

Sage Lake Cedar Swamp Ecological Reference Area (ERA)

Administrative Information:

- Sage Lake Cedar Swamp
- Atlanta Management Unit Compartment 12, stands 26 & 188 (Avery Hills Management Area)
- Montmorency County 29N 2E SEC 22, 23, 24, 25, 26, 27
- Contact Information
 - Plan Writer: Andrew Krugh, Forest Technician, Atlanta Management Unit
 - Local Biologists Tim Cwalinski, Fisheries Biologist, Gaylord OSC, Shelby Hiestand Wildlife Biologist Atlanta Field Office
 - Local Forester: Cody Stevens, Unit Manager, Atlanta Management Unit
 - Local Groups: Bill Houston, Montmorency County Conservation Club
- State of Michigan owned land, private
- Existing infrastructure/facilities: None
- Other documents related to this ERA: Sage Lake Cedar Swamp ERA Management Plan(Approved Oct. 16, 2007) and Rich Conifer Swamp Natural Community Management Guidance Draft 7-14-2016

Conservation Values

- Describe the natural community occurrence for which the ERA is recognized
 - Rich Conifer Swamp, EO_ID 15952, EO rank BC
 - Global/State Rank: G4, S3
 - ERA recognized for being a rare natural community.
 - Closed canopy (70-95%) dominated by 100+ year old cedar (20-40cm). Canopy associates include black spruce (*Picea mariana*) and larch (*Larix laricina*) with occasional super-canopy white pine (*Pinus strobus*). Many different vegetative zones and high species diversity are due to its proximity to Sage Lake, rapid transition to upland, and hummock and hollow microtopography. Flooding mortality is prevalent close to the lake where sedges and grasses (*Carex stricta*, *Calamagrostis canadensis*, and *Glyceria striata*) are more prevalent and the canopy is more open. With the exception of some areas with heavy balsam fir (*Abies balsamea*) or tag alder (*Alnus rugosa*), the understory is sparse to scattered with dogwoods (*Cornus rugosa*, *C. stolonifera*), and tag alder. The low shrub layer is prevalent with wild currant *Ribes americanum*, dwarf raspberry (*Rubus pubescens*), wild red raspberry (*Rubus strigosus*), Canada honeysuckle (*Lonicera canadensis*), and alder-leaved buckthorn (*Rhamnus alnifolia*). Tip and mound micro-topography increases microhabitats and also contributes to high species

diversity (over 80 species noted). Sphagnum moss dominates the ground cover with large leaf aster (*Aster macrophyllus*), gold thread (*Coptis trifolia*), and horsetail (*Equisetum prevalent*). (Cohen, J. 2007)

- Rich conifer swamp is a groundwater-influenced, minerotrophic forested wetland dominated by northern white cedar that occurs on organic soils (e.g., peat) primarily north of the climatic tension zone. The community is often referred to as cedar swamp. Refer to the MNFI Community Abstract for more details. http://mnfi.anr.msu.edu/abstracts/ecology/Rich_conifer_swamp.pdf
- The forest should be mature, and be all aged (exhibiting natural wind throw disturbance and vegetative layering), or older (>120 yrs) even-aged stands, with large diameter tree species. Natural regeneration and recruitment of the northern white-cedar, and minor components such as hemlock, are occurring and hydrology is intact. Optimally, rich conifer swamp ERA's will be inclusive of unfragmented, large wetland complexes including minerotrophic communities, such as northern fen, northern shrub thicket, northern wet meadow, and hardwood-conifer swamp and acidic communities such as poor conifer swamp where groundwater seepage dissipates. The upland area which feeds groundwater into the rich conifer swamps and maintains quality of groundwater (chemicals, nutrient levels, etc.) is intact, and if possible consists of high quality or restorable upland communities such as mesic northern forest, dry-mesic northern forest, and dry northern forest.
- Rich conifer swamp is a self-maintaining community that relies on windthrow disturbance to regenerate long-lived, shade-tolerant, northern white-cedar. Blown-down timber also helps to create the complex structure creating habitat for late successional species. Because groundwater influence is so critical to the ecological integrity of rich conifer swamps systems, maintaining hydrologic regimes will ensure long-term persistence. Effective conservation of rich conifer swamp include protecting and/or restoring the natural hydrology of overall wetland complex and surrounding watershed and allowing natural processes (wind throw, flooding and fire) to operate unhindered while considering human health, safety and resource protection needs. Maintain canopy closure of surrounding upland stands to minimize surface flow into rich conifer swamps and help maintain ground water seepage. Prioritize restoring natural flow where hydrological impediments occur within rich conifer swamp ERAs.

Threats Assessment

- Primary threats consist of lack of knowledge and effectiveness of natural regeneration, deer herbivory, and excessive flooding causing tree mortality.

- Long term threats are non-desirable species in understory taking over, current canopy dying of because of age, and possible future climate not best for tree species.
 - Invasive species that threaten the diversity and community structure of rich conifer swamp include glossy buckthorn (*Rhamnus frangula*), purple loosestrife (*Lythrum salicaria*), narrow-leaved cat-tail (*Typha angustifolia*), hybrid cat-tail (*Typha xglauca*), reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), and European marsh thistle (*Cirsium palustre*).

Management Goals

- Maintain good quality Sage Lake Cedar Swamp
- Control the spread of invasive species
- Reduce fragmentation
- Reduce other Threats (alteration of hydrology, ORV use, conflicting land uses, etc.)
- Manage over the long term for regeneration of northern white cedar within the ERA

Management Objectives

- Manage lake water level to minimize impacts from flooding on cedars and still maintain fishing opportunities in Sage Lake.
- Identify areas threatened by invasive species
- Increase desirable native plants
- Identify and eliminate illegal ORV access points
- Maintain legacy cedar within ERA
- Utilize natural processes to regenerate cedar
- Minimize impacts of deer herbivory on cedar regeneration and herbaceous flora over the long term

Management Actions

- Continue scheduled DEQ dam inspections.
- MDNR Wildlife Division continue annual maintenance of the dam
- Monitor cedar die off along lake margins and if it becomes significant consider decreasing flooding effects by controlling the lake level.
- Remove invasive plant species Consider different processes to regenerate cedar (fence, type of harvest etc.)
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- Land acquisitions to reduce fragmentation
- Evaluate adjacent Lowland Cedar for possible expansion of ERA.
- Close illegal roads and trails.
- Reintroduction of missing associated native plant species (both canopy and ground flora) using local genotypes

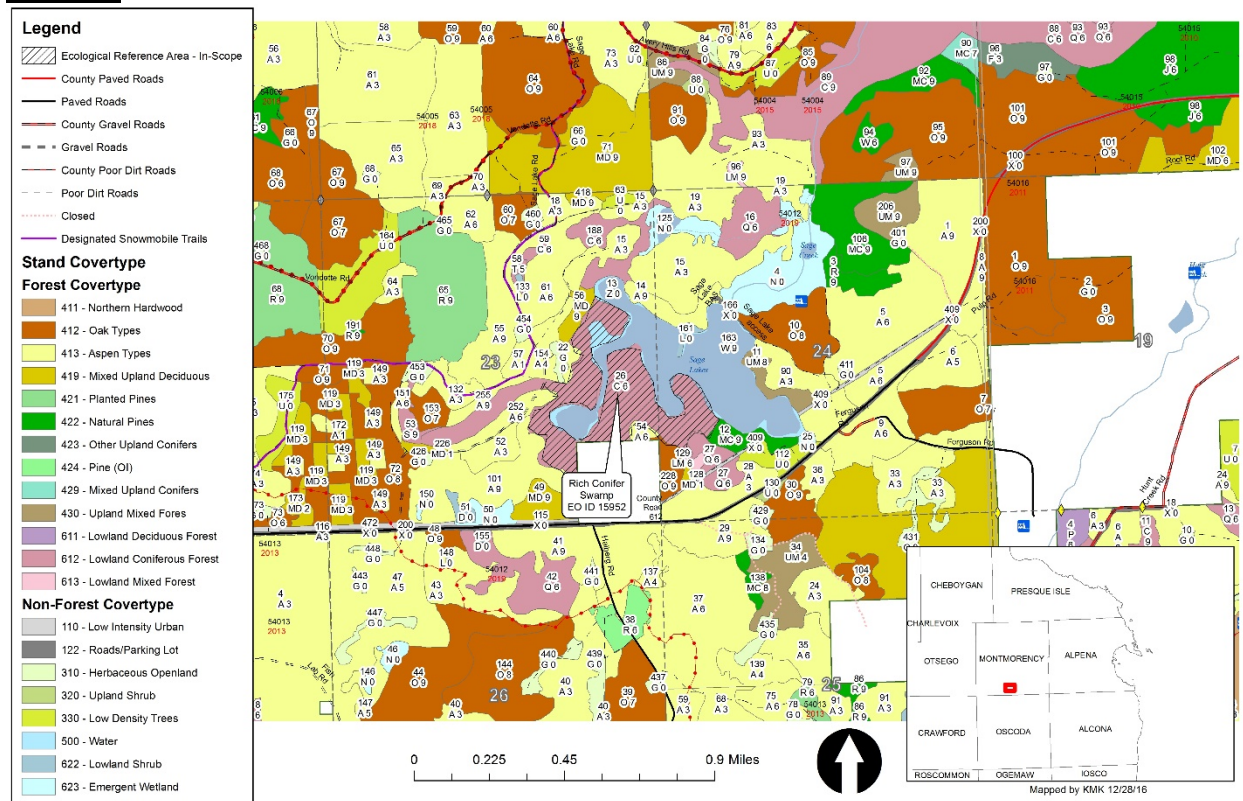
- Install culverts if necessary to restore natural hydrological flow

Monitoring

(Unless otherwise specified, monitoring is expected to occur once every 10 year cycle)

- Representative and rare species- species occurrences
- Presence of rare animals
- Populations of invasive species- number and scope by species
- Change in EO rank
- Evaluate the effects of invasive species treatment- growing year post treatment and for two successive years thereafter (dependent upon removal method and species)
- Illegal ORV activity- Number of new instances and number of citations issues
- Monitor die off, of cedar around lakes edge
- Invasive species within and around swamp
- Natural Regeneration of Cedar

Imagery:









Signatures & Approval Date:

- Each plan will require formal approval from all relevant resource divisions
- Date of final approval