Comparing Climate Adaptation Menus: A Waabizheshi (American marten) Case Study

By Tanya Aldred
BACKGROUND

• Waabizheshi - Clan animal for Ojibwe Tribes (Warrior Clan)

Photo by Craig Douce (2004)
• Waabizheshi - Clan animal for Ojibwe Tribes (Warrior Clan)

• Extirpated from Wisconsin by 1925
  - Habitat loss from logging
  - Exploitation/Overharvest
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- Three major reintroduction/restocking efforts took place
  - **1975 – 1976**
    124 martens from Ontario released into Nicolet National Forest
  - **1989 – 1990**
    150 martens from Minnesota released into the Chequamegon National Forest (CNF)
  - **2008 – 2011**
    90 martens from Minnesota released into the CNF

Current Wisconsin range: [http://www.dnr.state.wi.us](http://www.dnr.state.wi.us)
Habitat Requirements

- Conifer stands (Cedar, Hemlock, White Pine)
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- Vertical Structure: Snags, Den Trees (Yellow Birch)
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- Horizontal Structure: Stumps, logs and tip-ups
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Comparing Menus: Step 1 - Define

<table>
<thead>
<tr>
<th>Overall Project Description:</th>
<th>Understanding American marten ecology/biology and the factors that limit their success at a landscape scale, including emergent issues such as climate change and habitat connectivity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>The Chequamegon-Nicolet National Forest on the Great Divide District of Ashland and Price Counties, Wisconsin. This area contain a variety of forest cover types including upland/lowland hardwoods, upland/lowland conifers and aspen/birch/balsam fir stands.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ecosystem Types or Management Topics</th>
<th>Management Goals</th>
<th>Management Objectives</th>
<th>Time Frames</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigate habitat components essential to martens</td>
<td>Conduct and summarize 10 years of microhabitat research</td>
<td>Conduct forest structure sampling and analyze forest structure data at... - small mammal locations (180 sites) - marten rest site locations (90 sites) - hardwood stands (140 sites) - hemlock stands (120 sites)</td>
<td>15 years</td>
</tr>
<tr>
<td>Examine marten food availability</td>
<td>Calculate prey biomass at known locations where martens hunt</td>
<td>Conduct small mammal trapping and analyze data (36 sites)</td>
<td>2 years</td>
</tr>
<tr>
<td>Improve fecundity rates of martens in Wisconsin</td>
<td>Improving habitat suitability  - Increase small mammal prey densities for food availability for martens</td>
<td>Provide den boxes  - Increase forest structure thereby increasing cover for martens and other small mammals.</td>
<td>15 years</td>
</tr>
<tr>
<td>Improve forest structural components in known marten habitat</td>
<td>Provide increase downed and woody material for marten cover/habitat use  - Increase structural complexity across the landscape</td>
<td>Fell trees, leaving stumps, slash, etc  - Plant Canada Yew (Taxus canadensis) and mountain maple (Acer spicatum) within marten home-ranges</td>
<td>15 years</td>
</tr>
</tbody>
</table>
Comparing Menus: Step 2 -

<table>
<thead>
<tr>
<th>General Climate Change Impacts</th>
<th>Specific Considerations for the Project Area</th>
<th>NAICS</th>
<th>TRIBAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>How might broad-scale impacts and vulnerabilities be affected by conditions in your project area?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warm temperatures during the growing season</td>
<td>How might broad-scale impacts and vulnerabilities be affected by conditions in your project area?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More days with extreme heat</td>
<td>Potential conditions negatively impact cedar/hemlock health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower temperatures during the winter</td>
<td>Potential impact on marten movement in shallow snow conditions (favor fishers which is direct competitor of martens)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer days with extreme cold</td>
<td>Potential impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased winter &amp; spring precipitation</td>
<td>Positive impact for marten movement through deeper snow conditions, more difficult for direct competitor (fishers)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light or large decrease in precipitation (drought)</td>
<td>Negative impacts for cedar/hemlock pockets, negative impacts for growing conditions at plots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More frequent heavy precipitation events</td>
<td>May provide increased structure with downed/lost trees/shrubs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less snow and more variable snowpack</td>
<td>Difficult for marten movement/better for fishers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warmer winters</td>
<td>Survivorship of prey may increase, but so do predators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More high-streamflow days in winter and spring</td>
<td>Minimal impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More low-streamflow days in the summer and fall</td>
<td>Minimal impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced soil moisture in summer</td>
<td>Negative impact on cedar/hemlock pockets, negative impacts on growing new understory plants at plots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longer growing seasons</td>
<td>Minimal impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in phenology or phenology mismatches</td>
<td>Negative impact on growing conditions for newly planted species (to increase understory structure)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in food web or food availability</td>
<td>Increase food availability, marten negatively impacted due toastic stressors/which in turn negatively impacts reproduction</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Increase in wildlife activity</td>
<td>Both positive and negative impacts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More pests and disease (plants and wildlife)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in invasive or exotic species</td>
<td>Negative impacts on newly planted plots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others? Increase in southern tree species</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Others? Decrease in northern/boreal tree species</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
## Comparing Menus: Step 3 - Evaluate

<table>
<thead>
<tr>
<th>Step 3: Evaluate - Management Objectives</th>
<th>Challenges</th>
<th>Opportunities</th>
<th>Feasibility</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve fecundity rates</td>
<td>provide den boxes</td>
<td>Do martens use them?</td>
<td>High</td>
<td>short term</td>
</tr>
<tr>
<td>Improve fecundity rates</td>
<td>Increase forest structure</td>
<td>Within known Marten habitat</td>
<td>?</td>
<td>Adaptation to timber mngt techniques short term</td>
</tr>
<tr>
<td>Improve Structural components in known Marten habitat</td>
<td>Fell trees, leave stumps, slash, etc</td>
<td>Fuel Load?</td>
<td>High</td>
<td>Forestry Management</td>
</tr>
<tr>
<td>Plant Canada Yew</td>
<td>Deer eating yew</td>
<td>Plant within known Marten Habitat</td>
<td>Low; because deer eat yew</td>
<td>Tribal Menu: High Feasibility</td>
</tr>
<tr>
<td>Plant Mountain Maple</td>
<td>Drought year during planting?</td>
<td>Plant over multiple years</td>
<td>High and low</td>
<td>High Feasibility</td>
</tr>
</tbody>
</table>
## Comparing Menus: Step 4 - Identify

<table>
<thead>
<tr>
<th>Step 4: Management Topic</th>
<th>NIACS Menu</th>
<th>Tribal Menu</th>
<th>Practical?</th>
<th>Recommended?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase Structural Complexity</td>
<td>Plant Mtn. Maple</td>
<td>Plant Mtn. Maple</td>
<td>High</td>
<td>Yes</td>
</tr>
<tr>
<td>Increase Structural Complexity</td>
<td>Don’t Plant Canada Yew</td>
<td>Plant Canada Yew: Support plant communities Restore Native beings</td>
<td>NO/YES</td>
<td>NO/YES</td>
</tr>
<tr>
<td>Protection of corridors Penokee Range</td>
<td>YES</td>
<td>YES</td>
<td>High and low</td>
<td>Multi-agency Management Mining (Non-Climate Related)</td>
</tr>
<tr>
<td>Improve Structural components in known marten habitat</td>
<td>Fell trees, leave stumps, slash, etc</td>
<td>Fell trees, leave stumps, slash, etc</td>
<td>High</td>
<td>YES</td>
</tr>
<tr>
<td>Provide Den Boxes</td>
<td>YES</td>
<td>YES</td>
<td>Low</td>
<td>NO: Martens don’t Use Them</td>
</tr>
<tr>
<td>Learn though observation (Doing “nothing” is an action)</td>
<td>-</td>
<td>YES</td>
<td>High</td>
<td>Doing “nothing” is ok Listen to what they are telling us</td>
</tr>
</tbody>
</table>
Da aabiji ayaawaad ingiw
Waabizheshiwig
So martens will always exist!