



# **OREGON RIDGE PARK**

## **FOREST HEALTH ASSESSMENT AND FOREST MANAGEMENT PLAN**

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## TABLE OF CONTENTS

<b>1.0 EXECUTIVE SUMMARY</b>	1
<b>2.0 FOREST HEALTH AND THE OREGON RIDGE PARK FOREST</b>	
2.1. Background	11
2.2. Historical Land Use before Conversion to Oregon Ridge Park	19
2.3. Importance of Forests for Watershed Function	20
2.4. Purpose of the Forest Health Assessment and Forest Management Plan	25
2.5. Present Condition of the Oregon Ridge Park Forest	25
2.6. Expected Future Trends and Condition without Management	29
2.7. Anticipated Long-range Condition with Management Plan Implementation	30
<b>3.0 ASSESSMENT METHODS</b>	
3.1. Forest Stratification and Stand Delineation Procedures	31
3.2. Sampling Procedures in Overstory and Understory	31
3.3. Northeast Decision Model	33
3.4. Stream Assessment Methods	34
<b>4.0 FINDINGS AND RECOMMENDATIONS</b>	
4.1. Summary Description Across Forest Stands	35
4.2. Stand-by-Stand Reports and Management Recommendations	36
4.3. Stream Assessment Findings	61
4.4. Trail and Tree Maintenance Recommendations	67
4.5. Ground-layer Plant Survey	69
4.6. General Recommendations for Controlling Gypsy Moth, Deer, and Exotic, Invasive Plant Species at Oregon Ridge Park	72
<b>5.0 LITERATURE CITATIONS</b>	85
<b>6.0 GLOSSARY OF FORESTRY TERMS</b>	89
<b>7.0 APPENDICES</b>	95
7.1. Forest Stand Data	96
7.2. Sampling Plot Data	433
7.3. NED Stand Visualization System Plots	630

**List of Fold-out Maps:**

Appears after Page:

Figure 1: Forest Stand Map of Oregon Ridge Park . . . . .	8
Figure 3.1: Sample Plot Location Map . . . . .	32
Figure 4.3.1: Stream System Map . . . . .	66
Figure 4.3.2: Stream Side Management Zone Analysis Map . . . . .	66
Figure 4.4: Hazardous Tree Survey and Trail Notes Map . . . . .	68

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## **1.0 EXECUTIVE SUMMARY**

### **“OPPORTUNITY AND RESPONSIBILITY”**

*“We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.”*

Aldo Leopold

With nearly 900 acres of contiguous forest located centrally in Baltimore County, Oregon Ridge Park provides the County’s 800,000+ citizens and others in the region with ample opportunity to experience nature in close proximity to their communities. Nearly 6 miles of trails allow visitors to hike throughout a diverse forest community with 90 overstory, understory, and ground-layer plant species. More than 6 miles of streams originate within or flow through the Park, providing habitat for numerous aquatic species, including native brook trout. The casual Park visitor, observing the seasonal changes at Oregon Ridge, likely sees the forest as an aesthetically pleasing and healthy system.

But beyond the general story told by educational exhibits at the Oregon Ridge Nature Center, few visitors likely understand that this invaluable recreational resource exists on a landscape altered greatly by humans over the past two centuries. Visitors and non-visitors alike may assume that the forest system at Oregon Ridge is well-protected by its public ownership and Park designation. The County’s environmental managers have been aware, however, that the health of forest ecosystems here and throughout the region are threatened. As a result, Mar-Len Environmental was contracted to conduct an assessment of the health of the Oregon Ridge Park forest and to prepare a forest management plan to address problems revealed by the assessment. The forest assessment has identified significant environmental threats to the health and long-term sustainability of the Oregon Ridge Park forest that, without thoughtful management response, will change and potentially degrade the forest as it now exists.

### **ASSESSMENT METHODS**

The Oregon Ridge Park forest system assessment included three field study components:

1. **Forest** - The condition and health of the 895-acre forest system at Oregon Ridge Park was assessed using two methods:
  - Forest overstory, understory, and ground-layer characteristics were assessed quantitatively for 22 stands, presented in Figure 1, using the USDA Forest Service North East Decision (NED) model. Data were collected for 119 separate forest plots within these stands, including measurement of more than 1,700 overstory trees alone. Overall, tens of thousands of data observations were recorded.
  - The herbaceous community was assessed independently for species presence and coverage.
2. **Streams** - Streambank erosion and habitat condition were assessed qualitatively by walking all of the 6.2 miles (32,450 linear feet) of headwater and larger streams that originate within or traverse the Park.
3. **Trails** - Potential hazard trees (dead trees and large overhanging dead branches) were identified and marked along the 6 miles of recreational trails in the Park.

More detailed information about the forest assessment methods is presented in section in 3.0.

## **FINDINGS**

**Forest** - The forest system, including its herbaceous plants and wildlife, is the County's most important natural asset at Oregon Ridge Park. This assessment found that:

- **Canopy Composition** - The forest is comprised of four forest cover types, of which oak species dominate 80% of the 895 forested acres. Although 30 overstory species and 25 understory tree species exist within the forest stands, trees are found in only two size classes: 84% of all trees fall within the 18+” DBH size class, while the remaining 16% are in the 11-17.9” DBH size class. As documented in the Conservation Fund's 2006 *The State of Chesapeake Forests*, oaks are the most ecologically important species in the Chesapeake Bay region's forests.
- **Tree Age and Growing Potential** - Twenty of the 22 forest stands are more than 100 years old and 15 stands are between 108 and 121 years old,

suggesting that the forest was widely harvested in the 1880's and 1890's. Fourteen stands are now relatively crowded, with insufficient room for good continued tree growth. Only one stand (#3), at 140 years old (2<sup>nd</sup> oldest) and with a stand relative density of 73.6%, has good potential for old growth.

- **Forest Health** - A Gypsy moth infestation in 2006 was severe but localized (stand #6). Trees here and in other stands are stressed due to overcrowding and are therefore vulnerable to mortality from repeated infestations.
- **Regeneration** - As a result of deer browsing, 54% of the field plots sampled lacked oak regeneration, as well as regeneration of any other native species. All stands lack adequate regeneration.
- **Ground-layer Composition** - The ground-layer inventory identified only 48 species, 44 of which are herbaceous. Deer have also greatly impacted the herbaceous community, with 25% of the 127 plots devoid of herbaceous plants due to deer pressure. This is low species diversity for the site conditions.

**Streams** - Healthy forests in the Park are vital for providing good water quality by intercepting precipitation, shading streams and soil to reduce temperatures, filtering and trapping pollutants, and reducing soil erosion. These forests serve to protect the 6.2 miles of streams in the Park that drain into the Loch Raven Reservoir, as well as to protect the 640 acres of slopes with grades of 15% or greater adjacent to streams. The streams assessment found that:

- **Stream Channel Stability** - 18.2% of stream length has excellent stability, 32.1% has good stability, 47.4% has fair stability, and 2.2% has poor stability (see definitions on p. 34). Downed woody debris is causing streamflow blockages in segments of stream sections #2, #5, #7B, and #7.
- **Habitat Conditions** - 68.2% of the stream system has excellent habitat conditions, 8.4% has good conditions, 11.3% has fair conditions, and 12.1% has poor conditions (see definitions on p.34). The Baisman Run stream system has excellent habitat conditions for 95.4% of its length.

**Trails** - The 5.93 miles of trails provide access for citizens to enjoy the aesthetic and ecological benefits of the Park. The trails assessment found that:

- **Trail Stability** - Approximately 90% of the trails are in good condition. Portions of the Green and Blue trail, however, are badly eroded in sections.

- **Hazard Trees** - As often associated with forest trails, tree hazards are present. A total of 105 trees with dead overhead branches were identified and marked along the trail system, and another 127 dead trees were identified and marked in close proximity to trails.

Detailed findings and discussion are presented in Section 4.0.

## **MANAGEMENT RECOMMENDATIONS**

As the owner of one of the largest continuous tracts of forest land in the County, Baltimore County government has the opportunity and responsibility to practice good forest stewardship at Oregon Ridge Park for the purpose of ensuring a sustainable forest for present and future generations of its citizenry. The following management priorities are recommended for the Park's forests, trails, and streams:

- **Forests** – Baltimore County should actively manage the forest at Oregon Ridge Park with the objective of sustaining a naturally-regenerating oak community due to its high ecological value. In order to sustain an oak-dominated forest, environmental threats currently present such as pests and diseases (e.g., Gypsy Moth), invasive plants, and the high deer population must be controlled. Forest health and vitality will also be improved by reducing environmental stress caused by over crowding. The oak-dominated forest cannot naturally regenerate under the dense canopy in most stands. The closed canopy provides an ideal environment for shade-tolerant species such as red maple and black gum and, without any silvicultural intervention, the existing forest will convert to red maple, beech and black gum. These species do not provide ecosystem services equivalent to that of an oak forest.
- **Trails** – Baltimore County should close and stabilize the portions of the Green and Blue trails with severe erosion. Alternative trail sections should be determined and developed. Hazard trees should also be addressed as a priority for public safety.
- **Streams** – Baltimore County should relocate trail sections with high erosion to reduce transport of sediment to streams. Debris dams that are impeding stream flow should be cleared. Downed woody debris not blocking stream flow should be retained for aquatic habitat.

**Sustainable Forest Management** - The forest at Oregon Ridge Park was delineated into 22 distinct stands that represent the combination of different plant communities on different landscape features. While there are varying conditions across these stands, as a whole the Oregon Ridge Park's forest can be described as a system vulnerable to undesirable changes. The oak-dominated system that exists today is likely to change to a non-oak forest, which will provide less desirable recreational experiences and significantly less desirable ecological functions.

Based on the technical literature (citations appear in Section 2.3), it is anticipated that changes in the species composition of the forest over time will negatively affect the following ecological functions:

- **Nitrogen Cycling and Stream Water Quality** – Although the efficiency of nitrogen cycling in forests is dependent upon many factors including geography, climate, soil types, and forest stand ages, oak-dominated forests throughout the eastern U.S. typically have tighter control on nitrogen cycling than do beech/maple forests, releasing lower levels of nitrates from organic forest floor litter to adjacent streams. Oak forests also maintain a higher ratio of carbon to nitrogen in forest floor litter than other deciduous forest types because of high lignin content, which slows the decomposition rate of downed debris, and the movement of soluble nitrogen compounds through the landscape. Lignins also boost forest soils' capacity for storing and releasing water and cycling nutrients by adding very long-lived (hundreds to thousands of years), degradable-resistant biomass to the humus component, which supports myriad microorganisms and chemical processes that bring resource cycling efficiency and stability to the forest ecosystem. In these ways, oak forests are critical for the maintenance of high stream water quality and productive aquatic habitats at Oregon Ridge.
- **Wildlife Habitat and Biodiversity** - Thousands of years of dominance by oak forest types in the eastern United States have produced myriad interdependent relationships between oak forests and wildlife. At every spatial level, from the tallest trees in the canopy to the smallest plants on the forest floor, mammals, birds, amphibians, reptiles and countless insects and microorganisms feed on and are fed upon by other forest inhabitants in a complex food web that is driven by the presence of oaks. Native streamside trees and other plants in oak associations add annual pulses of food resources in the form of leaves and woody debris to macroinvertebrate communities that support high water quality stream system habitats for

aquatic plants, invertebrates, and fish species. Oaks are considered keystone species because of their significant contribution to the structural and biological diversity of the eastern forests and the critical processes that sustain the forest ecosystem. As an example, oak forests play a crucial role in the survival of hatchlings of most eastern forest bird species. In the spring, loopers, inchworms, and spanworms, the caterpillar stages of almost 200 species of forest moths, feed on the young leaves of oaks and other plant species in oak forest communities at a time when forest birds are foraging for hatchling food. Bird foraging reduces the insect pressure on the forest plants, allowing them to grow to their potential. The forest plants provide sufficient habitat for sustaining generations of birds that will consume other insects throughout the year. Oaks are primary hosts for gall wasps, whose larvae extend the food reserves into the summer and fall. From the fall to the winter, oaks continue to provide food in the form of acorn mast, which not only offers food for mammals and game birds, but also overwinters the larvae of acorn weevils that will provide additional food for birds and mammals the following year. In these ways, oak communities anchor a food web that supports a diverse range of higher feeding levels in the forest ecosystem.

As consulting foresters, Mar-Len Environmental considers that the oak-dominated forest that currently exists at Oregon Ridge Park can be perpetuated with sound management. As detailed in this report, for any forest management to succeed at Oregon Ridge, deer browsing must first be controlled. Without control of the deer population, regeneration of oak and other desirable forest species is not possible. Efforts must also be made to control the spread of invasive, non-native plant species. Once deer are controlled, standard sustainable forestry practices can be introduced to stimulate natural oak regeneration. These management recommendations require both a continuous and periodic commitment in order to succeed.

The level of forestry practices necessary to sustain natural oak regeneration is limited. Only parts of 6 of the 22 stands, with a combined area of 183 acres or only 20.4% of the total forest area, require silvicultural treatments for regeneration. A summary of recommended management actions for each stand is presented in Table 1.1, followed by a time schedule for these actions (Table 1.2), and estimated costs (Table 1.3).

More detailed information for management recommendations is presented in Sections 4.2, 4.4, and 4.6.

*“There is little question that change is the only thing that is constant in forests. I believe that one of the overriding issues is not the fact that changes in oak composition and distribution are probably occurring all across the eastern forests but that the rapid rate of change is unprecedented in the context of biologic and ecologic time frames of the past. We are seeing changes in less than a single generation of oaks that we would have expected in 10 to 20 or more generations. Ecological balances are not being reached as a result of human induced changes. It is imperative that we strive to enhance our understanding of the short and long-term, direct and indirect implications of human activity on our forested ecosystems.”*

David Wm. Smith  
Emeritus Professor of Forestry  
Virginia Polytechnic Institute and  
State University  
2005

Table 1.1: Summary of Forest Stand Management Recommendations for Oregon Ridge Park

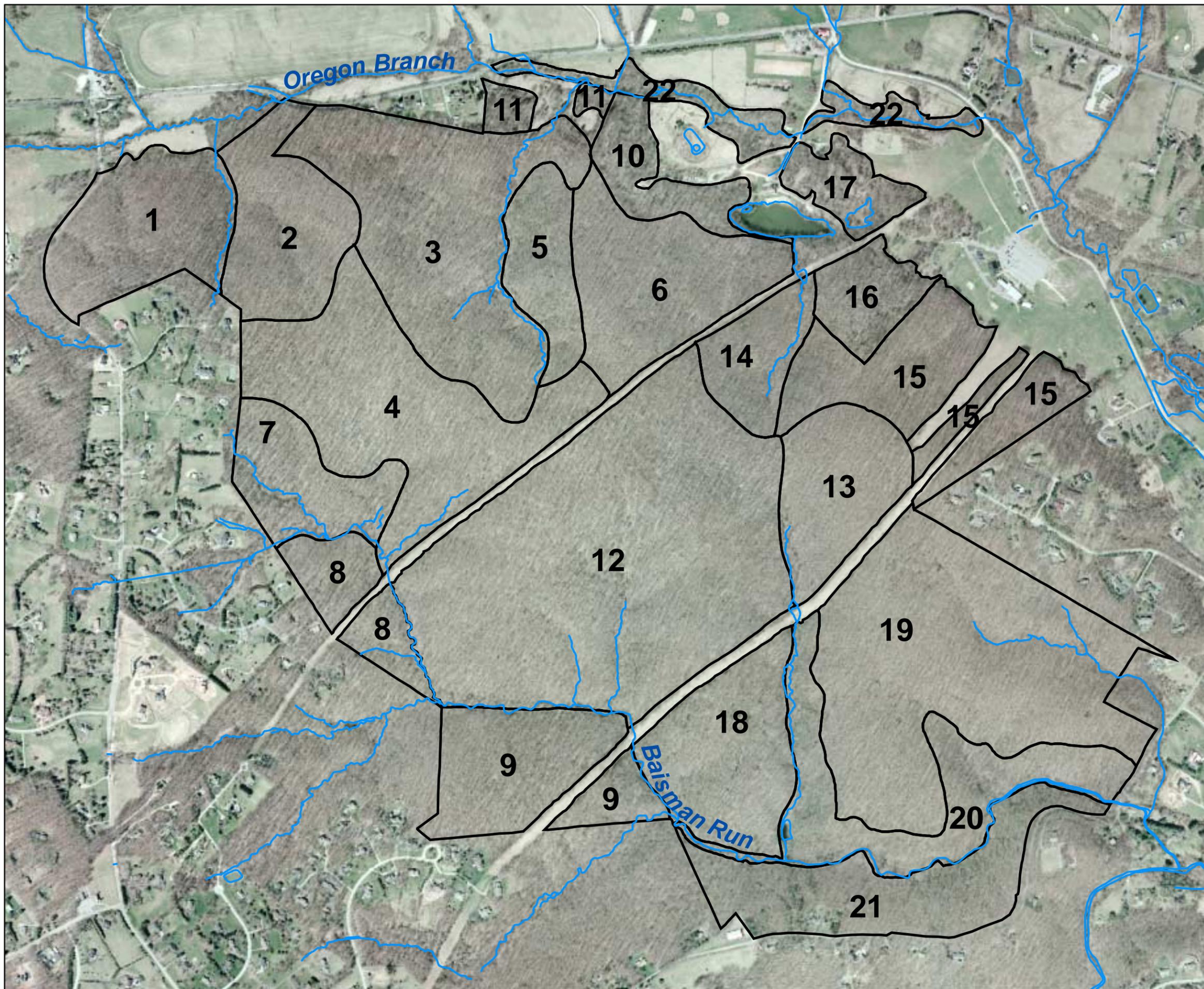
Stand #	% Relative Density All species	Basal Area (sf/ac)	Existing Stand Condition	Stand Management Objectives	Recommended Management Action	Recommended Silvicultural Method
1	117.0	157.0	25 sq ft unacceptable stock	oak regeneration	reduce BA to 80 sf/ac	Single Tree Selection
2	124.0	152.0	52 sq ft unacceptable stock	oak regeneration	reduce BA to 80 sf/ac	Single Tree Selection
3	73.6	120.0	optimum for good oak growth	maintain stand health	control invasives	none
4	79.8	140.0	36.7 sq ft unacceptable stock	oak regeneration	reduce BA to 100 sf/ac	thin undesirable trees
5	108.5	133.3	>15 % slopes near stream	maintain stand health	control invasives	none
6	121.8	162.5	recently defoliated	reduce Gypsy moths	control invasives	none
7	110.5	143.3	>15% slopes near stream	maintain stand health	control invasives	none
8	101.5	147.5	steep slopes and streams	maintain stand health	control invasives	none
9	106.5	140.0	slopes and stream crossings	maintain stand health	control invasives	none
10	52.0	140.0	high recreational usage	maintain stand health	control invasives	none
11	66.3	103.3	young - low crowding	oak regeneration	control heavy invasives	none
12	93.4	138.6	40 sq ft unacceptable stock	oak regeneration	control invasives	Shelterwood Harvest
13	103.0	144.0	32 sq ft unacceptable stock; no oak regeneration	oak regeneration	reduce BA to 90 sf/ac; control invasives	Initial thinning to reduce crowding; in 5-8 yrs, create canopy gaps
14	101.8	137.5	steep slopes	maintain stand health	control invasives	none
15	109.7	146.0	32 sq ft unacceptable stock	oak regeneration	reduce BA to 70 sf/ac; control invasives	Single Tree Selection
16	56.8	140.0	former pine dominance	oak regeneration	control invasives	none
17	56.4	113.3	optimum for good oak growth	oak regeneration	control invasives	remove Ailanthus trees
18	92.0	122.0	>15% steep slopes	maintain stand health	none	none
19	106.7	142.0	oak dominated; over crowded	oak regeneration	control invasives	Shelterwood Harvest
20	115.9	130.0	very steep slopes	maintain stand health	control invasives	none
21	120.4	156.0	steep slopes	maintain stand health	control invasives	none
22	124.2	140.0	riparian area	improve stand health	control heavy invasives	remove Ailanthus trees

Note: See glossary for definitions of terms

Figure 1 - Forest Stand Map

Oregon Ridge FHA

1 inch equals 800 feet  
1:9,600



Stand	Area (Ac)
1	37.00+/-
2	33.50+/-
3	76.20+/-
4	70.50+/-
5	18.90+/-
6	42.50+/-
7	24.70+/-
8	17.90+/-
9	38.20+/-
10	16.00+/-
11	5.20+/-
12	150.90+/-
13	28.90+/-
14	17.50+/-
15	44.30+/-
16	14.10+/-
17	12.20+/-
18	37.80+/-
19	105.60+/-
20	43.90+/-
21	42.40+/-
22	17.50+/-
<b>Total</b>	<b>895.80+/-</b>

Prepared by Geographic Information Services,  
Baltimore County Department of Environmental  
Protection and Resource Management  
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ForestStandMap2.mxd  
ForestStandMap2.pdf



**Table 1.2: Recommended Time Schedule for Stand Management Activities**

<b>Stand</b>	<b>Recommended Management Activity</b>	<b>Total Acres</b>	<b>Activity Acres</b>	<b>Target Year #</b>
1-22	Spray to control Gypsy moths	500+	895.7	1
1-22	Inspect annually for Gypsy moths	895.7	895.7	all
1-22	Control deer populations to 10 deer/sq. mi.	895.7	895.7	1
1-22	Control deer annually	TBD	895.7	all
1	Conduct Selection harvest for oak regeneration	37.0	6.0	2
2	Conduct Selection harvest for oak regeneration	33.5	4.4	2
3	Inspect for and control invasives	76.2	76.2	2
4	Selection harvest for regeneration	70.5	44.0	2
5	Inspect for and control invasives annually	18.9	18.9	3
6	Inspect for and control Gypsy moths annually	42.5	42.5	all
7	Inspect for and control invasives annually	24.7	24.7	3
8	Inspect for and control invasives annually	17.9	17.9	3
9	Inspect for and control invasives annually	38.2	38.2	3
10	Inspect for and control invasives annually	16.0	10.0	3
11	Inspect for and control invasives annually	5.2	5.2	3
12	Conduct 1 <sup>st</sup> Shelterwood cut for regeneration	150.9	62.0	4
12	Conduct 2 <sup>nd</sup> Shelterwood cut for regeneration	"	62.0	14
12	Conduct 3 <sup>rd</sup> Shelterwood cut for regeneration	"	62.0	24
13	Conduct Selection harvest for oak regeneration	28.9	15.3	5
13	Conduct Group selection harvest for regeneration		5.0	10
14	Control invasives	17.5	17.5	5
15	Conduct Selection harvest for oak regeneration	44.3	3.3	6
15	Control invasives-eastern boundary	"	5.0	6
16	Inspect for and control invasives annually	14.1	14.1	6
17	Inspect for and control invasives annually	12.2	12.2	6
18	None	37.8	0.0	n/a
19	Conduct 1 <sup>st</sup> Shelterwood cut for oak regeneration	105.6	48.0	7
19	Conduct 2 <sup>nd</sup> Shelterwood cut for oak regeneration	"	48.0	17
19	Conduct 3 <sup>rd</sup> Shelterwood cut for oak regeneration	"	48.0	27
20	Inspect for and control invasives annually	43.9	43.9	7
21	Inspect for and control invasives annually	42.4	42.4	7
22	Inspect for and control invasives annually	17.5	17.5	7

Note: Target Year represents relative sequence across stands and timing for multiple treatments within stands.

**Table 1.3: Approximate Costs for Recommended Management Activities**

<b>Stand</b>	<b>Activity</b>	<b>Cost/ Unit</b>	<b># Units</b>	<b>Total Cost</b>
1-22	Spray for Gypsy Moth Control	\$40/acre	896	\$10,750
3,5-11, 14-17, 20-22	Control Invasive Plants	\$150/acre	386	\$57,900
1-22	Deer Control	\$70/deer	TBD	TBD
Trails	Hazard Tree Removal	\$200/tree	127	\$25,400
Trails	Hazard Tree Trim	\$75/tree	105	\$7,875
Trails	Trail Maintenance	TBD/mile	3,168	\$18,000
1,2,4,12, 13,15,19	Silviculture/Regeneration Harvests	\$0/acre	183	No Cost

**Notes:** Spraying for Gypsy moths assumes treatment of the entire Park. Spraying is cost-shared by the MD Dept. Of Agriculture (70%) and Baltimore County (30%). Costs shown are the County's portion. Spraying is likely required periodically for all or a portion of the site.

Invasive plant control will be a continuing and variable activity.

Regeneration harvests performed by an industrial forester, as the operator and consultant, incur no cost. Regeneration harvests performed by a private consultant, on bid to commercial operators, incur a 10% commission fee on the total dollar value of the harvest, which is payable after the County is paid in full, so there is no out-of-pocket expense to the County.