|--------------------------------------|
| <u>Mussels</u> | |
| Paper pondshell | <i>Utterbackis imbecillis</i> |
| Notched rainbow | <i>Villosa imbecillis</i> |
| Eastern elliptio complex | <i>Elliptio complanata/congereia</i> |
| Atlantic pigtoe | <i>Fusconia masoni</i> |
| Slabshell | <i>Elliptio congereia</i> |
| Eastern lampmussel | <i>Lampsilis radiata</i> |
| Triangle floater | <i>Alasmidonta undulata</i> |
| Creeper | <i>Strophitis undulatas</i> |
| Giant floater | <i>Pyganodon grandis</i> |
| Dwarf wedgemussel | <i>Alasmidonta heterodon</i> |
| Yellow lance mussel | <i>Elliptio lanceolate</i> |
| Eastern floater | <i>Pyganodon cataracta</i> |
| <u>Fish</u> | |
| Roanoke log perch | <i>Percina rex</i> |
| <u>Mammals</u> | |
| White-footed mouse | <i>Peromyscus leucopus</i> |
| Little brown bat | <i>Myotis lucifugus</i> |
| Northern long-eared bat | <i>Myotis septentrionalis</i> |
| Tricolored bat | <i>Perimyotis subflavus</i> |
| Eastern red bat | <i>Lasiurus borealis</i> |
| Hoary bat | <i>Lasiurus cinereus</i> |
| Silver haired bat | <i>Lasionycteris noctivagans</i> |
| <u>Reptiles</u> | |
| Eastern box turtle | <i>Terrapene Carolina</i> |
| <u>Birds</u> | |
| Northern bobwhite quail | <i>Colinus virginianus</i> |
| Grasshopper sparrow | <i>Ammodramus savannarum</i> |
| Eastern meadowlark | <i>Sturnella magna</i> |
| Cerulean warbler | <i>Setophaga cerulean</i> |
| Bachman's sparrow | <i>Peucaea aestivalis</i> |
| Eastern kingbird | <i>Tyrannus tyrannus</i> |
| Eastern towhee | <i>Pipilo erythrophthalmus</i> |
| Yellow-breasted chat | <i>Icteria virens</i> |

We will answer these questions by using the information contained in the SWAP on SGCN distribution as well as habitats to connect species with habitats, and then map those across the landscape.

4.1 Represent SGCN spatially on the landscape

Virginia's WAP includes priority SGCN distribution maps at both the planning region and HUC12 watershed scales. To produce these maps, Virginia completed a SGCN downscaling process as a part of developing the WAP. Users, therefore, have distribution data readily available to identify SGCN that occur within an installation landscape. However, it is important to note that the SGCN information available within the WAP for the watershed level focuses on priority SGCN. We can use the SWAP online tool to get to a list of the priority species that occur within our nine-HUC installation landscape.

For example, Virginia identifies 883 species as SGCN in the SWAP. Of those, only 86 species occur in the Commonwealth PDC, and only 41 of those are listed as priorities. The SWAP online tool will provide us information on which of those species occur in each HUC, and that will provide us with the information we need to build our installation priority list.

We used the WAP online tool to identify priority SGCN for each of these nine HUC12 watersheds. Of those 61 priority SGCN, 24 are predicted to occur within the installation landscape (Table 2). Of these, 18 are aquatic (75%).

4.2 Downscale SGCN to installation landscape

Due to the availability of prioritized SGCNs from the WAP, the installation could choose to focus on these species for their INRMP. Further, many of these species may be present in this landscape specifically because the habitats they require are protected and/or maintained within the installation boundary.

In addition, we can use available habitat information to understand how the installation landscape compares to the surrounding area, or even the state, in terms of protecting habitat. This information could point to opportunities for additional conservation benefits.

For this task, we elected to use the Northeastern Terrestrial Habitat Classification (Ferree and Anderson 2013). This habitat information has been used at a regional level and will allow our analysis to be compared across a range of spatial scales should we so choose.

The habitat downscale will be a relatively simple operation whereby we identify which habitat types are found in greater than expected amounts on the installation when compared to their distribution at the reference scale. We will use the total area in all the nine HUCs as a reference, so our results will demonstrate the importance of MTC Fort Pickett to specific habitats found within this area.

First, we used a GIS to identify the habitat areas for both the installation boundary and landscape (Figure 2). Then we calculated amount of each habitat type identified in the NETHC for both the installation landscape and the nine HUC area (Table 3). Then we calculated a ratio of the total area in each type on MTC Fort Pickett to the total area within the reference region and used it to gauge the importance of that habitat type. The highest possible value is 1.0, which would indicate that all of a

particular habitat type in the reference region is located within the installation. Obviously, a 0.0 indicates that the type is not found on the installation at all.

Table 2. List of priority SGCN in watersheds comprising MTC Fort Pickett.

| Name | Scientific Name | WAP Tier | Rank |
|------------------------------|--|----------|------|
| A millipede | <i>Auturus erythropygos</i> | II | c |
| American brook lamprey | <i>Lampetra appendix</i> | IV | c |
| American shad | <i>Alosa sapidissima</i> | IV | a |
| Atlantic pigtoe | <i>Fusconaia masoni</i> | I | a |
| Bachman's sparrow | <i>Aimophila aestivalis</i> | I | a |
| Carolina slabshell mussel | <i>Elliptio congaraea</i> | IV | a |
| Chowanoke crayfish | <i>Orconectes virginienensis</i> | III | c |
| Creeper | <i>Strophitus undulatus</i> | IV | a |
| Dwarf waterdog | <i>Necturus punctatus</i> | III | a |
| Dwarf wedgemussel | <i>Alasmidonta heterodon</i> | I | a |
| Eastern slender glass lizard | <i>Ophisaurus attenuatus longicaudus</i> | IV | a |
| Gravel elimia | <i>Elimia catenaria</i> | IV | c |
| Ironcolor shiner | <i>Notropis chalybaeus</i> | III | c |
| Mud sunfish | <i>Acantharchus pomotis</i> | IV | c |
| Mudsnake | <i>Farancia abacura abacura</i> | IV | a |
| Notched rainbow | <i>Villosa constricta</i> | III | a |
| Roanoke bass | <i>Ambloplites cavifrons</i> | I | a |
| Roanoke logperch | <i>Percina rex</i> | II | a |
| Scarletsnake | <i>Cemophora coccinea copei</i> | IV | a |
| Spotted turtle | <i>Clemmys guttata</i> | III | a |
| Triangle floater | <i>Alasmidonta undulata</i> | IV | a |
| Whitemouth shiner | <i>Notropis alborus</i> | II | c |
| Yellow lampmussel | <i>Lampsilis cariosa</i> | II | a |
| Yellow-bellied slider | <i>Trachemys scripta scripta</i> | IV | b |

MTC Fort Pickett comprises approximately 22% of the total area within the nine HUC reference region (Table 3). The habitat with the highest score is Piedmont-Coastal Plain Large River Floodplain. While this type is not a widespread type in the reference area (0.7%) MTC Fort Pickett contains the majority of it. The most abundant habitat on MTC Fort Pickett is Central Appalachian and Southern Piedmont Dry Oak-Pine Forest, and while this type is well-represented throughout the region MTC Fort Pickett controls nearly a third of it. Conversely, types like agriculture and planted forest that comprise significant portions of the reference area (and relatively few SGCN) are not as abundant on the installation.

We can also identify rare habitats on the landscape found on the installation. Southern Piedmont Granite Flatrock and Outcrop is a very rare type in this landscape, and over 25% of it is found on MTC

Fort Pickett. While the score for this type is not high, it still may constitute a priority given its rarity and the relatively large area of it found on the installation.

With this downscaled information, we can better understand how the habitats on MTC Fort Pickett fit into the larger landscape and this helps to guide decisions on habitat and species conservation. For example, species that utilize Freshwater Riparian habitats (as described in the Virginia WAP) could be prioritized at MTC Fort Pickett since a significant portion of this type is found on the installation as compared to the surrounding area. Thus, SGCNs in this landscape that require that type, along with aquatic species that are threatened by degraded riparian buffers, could be efficiently conserved.

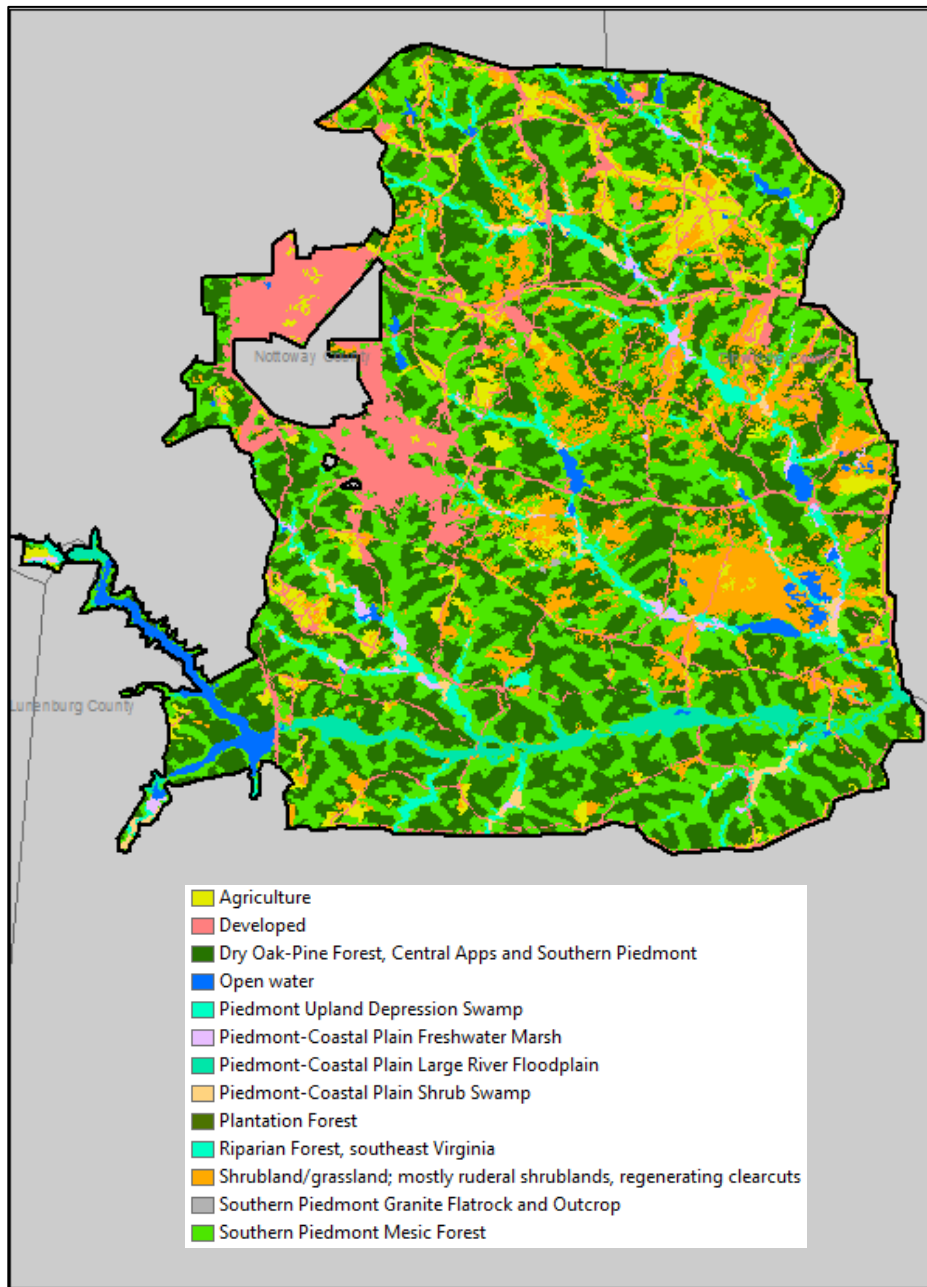


Figure 2. Map of habitats found on MTC Fort Pickett.

Table 3. Summary of habitat types for MTC Fort Pickett and 12-digit HUCs comprising the installation landscape. Area values are provided in hectares.

| Habitat Type | MTCFP_Area | % MTCFP | HUC_Area | % HUC | Imp_Score |
|--|-----------------|------------|-----------------|------------|--------------|
| Piedmont-Coastal Plain Large River Floodplain | 342.9 | 2.1% | 504.5 | 0.7% | 0.680 |
| Open water | 342.5 | 2.1% | 723.6 | 1.0% | 0.473 |
| Developed | 1,810.6 | 10.9% | 4,589.1 | 6.2% | 0.395 |
| Piedmont-Coastal Plain Shrub Swamp | 151.7 | 0.9% | 462.2 | 0.6% | 0.328 |
| Dry Oak-Pine Forest, Central Apps and Southern Piedmont | 5,605.9 | 33.7% | 17,996.9 | 24.1% | 0.311 |
| Shrubland/grassland; mostly ruderal shrublands, regenerating clearcuts | 1,692.5 | 10.2% | 5,712.5 | 7.7% | 0.296 |
| Piedmont-Coastal Plain Freshwater Marsh | 148.5 | 0.9% | 505.5 | 0.7% | 0.294 |
| Southern Piedmont Granite Flatrock and Outcrop | 5.3 | 0.0% | 20.0 | 0.0% | 0.266 |
| Southern Piedmont Mesic Forest | 5,157.0 | 31.0% | 19,778.3 | 26.5% | 0.261 |
| Riparian Forest, southeast Virginia | 554.0 | 3.3% | 2,948.4 | 4.0% | 0.188 |
| Agriculture | 829.7 | 5.0% | 12,354.2 | 16.6% | 0.067 |
| Piedmont Upland Depression Swamp | 4.6 | 0.0% | 104.8 | 0.1% | 0.044 |
| Plantation Forest | 8.6 | 0.1% | 8,907.0 | 11.9% | 0.001 |
| TOTALS | 16,653.8 | 1.0 | 74,607.0 | 1.0 | 0.223 |

5. Determine Installation Priority SCGN

Actually choosing priority species for MTC Fort Pickett is beyond the scope of this project. Additional information on installation training objectives, available resources, historical/cultural resource priorities, and other considerations should also be incorporated into identifying which SGCN should be prioritized.

Generally, we can consider a variety of factors when evaluating which priority SGCN identified during the downscaling process may also be installation priorities. They include the following:

- 1) Are there endemic SGCN to the installation?
- 2) Do you hold a significant portion of a habitat within the state or region?
- 3) Do you have multiple species in one habitat?
- 4) Does the WAP provide a prioritization process based on distribution within the state?
- 5) Does the WAP provide a ranking system of SGCN within the Plan?
- 6) What are the SGCNs' legal status?
- 7) Are there other factors that may come into play specific to the installation?

The following sections provide some basic information or suggestions for incorporating these factors when considering which SGCN should be prioritized.

5.1 Consider all WAP priority SGCN occurring on installation

An installation such as MTC Fort Pickett may wish to use all of these 24 priority WAP SGCN as installation priorities; however, there is also room to narrow the list to a more manageable number to address and analyze in terms of threats and actions on its installation. We may also wish to consider additional SGCN not identified within that analysis. The remaining steps outline a variety of approaches we can use to evaluate which SGCN we may also want to include.

5.2 Consider species endemic to your installation

It is extremely rare for an installation to contain a species found nowhere else outside of its boundaries. However, examples exist, especially for plants. For example, Michaux's sumac (*Rhus micheauxii*) is a plant with the majority of its known occurrence on this installation. MTC Fort Pickett does not have any known endemic fish or wildlife species within its landscape.

5.3 Develop a Tier or Ranking System for the SGCN that occur on your landscape

One method for further refining your priority species list would be through a ranking system. Ranking systems merely quantify importance of various factors along with a relative weight in order to differentiate between SGCN.

There are many factors that could be considered for a ranking. These include federal/state status, relative abundance, type of threat, or feasibility of conservation actions. We can also include downscaled factors, like the SGCNs that utilize habitats with the highest score on the installation, or those using truly unique features on the installation. There are no magic formulas for this, just options to make more informed decisions.

5.4 Compare downscaled list of WAP priority SGCN for the installation with species listed in the INRMP

When considering the 24 priority SGCN located within the installation landscape based on the HUC distribution analysis, seven of those SGCN also are identified in the INRMP. They include the Atlantic pigtoe, Bachman's sparrow, creeper, dwarf wedgemussel, notched rainbow, Roanoke logperch, and triangle floater. An installation that has little overlap between the priority SGCN from the WAP, and the INRMP may wish to consider all SGCN that occur within the landscape. As noted previously, if we look at the entire list of SGCN present on the installation landscape, there are 61 SGCN. Of these, only 19 are included in the INRMP. Thus, we may wish to focus on just the seven of overlap, or a larger list of 19. Either way, this represents a much smaller and more manageable set of species.

5.5 Consider SGCN's that occur within a habitat that is in high abundance within your installation

On MTC Fort Pickett, the terrestrial habitat with the highest habitat score is Piedmont-Coastal Plain Large River Floodplain and 21 of the 24 priority species benefit from this type. The next most highest terrestrial habitat type is freshwater wetland, and two reptiles depend on this habitat type. The most valuable habitat type overall is aquatic/ riparian. Eighteen of the priority SGCN on the installation depend on some type of river, creek, or black water river system.

Another habitat type worth noting because of its rarity within Virginia are pine savannas. Within MTC Fort Pickett, there are over 4,000 acres of pine savanna and grassland, and the Bachmann's sparrow is an important SGCN that depends on these savannas. Because of the work in neighboring areas with other pine savanna dependent species such as red cockaded woodpecker, this habitat type, although in small proportion, is important within the state and region.

5.6 Consider SGCN in habitats where some level of efficiency exists

In addition to looking at habitats that occur across a significant portion of an installation, we can also consider where there are habitats that include many SGCN's, or more habitat exists on the installation than is found in the surrounding landscape. By focusing on these areas, we may realize efficiencies in both cost and effectiveness.

Again, the Piedmont-Coastal Plain Large River Floodplain provides a good example. Focusing on aquatic environments at MTC Fort Pickett would be most beneficial as the majority of both the WAP priority SGCN and total SGCN occurring on the installation are aquatic; thus, focusing on riparian buffers or reducing erosion and sedimentation would benefit multiple species.

5.7 Use state's WAP SGCN ranking system to determine installation priority SGCN

Virginia's WAP uses a tiered system to rank its SGCN based on imperilment ranging from Tier I being the most impaired to IV being moderately impaired. For its 2015 WAP update, the State developed an additional ranking system based on conservation opportunity. The rankings are as follows:

- a – Managers have identified “on the ground” species or habitat management strategies expected to benefit the species; at least some of which can be implemented with existing resources and are expected to have a reasonable chance of improving the species' conservation status.
- b – Managers have only identified research needs for the species or managers have only identified “on the ground” conservation actions that cannot be implemented due to lack of personnel, funding, or other circumstance.
- c – Managers have failed to identify “on the ground” actions or research needs that could benefit this species or its habitat or all identified conservation opportunities for a species have been exhausted.

Of the 24 priority SGCN occurring on MTC Fort Pickett's landscape, eight are in the top two tiers (Table 4). Of these eight priority SGCN, four are Tier I Conservation Opportunity a, meaning they are highly imperiled and there are conservation management plans or programs in place or defined for these species. In addition, of these 24 priority SGCN 16 have a conservation opportunity ranking a regardless of tier.

Using this method helps an installation narrow a longer list of potential installation priority SGCN. An installation could consider various combinations of these; for example, all top tier SGCN or all SGCN that overlap with the INRMP SGCN, or just the top tier ones that overlap with the INRMP. Additionally, we can see which ones of these overlap with the species identified in Step 5.4. For the eight listed above, four overlap with the seven listed. These include Atlantic pigtoe, Bachman's sparrow, dwarf wedgemussel, and the Roanoke logperch.

Table 4. Summary of priority species Tier and conservation rank.

| Name | Scientific Name | WAP Tier | Rank |
|-------------------|------------------------------|----------|------|
| Atlantic pigtoe | <i>Fusconaia masoni</i> | I | a |
| Bachman's sparrow | <i>Aimophila aestivalis</i> | I | a |
| Dwarf wedgemussel | <i>Alasmidonta heterodon</i> | I | a |
| Roanoke bass | <i>Ambloplites cavifrons</i> | I | a |
| Roanoke logperch | <i>Percina rex</i> | II | a |
| Yellow lampmussel | <i>Lampsilis cariosa</i> | II | a |
| A millipede | <i>Auturus erythropygos</i> | II | c |
| Whitemouth shiner | <i>Notropis alborus</i> | II | c |

5.8 Use legal status or another designation to help determine installation priority SGCN

Because Virginia’s Tier system incorporates legal status and other designations related to imperilment, using the Tier and Conservation Opportunity Ranking system is the best mechanism to use to help identify which SGCN you may wish to consider as priorities SGCN for the installation. Otherwise, state or federal status could be used as an additional criterion for determining priority.

5.9 Work with experts (within installation and partners) to determine which priority WAP SGCN to consider as installation priorities

With all of this information assembled, the NRMs, along with their designated partners, can complete a list of priority SGCN for the installation landscape. This list will enable NRMs to be efficient in their application of available resources, and more effective in achieving their objectives. This information will also enable state wildlife management agencies to understand how other organizations are working to conserve SGCNs and their habitats, and to value the contributions of installation lands toward SWAP goals.

6. Identify Associated Threats and Conservation Actions

The primary reason for identifying priority SGCN is to use that information to enhance their conservation. This requires a recognition of what factors are contributing to the species decline (Threats) and how to mitigate it (Conservation Actions).

The Virginia WAP includes this information and relates it to each SGCN. Therefore, once the installation has identified a list of priority SGCN, it should be a straightforward process to identify both threats and conservation actions for each of those species.

6.1 Organize threats to installation priority SGCN

Once the installation priority SGCN were determined, we listed them in order of those that occupy the most habitat within the installation. Along the top row, column headers include Common Name, Scientific Name, Habitat number, Threats, and Conservation Actions (see Table 5).

6.2 Review list of threats and actions to determine which are applicable on installation and remove those that are not

We used threat and conservation information included in the relevant Local Planning Region Summaries’ habitat sections from the Virginia WAP. The three planning regions that include MTC Fort Pickett are Commonwealth, Crater, and Southside. We used the narrative information for each habitat type corresponding to our installation priority SGCN. We compared habitat threats and actions across the three PDC chapters and removed any repetitive threats and actions. An example of how the information appears for one of the priority SGCN identified through the priority SGCN HUC analysis appears in the table below (Table 5).

Table 5. Example of SGCN information for threats and conservation actions.

| Name | Scientific Name | Tier | Rank | Threats | Conservation Actions | |
|-------------------|-----------------------------|------|------|---|--|--|
| Atlantic pigtoe | <i>Fusconaia masoni</i> | I | a | Sedimentation, contaminants loading, water chemistry alteration, temperature regime alteration, stream nutrient dynamics alteration | Establish vegetated riparian buffers and incorporate riparian buffers into land use planning and management | |
| | | | | | Reforest erodible forest lands | |
| | | | | | Impacts from development and other land use changes | Implement erosion and sediment control practices |
| | | | | | Loss of connectivity | Restore aquatic connections |
| | | | | | Invasive Species | Monitor and address invasive species impacts |
| Bachman's sparrow | <i>Aimophila aestivalis</i> | I | a | Land Use Changes/ loss of habitat | Monitor temperature changes and changes to intensity of precipitation events | |
| | | | | | Restore native grasses, shrubs, and forbs | |
| | | | | | Maintain existing open habitats with periodic disturbance (e.g., prescribed burning, mowing, disking, etc.) | |
| | | | | | Conserve, via acquisition, easement, collaboration, or agreement, patches from 20 acres to 100 or more acres. Focus also should be placed on protecting circular or square patches rather than rectangular areas to minimize edge effect | |
| | | | | Invasive Species | Remove non-native species | |

6.3 Add any additional threats and actions specific to the installation

Once we organized threat and conservation action data from Virginia’s WAP for the installation priority SGCN, we reviewed the threats and actions listed for each species. We removed any threats that are not relevant on MTC Fort Pickett. We also reviewed the corresponding actions and removed any that did not apply. Please note that you can implement this step as you conduct Step 6.2 – removing any irrelevant threats and actions as you list them in the table.

All of the threats in the aquatic and riparian habitat section of the relevant PDC summaries apply to the installation priority SGCN on MTC Fort Pickett. However, not all conservation actions to address those threats are applicable. For example, the threats we removed from the list include those related to agriculture and livestock management, pet waste management, sewage management, and those relating to revising or developing new zoning regulations.

During this step, we also added threats that the WAP does not include but that we know exist for the installation. You may work with the Natural Resource Managers or other staff as well as consider other installation sources/ documents/ plans for this step. For example, vehicle stream crossings have the potential to introduce sediment to streams. An effective action would be to routinely inspect and maintain crossings to ensure erosion is managed appropriately.

7. Determine Conservation Opportunities, Existing Efforts, and Potential Mission Conflicts

7.1 Identify common/ overlapping conservation management opportunities from the WAP and INRMP for installation priority species (and habitats)

In its INRMP, MTC Fort Pickett includes one specific section highlighting the WAP and noting the installation will work to integrate its recommendations into its management. Although no other specific text references the WAP, many of the species based and habitat based management actions relate to the Plan. Some examples include:

Avian Management Recommendations:

- *Riparian and wetland habitats are important habitat for migratory birds. Fort Pickett will strive to prevent the destruction or degradation of wetlands and riparian vegetation, and also restore those habitats, when feasible, where they have been degraded.*
- *Managing grasslands for native warm-season grasses can have a great benefit the overall quality of habitats for faunal species and ecological integrity. To manage for grassland birds species, large tracts of grassland habitat should be kept intact. The fields that are fescue dominated or mowed should be minimized where possible.*
- *Mowing during the breeding season mid-April through mid-July should not take place when and where possible. Grasses should remain unmowed for the duration of the winter period (until ~ February) to provide cover and increased foraging potential. If mowing does occur during the wintering period, concealment islands of unmowed areas should be left to provide cover. These islands can then be mowed later in the season.*
- *An increased use of soft edges of shrubby growth along the wood line would provide additional habitat for grassland species (especially SGCN) that prefer to have a mix of shrubby intrusion, (e.g. northern bobwhite quail). A buffer of 20 meters (50 feet) would be sufficient for this purpose. More permanent shrubby islands or hedgerows within the larger grasslands would be an added benefit.*

The INRMP also includes specific sections for threatened and endangered species occurring on the installation. These species are also SGCN and the actions mirror recommendations within the WAP. For example, the INRMP includes the following management actions for the Roanoke logperch:

- *Strictly observe the Roanoke Logperch Protection Zone, which prohibits any action that will disturb the stream bank or result in soil erosion within 300 meters of the Nottoway River.*
- *No in-stream work within the Logperch Protection Zone between 15 March and 30 June will be conducted to protect spawning adults and newly laid eggs.*
- *Protect areas identified as potential spawning, incubation, or foraging sites based on most current understanding.*
- *Maintain integrity of Nottoway riparian corridor and macrobasin in order to protect the Nottoway River from activities that result in soil erosion or stream bank degradation.*
- *Observe Virginia Department of Forestry's best management practices for silvicultural activities installation-wide in order to reduce and control soil erosion, including well-marked hardened areas at crossings.*
- *Observe the wetland and riparian protection zones installation-wide.*
- *Determine the population status, viability, and distribution throughout the Nottoway River within the boundaries of Fort Pickett. Population levels and habitat condition should be monitored at least every 3-5 years.*
- *Utilize GPS to accurately map habitat features and environmental conditions relevant to the protection of Roanoke logperch and habitat.*
- *Cooperate with USFWS to determine the feasibility of rehabilitating habitat in Nottoway River, and/or reintroducing the logperch in appropriate habitat.*
- *Implement adaptive management strategies identified from population and habitat monitoring.*

7.2 Look for SGCN that share habitat and determine whether the INRMP or other management activities on the installation address these habitats

Consider whether a suite of installation priority SGCN are located in a common habitat type, and if this habitat type is widespread or of high value within the installation boundary. If this is the case, we can determine which threats are most pervasive, immediate, and/ or feasible to address. We can determine conservation actions at the habitat level that are realistic for the installation to implement. By doing only one or two actions for a high value habitat with multiple SGCN, the installation will be addressing multiple threats and SGCN in an effective and more efficient manner.

MTC Fort Pickett notes actions to protect mussels, but these actions would protect many other aquatic species within the installation:

Mussel Management Recommendations

Reduction of sedimentation through the establishment of riparian buffer zones and the continued avoidance of stream channel modifications can increase the quality and availability of healthy habitats. Not only would these actions have positive implications for mussel fauna, but would have cascading effects on the overall aquatic ecosystem.

7.3 Consider if installation contains significant portion of rare habitats and associated SGCN for the state/region

If a base has only a small percent of a specific habitat type, but is rare within the state, then this is a habitat to analyze further in terms of both conservation opportunities and challenges. It is important to determine what threats training may pose or, if training is already limited in the areas, perhaps some targeted effort is required to provide conservation benefit. Alternatively, management actions may require minimal effort to protect a high value area.

MTC Fort Pickett contains pine savanna that has been utilized by the state threatened and SGCN Bachman's sparrow in the past. The INRMP notes the importance of this habitat type and conserving it as a priority (page 43). In the section on "Southern Maneuver Areas", the INRMP notes:

The heavily forested southern areas include a number of tracts of planted pine plantations. Range Operations coordinated with Forestry to begin a regime of heavy thinning of these pine tracts, with the goal of establishing upland-pine savannahs, with a very low tree density, scattered throughout the mature hardwood forests (Page 61).

7.4 Consider SGCN that installation did not know were or could be present

One advantage of this downscaling approach is it can provide information on species that may be present within the installation but have never been documented. Some species are difficult to document without dedicated surveys, however we can determine if the habitats they require are present, and examine which threats/conservation actions are likely to benefit those habitats.

Identifying potential SGCNs that would benefit from conservation actions targeting other species can bolster justifications for these actions. Further, even if these species are not currently utilizing these habitats there may be opportunities for them in the future either through natural migration or through introduction.

7.5 Consider current land management activities and potential conservation opportunities for installation priority SGCN

As we have mentioned, the current management of training lands at MTC Fort Pickett has created unique habitats that result in valuable lands for SGCN. Prescribed fire, used to maintain training areas, has resulted in many species of SGCN persisting within the installation that have all but disappeared from the surrounding landscape. It is important for NRM's to identify those ongoing benefits of training management and communicate them to collaborating agencies.

7.6 Consider plans for the installation and whether new/ different training or activities could threaten installation priority SGCN

It is also beneficial to understand how changes to those training area management activities might change the benefits to SGCN. While range management activities like timber harvest, prescribed fire, and road maintenance are critical for the training mission, we can use information from the WAP to understand potential impacts on SGCN and plan accordingly. Often, changes in training management activities can benefit SGCNs if those linkages are identified early in the process and are included in the overall plan.

7.7 Determine whether there are other WAP SGCN that are not within the installation priority SGCN list that may benefit from actions for the priority SGCN

While much of our downscaling effort has focused on identifying priority SGCN for the installation, we should understand that any conservation actions implemented will likely benefit other SGCN. For example, we have demonstrated how protecting the large river floodplain habitat will benefit several priority SGCN, but we can also now use that information to gain a bigger picture of the other SGCNs likely to benefit as well. There are 90 species of SGCN identified for the three planning districts around MTC Fort Pickett, and many more species of aquatic and terrestrial species will benefit. Quantifying that number by reviewing the habitat information provided by the DGIF SWAP tool will further support the conservation actions taken in this habitat.

8. Conclusion

The SWAP is a powerful tool for identifying species at risk of endangerment in Virginia. The process we have outlined for MTC Fort Pickett demonstrates how readily available information from the SWAP can inform conservation on the installation, and vice-versa. MTC Fort Pickett plays a significant role in providing and maintaining SGCN habitat in this landscape. Further, these lands can continue to support both military training and SGCNs through sound management.

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