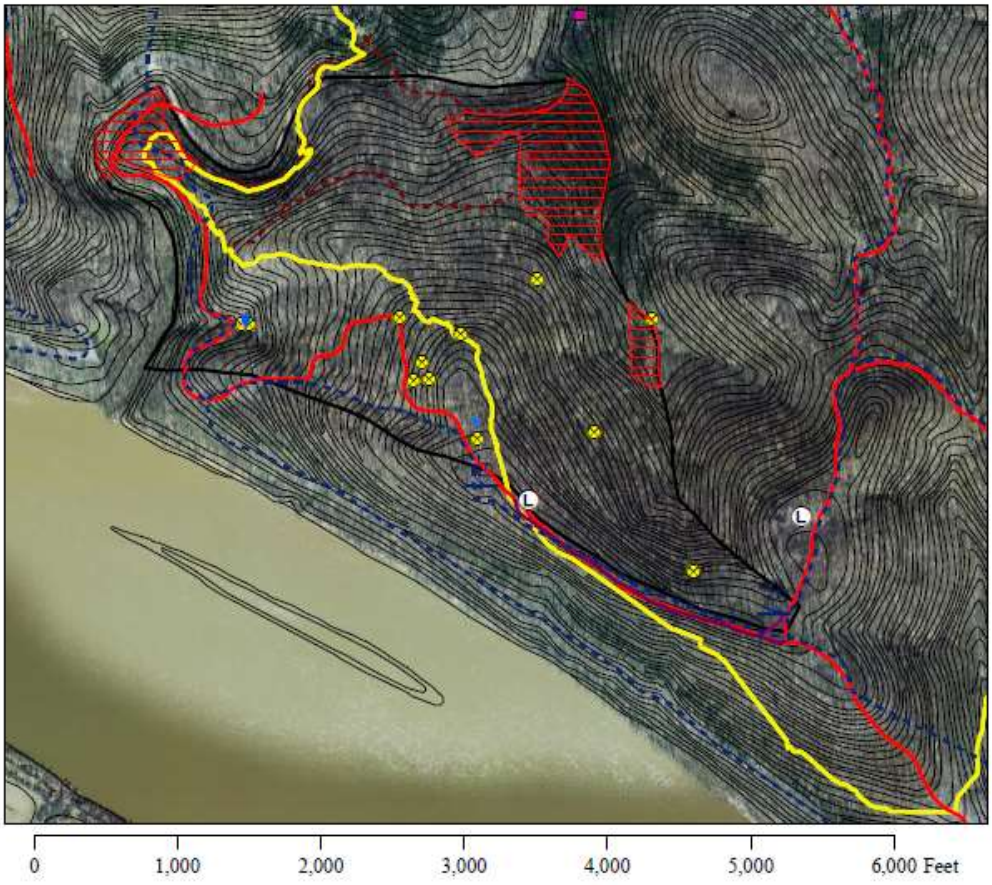
Indiana Department of Natural Resources – Division of Forestry
Draft - Resource Management Guide

STATE FOREST: Harrison Crawford **COMPARTMENT:** 28 **TRACT:** 02

Date: June 22, 2016 **Forester: Wayne Werne**
(Inventory – August 2015)



Legend

- 2802 spring
- 2802 exotics
- 2802 wet area
- 2802 yards
- Horse trails
- Fire trails
- AHT
- Cliff Dweller Trail
- Tract 2802
- 2802 pond

- Stand 1: Mixed mesophytic - 177 ac
- Stand 2: Old field advanced - 23 ac

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TRACT BOUNDARIES: This 200-acre tract is defined by topographic and physiographic features that form its borders. The southwestern edge is formed by the ridgeline that divides this tract from neighboring tract 2803. The eastern border is formed by an intermittent stream that divides it from tract 2805, and the northern and western borders are formed by Potato Run Creek which also separates it from tract 2801.

ACCESS: Best access to this tract is from fire trail 303 which comes off of Cold Friday Road, and eventually joins up to the main forest road beyond the pioneer cabin after running along the ridgeline and winding around the hills on the western edge of the tract. However, this trail is impassible by vehicle on the western edge due to erosion that has exposed a rock shelf in the middle of the road. Consequently, one must drive in from Cold Friday Road. There is also an old fire trail that is used by horse traffic which comes off of fire trail 303 and connects to the main forest road across from the old quarry site after going through tract 2805. This route is borderline due to erosion, muddy seep areas, and an ill-defined creek crossing.

ACQUISITION HISTORY: The land that makes up this tract was acquired primarily from two different landowners about 70 years ago. These were some of the original land acquisitions that started to form Harrison-Crawford State Forest (parcel numbers 3 and 21). The majority of the acreage in this tract was acquired from Samuel Pfrimmer in 1934, and the remainder was acquired from James Brewster in 1932.

TRACT STAND DESCRIPTION: This tract was divided into two basic stands based on cover type and past management. These stands include: mixed mesophytic (majority of tract) and old field – advanced. These stands are described below.

Stand 1 – Mixed mesophytic

This 177-acre stand forms the majority of the tract and is made up of a mix of mesic site species. The volume of this stand (10,095 bd. ft/ac) is composed primarily of yellow-poplar (2839 bd. ft/ac), sugar maple (1910 bd. ft/ac), northern red oak (1220 bd. ft/ac), and white ash (1023 bd. ft/ac) with chinkapin oak, shagbark hickory, white oak, and various other species making up the remaining 30% of the volume. As a whole, this stand can be described as a mixed hardwood type, but it seems to gradate between sugar maple/white ash/yellow-poplar domination along the upper reaches of the slope to more red oak mixed in with less maple midslope, and finally to more white oak/red oak/chinkapin oak on the lower reaches of the slope near the creek.

It might also be noted that there were a couple of areas within this stand that had been agricultural fields at one time, but had succeeded to the point that it was difficult to tell them from the surrounding area. Mostly these areas had well-established yellow-poplar and white ash in the overstory with a mixture of sassafras, sugar maple, and cherry in the smaller size classes. These areas were located on the southern ridgeline and into the central portion of the tract where the ridge dropped off more steeply. Due to the fact that they had large trees growing there, these areas were included as part of stand 1.

Records indicate that three timber sales took place on this tract in the 1970's and one on 2005. One in 1970 removed about 54,000 bd. ft in 549 trees (mostly black oak and sugar maple), one in 1976 or 1977 removed about 112,000 bd. ft in 299 trees (mostly yellow-poplar, sugar maple, and red oak), and one in 1977 appears to have been a separate sale of high quality timber which removed about 28,000 bd. ft of white oak and black walnut exclusively in 109 trees.

A sale was marked in this tract in 2003, but not marketed. Subsequently, a windstorm in 2004 blew down a number of trees, and a salvage sale was undertaken in 2005 which removed about 56,000 bd. ft in 188 trees (and 72 culls) – mostly sugar maple, yellow-poplar, and black cherry.

The salvage harvest in 2005 removed about 279 bd. ft per acre and left the residual stand with about 7000 bd. ft per acre at that time.

Using 2003 and 2015 inventory and past harvest data annual growth since 2003 has been estimated between 188-222 bd. ft per acre, depending on if you exclude the old field acreage in stand 2 (23 acres) or not.

Cedar volume was not included in this calculation.

Annual growth in 2003 was estimated at 155-168 bd. ft per acre per year. Given stand volumes at that time, this appears fairly consistent with an estimated 2-3% annual growth rate indicated by the most current inventory.

Stand 2 – Old field advanced

This 23-acre stand forms the remainder of the tract, and is located mostly along the northeastern portion along the lower slopes by the drainage where an agricultural field once existed. There is also a small area of this stand type on the western end of the tract on the narrow ridge that once contained a homesite. It is defined by varying amounts of eastern redcedar, from pure stands of cedar to mixtures of cedar and more mesic species such as yellow-poplar and noticeable amounts of black cherry. The volume of this stand (8170 bd. ft/ac) is composed primarily of eastern redcedar (5167 bd. ft/ac) and yellow-poplar (1703 bd. ft/ac). Black cherry, shumard oak, white ash, and northern red oak make up the remaining 15% of the volume.

It should be noted that the volume of cedar is figured using a cedar log scale that results in a higher than Doyle volume, and includes trees down to 6" DBH as sawtimber volume. Eastern redcedar was not given much volume in the last inventory because the cedar log scale was not used then, but since it was used for this inventory, this gives the impression that a lot of growth and volume accumulation took place since the last inventory, which is deceiving if not considering the scaling used.

SOILS: The following soils are found on the tract in approximate order of importance.

CoF Corydon stony silt loam, 20-60% slopes Upland oak SI is 65-75, Yellow-poplar SI is 80-90, est. growth is 155-220 bd. ft/ac/yr. for oaks and 260-335 bd./ ft/ac/yr. for yellow-poplar.

GpF Gilpin-Berks complex, 18-30% slopes Upland oak SI is 70-80, Yellow-poplar SI is 70-80, est. growth is 185-260 bd. ft/ac/yr. for oaks and 185-260 bd./ ft/ac/yr. for yellow-poplar.

HaD2 Hagerstown silt loam, 12-18% slopes, eroded Upland oak SI is 85-95, Yellow-poplar SI is 90-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 335-450 bd./ ft/ac/yr. for yellow-poplar.

WbF Weikert-Berks channery silt loams, 35-60% slopes Shortleaf pine SI is 53-72, est. growth is 100-200 bd. ft/ac/yr.

WeC2 Wellston silt loam, 6-12% slopes, eroded Upland oak SI is 70-80, Yellow-poplar SI is 90-100, est. growth is 185-260 bd. ft/ac/yr. for oaks and 335-415 bd./ ft/ac/yr. for yellow-poplar.

HgD3 Hagerstown silty clay loam, 12-18% slopes, severely eroded Upland oak SI is 85-95, Yellow-poplar SI is 90-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 335-450 bd./ ft/ac/yr. for yellow-poplar.

HgE3 Hagerstown silty clay loam, 18-25% slopes, severely eroded Upland oak SI is 85-95, Yellow-poplar SI is 95-105, est. growth is 300-375 bd. ft/ac/yr. for oaks and 375-450 bd./ ft/ac/yr. for yellow-poplar.

Hu Huntington silt loam Yellow-poplar SI is 95-105, est. growth is 375-450 bd./ ft/ac/yr. for yellow-poplar.

TlB2 Tilsit silt loam, 2-6% slopes, eroded Upland oak SI is 70-80, Yellow-poplar SI is 85-95, est. growth is 185-260 bd. ft/ac/yr. for oaks and 300-375 bd./ ft/ac/yr. for yellow-poplar.

RECREATION: This tract is located in the largest contiguous block of forest comprising Harrison-Crawford State Forest. It has a high density of various types of trails. This includes the cliff dweller loop hiking trail located in the northwestern portion of the tract, the adventure hiking trail which crosses the tract from the northwest to the south-central boundary, and fire trail 303 that runs along the southern boundary and serves as part of the Ohio River horse trail loop. Additionally, there is an illegal horse trail that crosses into the tract in the northeastern end and follows Potato Run along its edge to where the legal horse trail enters the tract on the western end. There is an overnight shelter for camping along the adventure hiking trail located on the ridgetop overlooking the Ohio River as well. Tract 2803 to the south is mostly made up of the Deam Bluff Nature Preserve, and receives additional visitation as well. This tract certainly receives a fair amount of public activity through trail riding, hiking, and hunting. Recreation use will be considered during the design and implementation of forest resource management activities.

Additionally, there was one major erosion gully that has formed down the north slope from where the main ridge terminates. The horse trail that is located above it makes a sharp turn to the west, and the water coming off of the trail to this point seems to be feeding this gully. The level of persistent erosion is impressive since the entire slope is protected by tree canopies, and the forest floor has a constant cover of leaves, sticks, and limbs. Yet the erosion continues to cut into the hillside on a relatively even side slope with no additional channeling of water from the sides. Restoration work and timber sale closeout should include efforts to channel water away from this gully, and placing tops in this gully to reduce water forces and the resulting erosion.

WILDLIFE: This tract represents typical upland forest habitat, in addition to a component of old field successional habitat, with cedar and smaller hardwoods. Consequently, it likely receives use from a typical assemblage of common game and nongame wildlife species such as white-tailed deer, wild turkey, squirrels, songbirds, snakes, box turtles, and others. However, the fact that the various oak species comprise <20% of the tract limits the mast production of this tract as a whole for wildlife known to depend on hard mast for their major food source. Due to the mesic nature of this tract, however, there is an abundance of spicebush and pawpaw to help provide soft mast food sources.

There are two wet and seasonally ponded areas in or near this tract that could provide a water source for wildlife. One is located on the far eastern tip, with shallow water and red maple trees growing around the periphery. The other is located near the overnight shelter where all the trails seem to converge. There is also a wildlife pond a short distance north of the overnight shelter on the ridge. The Ohio River, of course, is quite nearby down the bluff, and would serve as a major water source. These areas will be buffered during management activities.

Snags were tallied in this inventory for potential uses by wildlife. The following tables summarize guidelines and actual data with regard to the new strategy for consideration of the Indiana bat.

Guidelines for preferred density of live and dead trees:

# of live trees per acre	**Guidelines maintenance**	**present – harvest = residual**
12"-18" DBH class	**6**	**36.5 – 18.3 = 18.2**
20" DBH and greater	**3**	**21.6 - 12.0 = 9.6**
Total	**9**	**58.1 - 30.3 = 27.8**

# snags per acre	**Guidelines maintenance**	**Tract 2802 actual**
6" - 8" DBH class	**1**	**14.1**
10"-18" DBH class	**2.5**	**9.4**
20" DBH and greater	**0.5**	**1.1**
Total	**4**	**24.6**

These numbers show that both live tree densities, as well as snag densities, meet or exceed guidelines. The density of large snags is higher than on other tracts where densities seem to hover at about 0.3 per acre. The vast majority of snags are in the smaller size classes, which makes them unsuitable for most nesting or roosting purposes, but some feeding use might be gained from them.

Management activities will not intentionally remove snags, with a few exceptions of recently dead trees, so any timber harvest will not negatively impact that component significantly. Creation of more snags in this size class could be undertaken by girdling large cull trees in a post-harvest TSI operation.

Additionally, the prescribed management activities should not affect this habitat long-term from the perspective of any wildlife utilizing it due to the maintenance of a forested habitat on the tract. There may be some conversion of cedar or the old field area to temporarily open areas that will be allowed to succeed into native hardwoods, and this would change the character of the tract over time, but will not change it into a permanently nonforested cover type. Creation of openings and/or conversion of portions of the old field areas into openings will create important early successional forest habitat that will be beneficial to certain groups of wildlife dependent upon this habitat.

This tract comes close to, but does not border the Ohio River. There should be no disruption of any potential travel corridors along the river by forest management activities due to a 750+ foot buffer between the two. The habitat on this tract in the context of the surrounding landscape does not represent any special component that would be used more preferentially or exclusively by wildlife for traveling or dispersion, as truly riparian habitat might be, or as forest in a non-forested landscape might be. The small pond found in the south central portion of the tract would provide a valuable water source for wildlife during dry periods, and also represents good habitat for reptiles and especially amphibians.

WATERSHED / HYDROLOGY: The majority of this tract contains gentle to moderately steep slopes that drain into Potato Run and an intermittent stream that drains into Potato Run. Potato Run is indicative of a stream draining a karst landscape, and can flash flood dramatically in heavy rains. Potato Run empties shortly into the Ohio River, and frequently back floods when the Ohio water level rises.

There are sinkholes, most with no openings, scattered throughout portions of this tract which indicate the karst topography that underlies it. There was one small cave that was given the name – Bumblebee pit - which was found in about the middle of the tract in 2003. At the time it was surveyed, there was a bumblebee buzzing around the entrance. It is a blind pit with no passage at the bottom.

The northwestern corner of this tract, which borders Potato Run, contains a scenic short cliff face. This area is the source of the name of the cliff dweller trail, which runs adjacent to it. This stretch of cliffs creates a narrow perched plateau above the dropoff down to Potato Run creek. During wet weather, a fair amount of water can be seen dripping off of the edge of this cliff line to the levels below. As previously mentioned there are also a small wildlife pond and a couple seasonally wet areas in the tract.

Water features will receive buffers in accordance with established best management practices.

HISTORICAL AND CULTURAL: This tract was reviewed for cultural sites during the forest resource inventory. Cultural resources may be present on this tract but their location(s) are protected. Adverse impacts to significant cultural resources will be avoided during any management or construction activities.

RARE, THREATENED, OR ENDANGERED SPECIES: A Natural Heritage Database review was completed for this tract. If Rare, Threatened or Endangered (RTE) species were identified for this area, the activities prescribed in this guide will be conducted in a manner that will not threaten the viability of those species.

Kentucky coffeetree - a relatively uncommon tree species on the forest - was noted in a few places in this tract as well. There was a very large individual present close to the top of the ridge and within sight of the fire trail which might be measured for possible inclusion into the big tree register since it was greater than 30 inches DBH. Unfortunately, it was hollow at the base.

EXOTICS: There are several pockets of ailanthus scattered throughout this tract in various places where any openings have allowed it to get established. This tree has apparently gotten its

foothold along the river corridor and expanded its' range from there. It was noted occasionally throughout the tract, but more regularly at the south end close to the ridge top. It was noted growing in clumps of individuals where a tree had either fallen naturally, or was cut in the last timber sale. These trees are mostly small pole-sized, but they have begun to produce seeds and there are places where small seedlings have established themselves below the parent trees. There used to be a lot more ailanthus presence – and with larger seed producing trees – back in 2003, but several TSI treatments have been conducted, and its presence is much reduced. The remaining ones that were found were painted with pink, so pre-harvest treatment should be easier, and needs to be done to eliminate the established seed source.

It is the intention of this resource manager to conspicuously mark these individual trees with fluorescent colored paint during the marking process, and to treat these trees before any sale takes place. Where practical, the small seedlings will be pulled out as well so as to remove every possible source of invasion by this very aggressive and invasive exotic species. Post-sale monitoring will be required as well in order to prvent new individuals from becoming established and supplanting the native hardwood species.

There are also some spreading areas of stilt grass within the tract along the horse trails. The stilt grass along the trails could be sprayed easily enough, but it is hard to eliminate, and it is likely that the seed has spread out into the woods in places, and this would be less feasible to control.

Both species are prevalent throughout the region making eradication unfeasible. Spread in this tract is currently via recreation users, wildlife and natural forces.

SILVICULTURAL PRESCRIPTION:

The number of trees per acre and basal area per acre figures indicate that both stands 1 and 2 are overstocked at about 105% and 120% respectively and are prescribed for a managed harvest. Removal of trees tallied as "cut" either via a timber sale or TSI would reduce the stocking levels to about half that just below the B-line. This larger reduction in stocking is due in part to white ash removals due to Emerald Ash Borer, as well as much of the drought damaged yellow-poplar. Consequently, stocking levels would be below what is normally considered optimal, but with the objective of continuing to transition this tract to a better growing state through overstory removal and understory establishment and recruitment.

A harvest volume of about 800,000-900,000 board feet of hardwoods is anticipated. Inclusion of red cedar would potentially add 50,000- 100,000 board feet (cedar scale)

Other than the cedar, most of the merchantable volume in this tract is of moderate to high quality hardwoods, but some fire or grazing damage was definitely noted in the south central portion of the tract where the main ridge descends to the north along the path of the adventure hiking trail. Here, most of the trees on the upper slope here were either hollow at the base or completely hollow. There were also numerous large beech trees scattered throughout the tract that were almost exclusively hollow. The maple, poplar, ash, and oak trees in the rest of this tract however, seemed to be generally large and fast growing with healthy tops. The white ash makes up about 10% of the volume of this tract.

Much of what is prescribed for harvest is larger, mature trees rather than the typical improvement harvest, which would remove mostly low-grade trees. This is a reflection of stocking rates and management history on the tract. Most ash will be targeted for removal before it dies due to

Emerald Ash borer now present on the forest. This will allow ash seed to be captured and regenerate prior to the loss of seed bearing trees. Many of the large sugar maple trees were noted to have a definite lean, and many of these will be marked so as to utilize their volume before their mass causes them to uproot. Larger cherry trees will be marked as well due to windthrow concerns.

The **Mixed Mesophytic Stand 1** (177 acres) contains 10,095 board feet per acre of which 5,095 was classified as harvestable and 5,000 was classified as residual. This would potentially remove 69 square feet of basal area, which would leave the residual stand with approximately 62 sq. ft.

The majority (77%) of the harvest volume would be contained in yellow-poplar (2,152 bd. ft/ac), white ash (1,023 bd. ft/ac), and sugar maple (733 bd. ft/ac) respectively.

Most of the stand would be harvested under a single tree or group selection routine with occasional openings where groups of low-grade trees or multiple large trees are growing together. Expected regeneration is mixed mesophytic hardwoods. Selection would also concentrate on removing low-grade trees that show major defect or indicate slow growth from suppressed growing conditions. When possible, selection should also favor releasing future crop trees.

For user safety, recreation trails will be rerouted or temporarily closed during operations.

Timber Stand Improvement (TSI) is prescribed after the harvest to accomplish a variety of tasks. This would include completion of any marked openings, additional control of any ailanthus missed in the pre-harvest TSI, and deadening of some of the large cull beech trees found scattered throughout the tract. TSI of pole-size trees may be required for thinning in places, and to open up the understory for potential oak regeneration to take hold or be released. These actions will create snags and the associated wildlife habitat benefits. Vines did not seem to be a big problem in this tract, but need to be kept at bay with TSI activities as well. Extensive understory treatment of shade tolerant species will be necessary to encourage oak regeneration where present, though most of the sites on this tract are more suited to growing mesic hardwoods rather than traditional oak-hickory.

The Old field – advanced Stand 2 (23 acres) contains a lower volume of 8,170 board feet per acre of which 5,404 was classified as harvestable and 2,766 was classified as residual. This would remove 77 square feet of basal area (mostly cedar), which would leave the residual stand with 61 sq. ft.

The majority (89%) of the harvest volume for stand 2 would be contained in eastern redcedar (4112 bd. ft/ac by cedar scale) and yellow-poplar (715 bd. ft/ac), with black cherry, white ash, elm, and sassafras making up of the remainder of the harvest volume.

There are both large cedars and suppressed and overtopped small cedars growing in this stand. A separate cedar sale would probably have to be undertaken to achieve optimal management, as most of the cedar would be removed to encourage poplar and the oak regeneration that is usually found in the understory of such stands.

The fact that numerous larger cherry trees can be found growing throughout this stand indicates the site is not as degraded as the cedar would indicate. It would be possible and maybe desirable to convert this stand to the higher value and faster growing cherry. However, the cliff dweller trail goes through this stand, and the visual impact of this would be quite significant for some

time. A scaled back conversion to minimize this impact is prescribed, followed by post harvest timber stand improvement.

Inventory Summary:

	TRACT 2802 TOTAL VOLUME (bd ft)					
	CUT		**LEAVE**		**TOTAL**	
SPECIES	per acre	total	per acre	total	per acre	total
American beech	24	4,800	26	5,200	50	10,000
American elm		-	28	5,600	28	5,600
Basswood	91	18,200	37	7,400	128	25,600
Bitternut hickory	12	2,400	134	26,800	146	29,200
Black cherry	113	22,600	9	1,800	122	24,400
Blackgum	93	18,600		-	93	18,600
Black locust	10	2,000		-	10	2,000
Black oak	23	4,600	76	15,200	99	19,800
Black walnut		-	151	30,200	151	30,200
Blue ash	9	1,800	17	3,400	26	5,200
Chinkapin oak	76	15,200	424	84,800	500	100,000
Eastern redcedar	511	102,200	114	22,800	625	125,000
Hackberry	23	4,600		-	23	4,600
Honeylocust		-	6	1,200	6	1,200
Kentucky coffeetree		-	50	10,000	50	10,000
Northern red oak	288	57,600	814	162,800	1,102	220,400
Persimmon		-	64	12,800	64	12,800
Pignut hickory	22	4,400	61	12,200	83	16,600
Red elm	10	2,000		-	10	2,000
Sassafras	91	18,200		-	91	18,200
Shagbark hickory	52	10,400	309	61,800	361	72,200
Shumard oak	25	5,000	172	34,400	197	39,400
Sugar maple	654	130,800	1,049	209,800	1,703	340,600
Sycamore	14	2,800	204	40,800	218	43,600
White ash	932	186,400		-	932	186,400
White oak	55	11,000	292	58,400	347	69,400
Yellow-poplar	1,997	399,400	719	143,800	2,716	543,200
TTOTAL	5,125	1,025,000	4,756	951,200	9,881	1,976,200

PROPOSED ACTIVITIES LISTING

2015	Field inventory
2016	Write mgmt plan
2016	Basal bark treat ailanthus
2016-17	Mark timber sale
2017	Sell timber sale
2018-2019	Post harvest TSI and regeneration check
2018-19	Post harvest trail rehab
2023	Recon & monitor for exotics
2030-2035	Inventory for next mgmt cycle

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