Interim Forest Management Policy for High Conservation Value Forests

HCV: Intact forest blocks with concentrations of vernal pools

NOTE: For the purposes of feasible implementation given the difficulty of consistently identifying this HCV, this interim HCV policy is only applicable on the following HCVFs, where the HCV has been previously identified:

Table 1. Included HCVFs				
Region	**HCVF #**	**HCVF Name**	**County**	**Acres**
Region 1	111870	Bungo 29	Cass	3,100
Region 1	31960	Smoky Hills 4	Becker	1,200
Region 1	32020	Straight River Headwaters (aka Belden Swamp)	Becker	1,650
Region 1	32040	Two Inlets Lake South	Becker	1,050
Region 1	441000	Oakland Woods	Mahnomen	3,450
Region 1	600660	Dorr WMA 66	Polk	300

Table 2. Key Statistics	
Known occurrences on HCVFs	6 HCVFs currently include this HCV on HCVF informational reports (see Table 1 above).
Primary Location	Scattered across the landscape
Known Occurrences on HCVF (non-STL)	6 HCVFs include this HCV on non-school trust land.
Known occurrences on HCVF (STL)	5 HCVFs include this HCV on school trust land.
Acreage on HCVF (non-STL)	8,457 acres
Acreage on HCVF (STL)	2,285 acres

Notes: There is no formalized tracking of vernal pool presence.

Brief Description

For the purposes of managing "intact forest blocks with concentration of vernal pools," this HCV is defined as two or more vernal pools (or seasonal ponds) within 300 feet of each other that are located on an HCVF. The definition is based on previous literature on the subject of "clusters of vernal pools" (Petranka et al. 2004). We slightly amend their definition of a "cluster" from two or more pools within 100 meters of each other to two or more pools within 300 feet of the definable edge of each other, to make it a distance that is more easily identified in the field.

Policy for Intact Forest Blocks with Concentrations of Vernal Pools within HCVFs

When this HCV is encountered within the HCVFs listed above, use the following management approaches:

- To maintain the HCV, apply management option #1, as described in Table 3: harvest with reserves and 50-foot, limited harvest buffers around all pools in the concentration.
- Where there is an opportunity to enhance the HCV, or if it is operationally more feasible to do so, apply management option #2 as described in Table 3. Examples of operational feasibility

include when pools are close enough together that it is not reasonable to harvest or when slope makes access difficult.

- If a listed species is present, species-specific guidelines should be applied in place of this policy. .

	Table 3. Management approaches for intact forests with concentrations of vernal pools within HCVFs
#	**Management approach, description and consequences**
1	**Harvest with reserves and apply 50-foot, limited harvest buffers around all pools.** Apply a 50 foot buffer around each vernal pool with a minimum of 80 sq. feet of basal area, which will have 60% canopy closure immediately after harvest. Allow buffers to exceed 5% reserves. Lop and scatter evenly across the site. No slash is permitted within the vernal pool. Harvest outside of the buffer during frozen/dry soil conditions only, to minimize soil disturbance. Prohibit skidding, haul roads, and landings in vernal pools and reserves. Avoid travel, access trail and skid trails through the site in all seasons, when possible. **Consequences:** • Maintains a shaded breeding pool and minimizes shifts to wetland hydrology, thermal regimes, plant communities, and nutrient cycles. • Provides minimal suitable terrestrial habitat for vernal pool dependent species. Amphibians, for example, often spend summer and fall months in terrestrial habitats that are >500 feet from breeding pools.
2	**Harvest with reserves and apply 50 foot no-harvest buffers around all pools.** Apply a 50 foot no-harvest buffer around all pools. Allow buffers to exceed 5% reserves. Lop and scatter evenly across the site. No slash is permitted within the vernal pool. Prohibit skidding, haul roads, and landings in vernal pools or buffers. Harvest outside of the buffer during frozen/dry soil conditions only, to minimize soil disturbance. Prohibit skidding, haul roads, and landings in vernal pools and reserves. Avoid travel, access trail and skid trails through the site in all seasons, when possible. **Consequences:** • Maintains a more heavily shaded breeding pool and minimizes shifts to wetland hydrologies, thermal regimes, plant communities, and nutrient cycles. • Provides minimal suitable terrestrial habitat for vernal pool dependent species. Amphibians, for example, often spend summer and fall months in terrestrial habitats that are >500 feet from breeding pools.

Figure 1. Example of an inundated vernal pool in spring and the same dry vernal pool in summer.

HCV Description

Vernal pools are relatively small wetlands that have seasonal and non-permanent hydroperiods (i.e., frequency and duration of flooding), lack perennial inlet and outlet streams, are hydrologically isolated from other surface waters, and do not support permanent fish populations. Although vernal pools are most often dry during some part of the year their hydroperiod varies by site and annual precipitation. These ecologically valuable wetlands are:

- Typically less than one acre in size,
- May or may not contain vegetation, and,
- Do not necessarily dry out every year.

Each vernal pool hydroperiod is wetland- and year-specific and ranges between several weeks to more than one year in duration. Vernal pools share hydrological characteristics with other seasonal wetlands such as shallow marshes, however, they are strongly influenced by their forested environment, particularly canopy shading and leaf fall. While they can be described as seasonal wetlands, not all seasonal wetlands are vernal pools.

Management Considerations that Informed Policy Development

The ecological importance of vernal pools. Vernal pools, like keystone species, have an ecological importance that far exceeds their size. More than 550 wildlife species have been documented using forested vernal pools. Some of these species are vernal pool obligates that explicitly depend on predictable and non-permanent hydroperiods; however, the majority are vernal pool facultative species that opportunistically use these wetlands for breeding, foraging, hydrating, or sheltering during some portion of their life history.

In Minnesota, vernal pool obligates include the spotted salamander (*Ambystoma maculatum*), a special concern species, blue-spotted salamander (*Ambystoma laterale*), wood frog (*Lithobates sylvaticus*), and fairy shrimp (order Anostraca).

The impact that vernal pools have on wildlife populations extends beyond their perimeter. For example, vernal pools facilitate wildlife migration and dispersal between waterbodies and watersheds by acting as aquatic "stepping-stones" in upland landscapes. Additionally, the invertebrates and amphibians that reproduce in vernal

pools typically produce a large number of offspring, and these young animals move into the surrounding forest and provide an important food source for other wildlife species.

The mere presence of vernal pools is not an indication of their quality or ability to sustain wildlife populations. Even if undisturbed, an exemplary vernal pool may quickly become poor-quality wildlife breeding habitat if the surrounding upland is overly degraded.

How and when to identify vernal pools. Vernal pools may be difficult to identify, because they are typically small, not continually flooded and, at least in Minnesota, there is no database or clearinghouse of vernal pool location data. Many high quality, productive vernal pools are less than 0.1 acre in size and hold water for fewer than 12 weeks. Therefore, optimal time to identify vernal pools is after snowmelt, preferably in the spring time, when pools are potentially flooded.

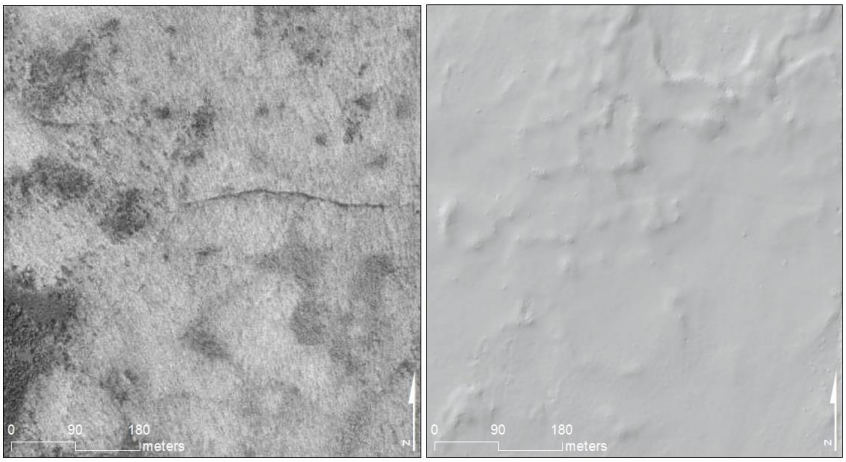

Figure 2. Images from the 1991 USGS NAPP Black and White Aerial Photography data layer and Best Available Resolution Hillshade data layer (map scale: 1:4,000).

Identifying dry vernal pools in summer and early fall requires experience and proficiency. Adept surveyors search for forest floor depressions containing compacted leaves that may or may not be darkened by water staining or sedimentation; trees, rocks, or woody debris with horizontal water stains or siltation marks; wetland vegetation including but not limited to sphagnum moss (Sphagnum spp.), sensitive fern (Onoclea sensibilis), speckled alder (Alnus incana), black ash (Fraxinus nigra), rushes (Juncus spp.) and sedges (Carex spp.); and trees with buttressed trunks or stilt roots. In some instances a lack of vegetation could be an indication of vernal pools. Identifying dry vernal pools in late fall, after leaf-off, and winter should not be attempted, because evidence indicating the presence of vernal pools may be concealed by newly fallen leaves or snow.

Vernal pools can potentially be identified in ArcMap using aerial imagery and hillshade data layers. For example, the 1991 USGS NAPP Black and White Aerial Photography data layer shows leaf-off conditions, and the Best Available Resolution Hillshade data layer shows relatively fine-scale topographic relief shading; both data layers are available via the DNR's Quick Layers toolbar.

Vernal pools within deciduous forests may appear as dark spots or smudges when aerial imagery is displayed at a map scale of 1:4,000, and a hillshade layer may provide further evidence of vernal pool presence (see images below). For example, pools may be positioned in upland areas where large wetland complexes are present or

they may coincide with topographic features (e.g., toe-of-slope) in drier landscapes. Light Detection and Ranging (LiDAR) data can also be used to identify potential vernal pools. For detailed methods, see Wu et al.'s 2014 article titled An Effective Method for Detecting Potential Woodland Vernal Pools Using High-Resolution LiDAR Data and Aerial Imagery (link to document: http://www.mdpi.com/2072-4292/6/11/11444).

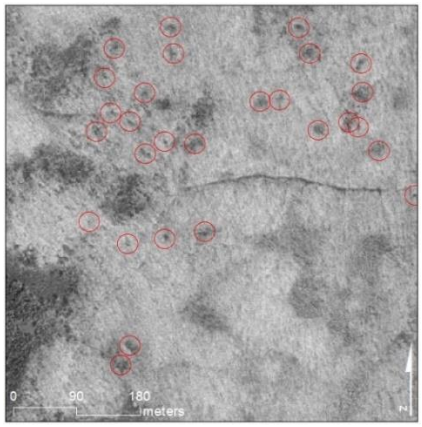

Figure 3. 1991 USGS NAPP Black and White Aerial (map scale: 1:4,000). Potential vernal pools.

Examining aerial imagery, LiDAR data, and wetland databases may be a useful first step to identify potential vernal pools, but all data have limitations. For example, the process described above will fail to identify small pools and pools under coniferous canopy cover, and it will also incorrectly identify some vernal pools (a large, lone conifer within a deciduous forest may also appear as a dark spot on aerial imagery). Similarly, National Wetland Inventory (NWI) maps may include large vernal pools but most pools, especially small ones, are not mapped by the NWI. Vernal pools may be coded on NWI maps as PFO (palustrine forested), PUB (palustrine unconsolidated bottom), PSS (palustrine scrub-shrub), or PEM (palustrine emergent). Use aerial imagery, LiDAR data, and NWI maps with caution. A survey of HCVF areas with vernal pools may be needed for future monitoring.

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