



# ORGANIC FOREST HEALTH CONSERVATION CHECKLIST

*Optimal Conservation Practices to protect water quality, site productivity, native biological diversity, and carbon sequestration and storage and to attenuate flood damage in forests actively managed for wood products, non-wood forest products and other forest ecosystem products and services.*

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## **Introduction**

Vermont Family Forests™, Inc. is a not-for-profit organization working to conserve the health of the forest community and, when appropriate, promoting the careful cultivation of local family-owned forests for community benefits. Vermont Family Forests (VFF) has adopted a set of principles to guide forest conservation activities. One of these principles states that “ECOLOGICAL FORESTRY should conserve native biodiversity, water quality, site productivity and scenic beauty; use only biological pest control; and mimic natural processes.” The following forestry practices have been designed for forest friends and stewards who are interested in practicing ecological forestry. They are most applicable to the following natural community types: Northern Hardwood Forest; Rich Northern Hardwood Forest; Mesic Red Oak-Northern Hardwood Forest; Red Spruce – Northern Hardwood Forest; Hemlock-Northern Hardwood Forest; Mesic Maple-Ash-Hickory-Oak Forest; and the Valley Clayplain Forest. Owners of lands in the VFF-certified pool agree to comply with the VFF Forest Health Conservation Checklist to the maximum practical extent.

## **Accessing the Forest**

### *Forwarding Paths, Truck Roads, Skid Trails and Log Landings*

- ✓ Build and maintain forwarding paths, truck roads, skid trails, and log landings in full compliance with the standards contained in the *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont* (VT FP&R 1987). Space drainage structures as shown in Table 1 & maintain them with post-harvest use.
- ✓ Out-slope access trails. Avoid ditches to the optimal practical extent to reduce storm flow concentration.
- ✓ Log under frozen winter conditions to maximize the soil’s ability to store carbon and protect breeding birds. Delay summer harvests until after August 15th. Avoid spring harvests and rutting that extends beyond the A soil horizon.
- ✓ Design and construct forwarding paths, skid trails, truck roads, and log landings before logging begins. The average grade of the access network should be 7% or less.
- ✓ Minimize the width, number and extent of truck roads and skid trails -- particularly in or near sensitive areas such as stream crossings and protective strips. Access networks should avoid topography with slopes of 35% or greater.
- ✓ The access network of roads, trails, and paths should not exceed 5% of the treated area.
- ✓ Road and trail networks should be planned to avoid fragmenting forest blocks and to avoid creating linear openings in the forest. These can serve as vectors for predators or contribute to desiccation of leaf litter on the forest floor.
- ✓ Forwarding paths, skid trails, truck roads, and log landings -- should only be used when adequately dry or frozen.
- ✓ Properly buffer and protect special habitats such as cliffs, caves, talus slopes, beaver meadows, vernal pools, spring seeps, and remnant patches of old growth forest.
- ✓ Take special care to protect wetlands, particularly those with muck and peat soils and a thick organic layer. These wetland soils are capable of storing ten times as much carbon as other soils in the region.

- ✓ Use low-impact logging equipment, including small forwarders, to minimize residual stand damage and soil compaction.
- ✓ Log landings should: be located on nearly-level, stable ground; be kept away from protective strips; have water diversions installed; and be graded to prevent erosion and sedimentation.

### *Protective Strips and Buffer Strips*

- ✓ Maintain protective strips—characterized by minimal soil disturbance, nearly-complete canopy closure, and many large, mature trees—between the access network and surface waters according to Table 4 in the Vermont AMPs at a minimum.
- ✓ Seed areas of exposed soil within the protective strip using native species and sources to the maximum extent possible and mulch with material free of invasive exotics. Apply according to Table 3 in the AMPs.
- ✓ Keep stream buffer strips at least 25 feet in width, free of logging vehicles. Conduct little or no tree cutting in buffer strips.
- ✓ Take particular care to prevent stream bank erosion in order to avoid the release of sediment and stored carbon.

### *Stream Crossings*

- ✓ Restore stream crossings and remove non-permanent structures as soon as possible.
- ✓ Cross streams with bridges or culverts that are properly sized according to Table 1 and installed at right angles to the stream.
- ✓ Prevent sediment from reaching streams by using turn-ups or broad-based dips on forwarding paths, truck roads, and skid trails prior to all stream crossings. Drainage ditches should not feed directly into streams or other surface waters.

### *Closeout*

- ✓ Restrict post-harvest use of the access network to prevent erosion, compaction, and site disruption.

## **Vegetation Management**

- ✓ Use single-tree and small group selection methods for communities with gap-phase replacement (e.g. northern hardwoods). Use the irregular shelterwood method for communities with stand-replacing disturbance regimes (e.g. spruce-fir). Uneven-aged management by area regulation is recommended. If using the group-selection method, keep canopy openings less than 0.25 acres. If using the group-shelterwood method, the size of the regenerated areas can be increased. Avoid clear-cutting and whole-tree harvesting.
- ✓ Forests generally sequester and store the most carbon when left untouched. Therefore, avoid creating canopy gaps other than those that are deemed essential to meet non-ecological forest functions and values.
- ✓ Maintain gradual or soft edges between habitats. Allow native shrubs, saplings, and some overstory trees to remain along the harvest boundary. Edges may also be “feathered” by retaining more trees closer to the uncut forest and gradually fewer trees closer to the harvested area.
- ✓ Manage for at least four large and secure cavity, snag, and/or decadent, living trees per acre on average, with one exceeding 21 inches diameter breast height (DBH) and four exceeding 15 inches DBH.<sup>1</sup> Leave trees that have cavities of varying sizes and are located in the upper trunk of the tree. Give priority to hardwood trees with cavities, as they remain intact longer than softwoods.
- ✓ Manage for at least four downed trees or 16+ foot long logs per acre on average, with one exceeding 21” DBH and four exceeding 15” DBH.
- ✓ Grow the largest trees and use the longest rotations possible within site and log quality limitations.

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<sup>1</sup> To address safety issues, this may be accomplished by clustering cavity and snag trees in areas such as riparian zones and wetlands and away from access roads and trails.

- ✓ Retain a minimum of three vigorous and wind-firm legacy trees per acre measuring over 19 inches DBH. Intermediate treatments should raise the average (mean) diameter of the residual dominant and co-dominant trees of the forest.
- ✓ Any forest management in natural communities that are ranked as “very rare”(S1) and “rare” (S2) or in natural communities ranked as “uncommon” (S3), “common” (S4), and “very common”(S5) but with little or no evidence of past human disturbance should be reviewed and approved by the VT F&W Natural Heritage Biologists.
- ✓ When planting, use only local sources of native species, plant three or more species, and include deciduous species.
- ✓ When thinning or regenerating stands, favor native species over non-native species and trees and shrubs that produce seeds and fruits.
- ✓ Use natural regeneration to the maximum practical extent.
- ✓ Biological legacies of the forest community—including coarse dead wood, logs, and snags; trees that are large, living, and old; buried seeds; soil organic matter; invertebrates; sprouting plants; and mycorrhizal fungi—should be protected to aid in post-harvest recovery and to keep the forest from becoming "oversimplified."
- ✓ Promote the seed-bearing capacities of poorly represented members of the forest.
- ✓ Avoid tree felling on slopes exceeding 50%.
- ✓ In general, leave as much biomass on site as possible, including all materials less than 3 inches in diameter.
- ✓ Promote a vertical stand structure that includes over-story, mid-story, shrub, and herbaceous vegetation layers.
- ✓ Remove most woody, invasive exotics before harvesting forest products. Do not use agrochemical pesticides or hormone herbicides.
- ✓ Use biodegradable, non-petroleum bar and chain oil to protect forest workers and groundwater supplies.
- ✓ Avoid using genetically modified organisms (GMOs).
- ✓ Limit residual stand damage—including basal wounds, broken and/or scraped tops, and exposed roots—to 10% or fewer of the dominant or co-dominant trees.
- ✓ Prior to the inception of harvest, mark all trees to be logged.
- ✓ Leave at least 30% of the average annual growth on site.
- ✓ Avoid grazing by domestic animals and support active control of deer populations.
- ✓ Directionally fell low-value timber across slopes and leave in place to slow, spread, and sink storm flows.

## **Sensitive and Special Habitat Areas**

*Areas including wetlands, raptor nests, upturned tree roots, seeps, vernal pools, hard/soft mast species, and other unique or fragile, natural or cultural sites including areas of historical or community significance sites require identification and protection.<sup>2</sup> Harvesting and road building in wetlands, including the construction of new roads or expansion of the width of existing roads by more than 20%, will require a permit or review by the Wetlands Office of the Water Quality Division (802) 241-3770. The UVM publication "Wetlands Rules and Regulations: What they mean to your logging operation in Vermont" should be referred to when building or upgrading access and managing vegetation around wetlands.*

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<sup>2</sup> Cultural resources should be protected by following best management practices contained in *Stonewalls and Cellarholes* (VT ANR 1994). Well-drained terraces within 100 feet of permanent streams and having south to west aspect are potential prehistoric sites. These should be mapped and/or otherwise identified and avoided. If site disruption is likely, the Vermont Division of Historic Preservation should be consulted with permission of the landowner(s).

**Table 1: Recommended Distances Between Drainage Structures on Paths, Trails & Roads (feet)**

Road Grade (%)	Distance between waterbars	Distance between culverts	Distance between turn-ups, dips, and pole culverts
1	290	290	290
2	250	270	270
5	135	180	180
7	100	160	160
10	80	100	100
15	60	60	n/a
20	45	n/a	n/a
25+	40	n/a	n/a

**Table 3: Methods of Seeding and Mulching Logging Roads, Log Landings, and Skid Trails**

Temporary Cover		
Material	Rate of Application	Recommended Time of Application
(A) Straw or hay, free of invasive species seed	60 bales/acre	Any time
(B) Domestic ryegrass	20 lbs./acre	Fall (for spring growth)
<b>OR</b>		
Permanent Cover		
Material	Rate of Application	Recommended Time of Application
(A) Soil Conservation Mix*	42 lbs./acre	April 15-June 15 Or Aug 1 – Sept 15

\*Use mixes that contain native species only.

**Table 2: Guide for Determining Culvert Size When Permanent and Temporary Paths, Trails, and Roads Cross Streams**

<i>Drainage Area: number of acres sloping toward the stream</i>		
Drainage area, well-drained soils (acres)	Drainage area, shallow soils with frequent rock outcrops or impermeable soil conditions (acres)	Recommended Pipe Diameter (inches)
16	4	15
25	7	18
40	12	21
55	16	24
84	27	30
130	47	36
190	64	42
260	90	48
335	120	54
400	166	60
550	205	66

**Table 4: Protective Strip Width Guide**

Slope of land between roads or landings and streambanks or lake shores (%)**	Minimum width between roads or landings and stream (feet along surface of ground)
0-10	50
11-20	70
21-30	90
31-40*	110

\*Add 20 feet for each additional 10% side slope