



Impacts of Climate Change on Wisconsin County Forest Planning and Management Practices

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Abstract:

The impacts of climate change are becoming increasingly apparent. With the publication of the Wisconsin Initiative on Climate Change Impacts 2021 Assessment report in early February of 2022, the vital role Wisconsin forests play in mitigating climate change has never been clearer. The report notes, "Forests cover nearly half of Wisconsin. They provide a unique opportunity to address climate change because they can both reduce concentrations of greenhouse gases while simultaneously providing essential social, environmental, and economic benefits" (WICCI 2021). County managed forests represent the largest amount of managed forest in Wisconsin. To understand not only the impacts of climate change but the implementation of management strategies targeting climate change in Wisconsin's forests, we surveyed those working in county forests across Wisconsin. This research builds upon prior findings from a 2019 study conducted by University of Wisconsin-Stevens Point Natural Resource Planning students on climate change planning in Wisconsin county forests. It also draws comparisons to a 2021 Yale survey on climate change policy and public opinion. The objective of this research is to seek a better understanding of the implementation of management strategies targeting climate change as well as the inclusion of such management strategies into county forest planning documents and practices.

Climate Change and Wisconsin County Forests:

As climate change becomes increasingly prevalent, fluctuating temperature and precipitation regimes will have a strong impact on forest ecosystems in Wisconsin. (Kirilenko and Sedjo 2007). Forested ecosystems in the Northwoods are being subjected to these same pressures, erratic temperature, increased disturbance events, increasing invasive species, and as a result foresters are having to adapt to these changing conditions (Janowiak et al., 2014). Foresters are employing a multitude of strategies for adaptation and mitigation. For example, plans in Europe address, increasing the species mix and assistance in tree regeneration. Other strategies include heavy thinning and the reduction of rotation length (Brunette et al., 2020). While foresters need to be cognizant of climate change adaptation, forested ecosystems such as those in northern Wisconsin have the capability to mitigate climate change as well. Forests via the carbon sequestration process sequester roughly 10-15% of U.S greenhouse gases (WICCI, 2021). Forests cover 17 million acres of Wisconsin land, this represents an opportunity for our state forestry sector, of which 2.4 million acres can be found amongst the 30 Wisconsin county forest units (Wisconsin County Forestry Association). In addition to the ecosystem services, these forests provide a vital economic resource for the state. The Wisconsin DNR notes, "Each year, county forests generate anywhere from \$40-50 million in timber revenues, resulting in approximately 16,000 jobs and \$4.6 billion in forest products production. County forests also provide many recreational and tourism opportunities" (Wisconsin DNR).

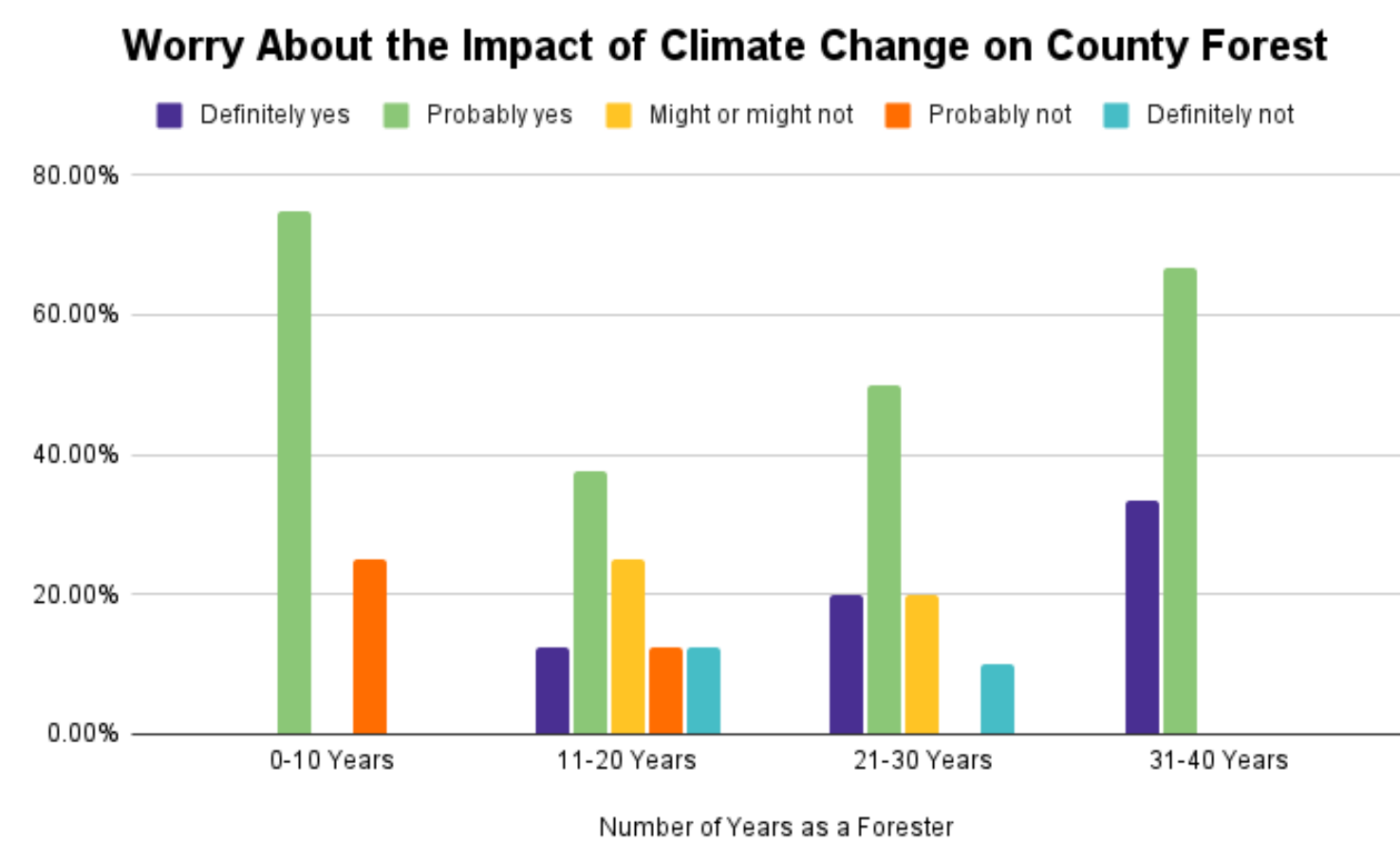
Methods:

- We reviewed County Forest Comprehensive Land Use Plans from county forests across Wisconsin. The plans were found to be in the early draft stages; thus, we could not consider any changes from the 2005-06 planning documents. Additionally, these plans are based upon a template. Unless the state changes their template, there is unlikely to be any addition of climate change language, or strategies intended to mitigate and adapt for climate change within county forest management plans.
- The survey addressed county forest management strategies to address: climate change impact on county forests, barriers to the execution of management strategies, and implementation of management strategies.
- The survey was designed to build upon the 2019 study. We retained most of the language and questions from the 2019 survey to provide further insight and to examine change over time. We also added several new questions.
- A Qualtrics email survey was conducted comprising of 36 questions. Most questions were multiple choice on a 5-point Likert scale. These questions were useful in comparing past results with current results. There were several matrix-based questions and open-ended questions. These questions were beneficial as they gave respondents a greater opportunity to explain their reasoning.
- Survey results were examined, and conclusions were drawn with the aid of Qualtrics built in analytics suite.

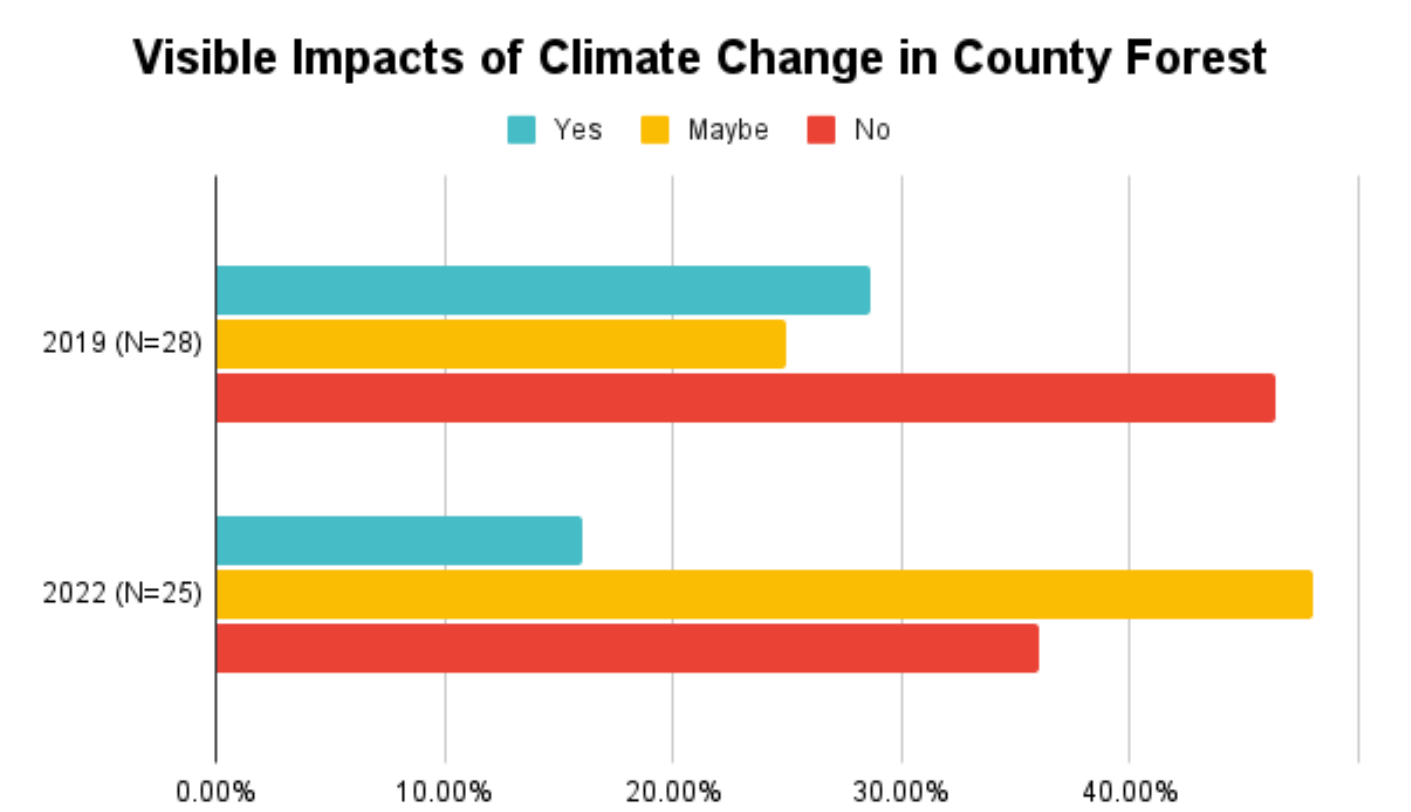
Results:

The survey was open and received responses from 1/21/2022 to 2/22/2022. There was a total of 37 responses. The response rate for the survey was 53.6%

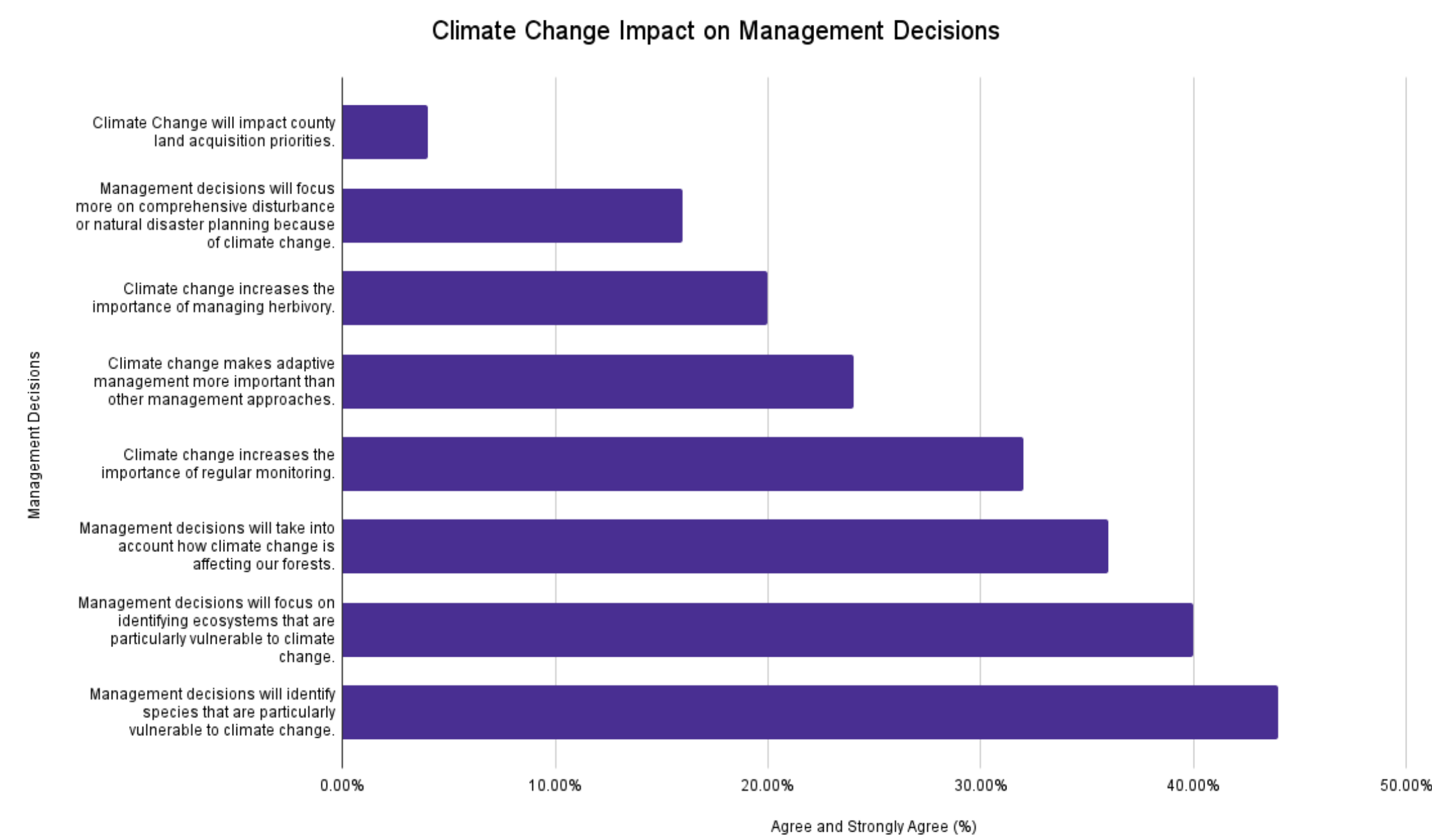
Foresters are worried about the impacts of climate change on county forests.



This worry is warranted as expressed by the visible impacts of climate change experienced by county foresters.

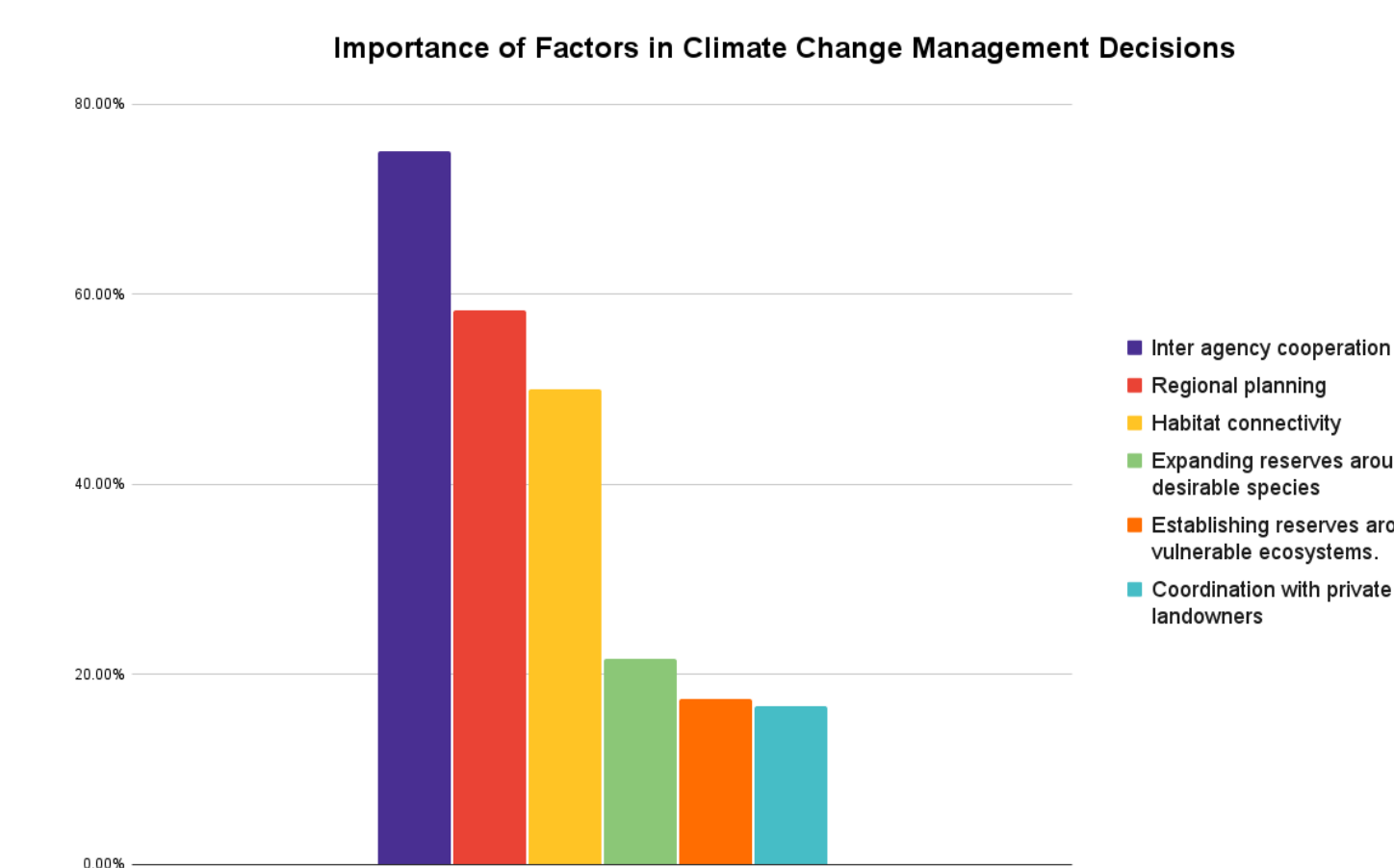


Climate change is altering how the county manages their forests. One area of focus that was identified by 44% of respondents is identifying species vulnerable to climate change.

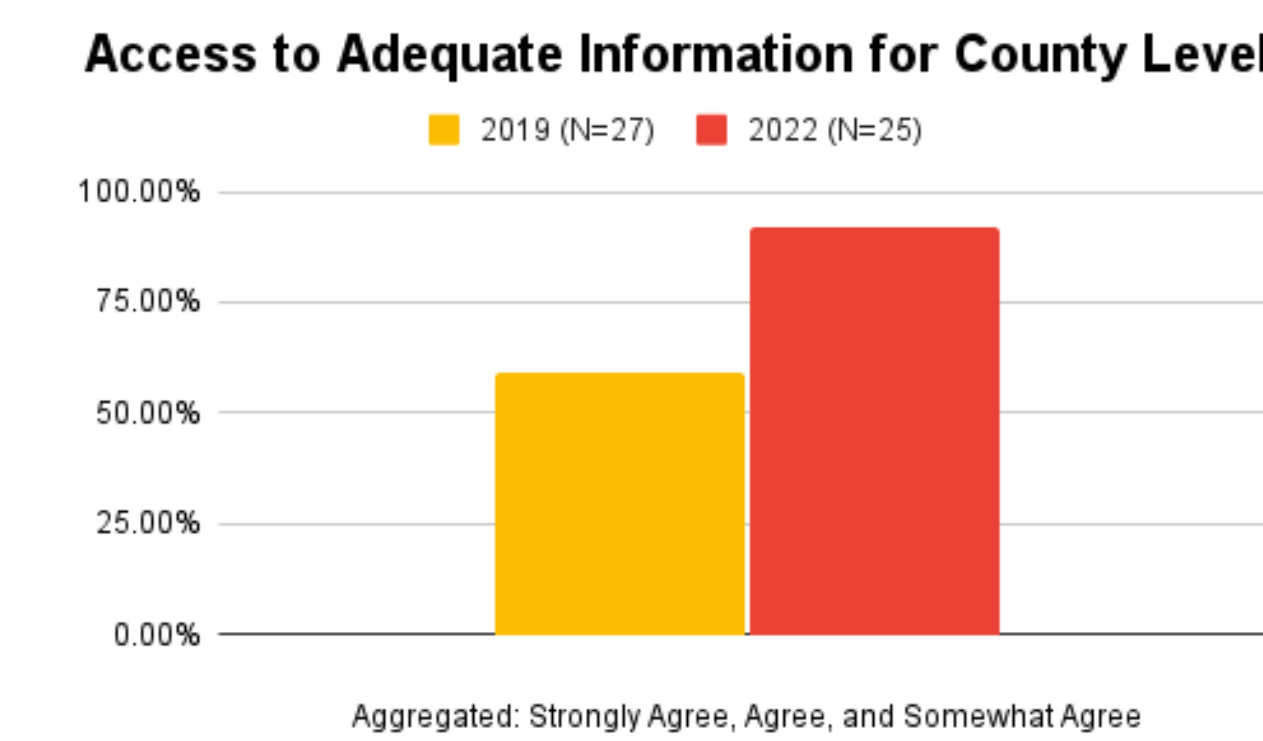


County forest management approaches are keeping climate change in mind, allowing for the flexibility to adapt as climate change becomes more prevalent in our forested ecosystems. 84% of foresters noted they, "Continue to manage for diverse, vigorous forest with an eye towards adaptation as the situation arises".

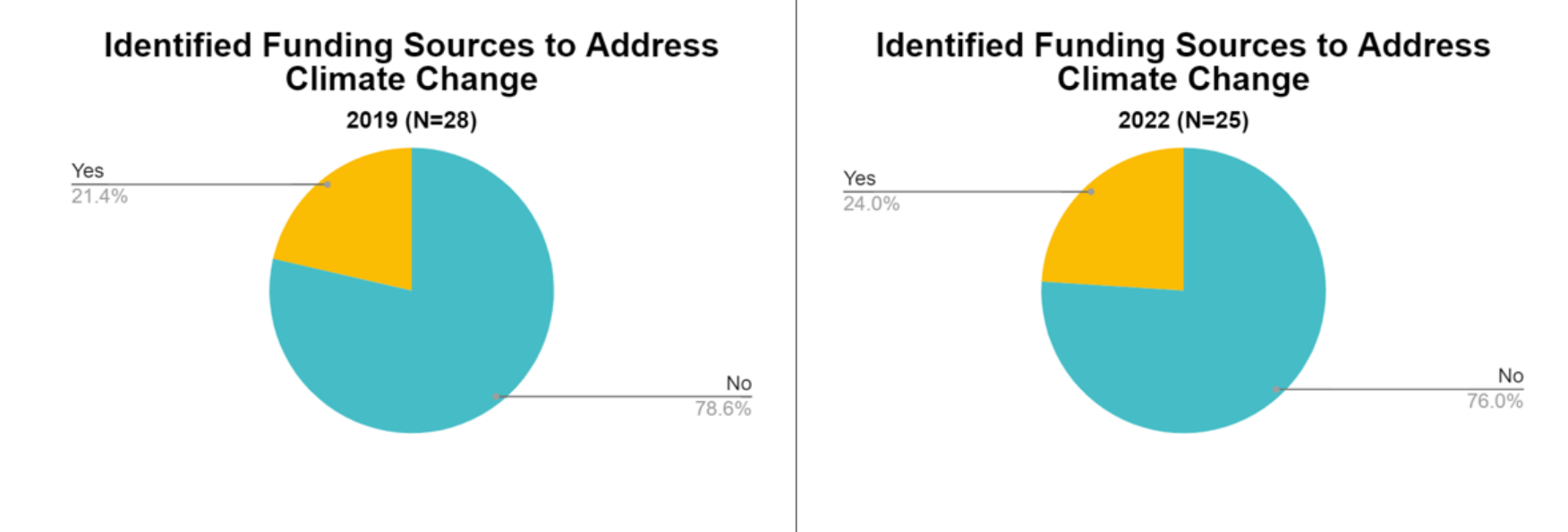
Interagency cooperation, regional planning, and habitat connectivity are key considerations in climate management decisions.



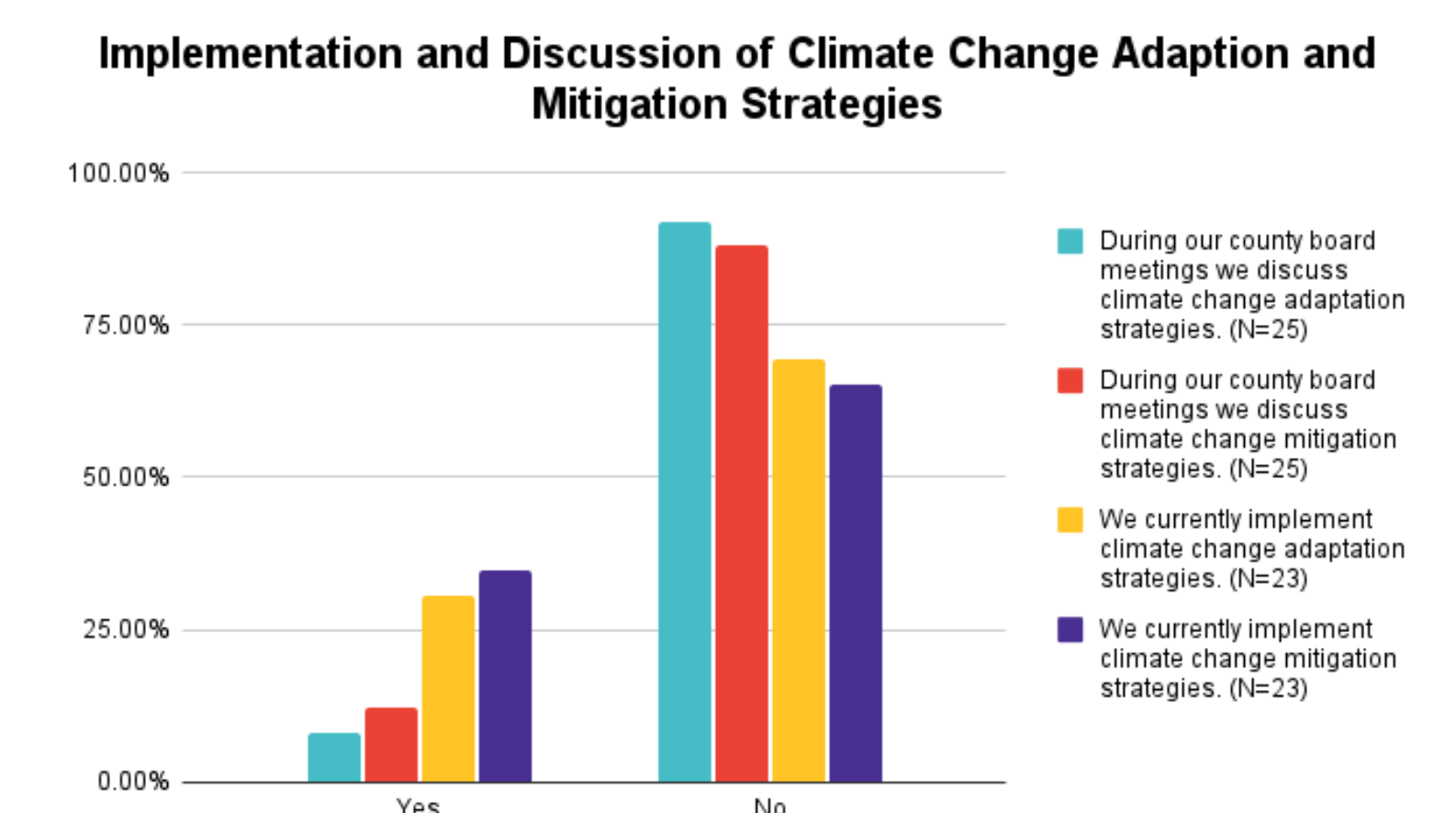
The results indicated that there is an abundance of adequate information on climate change available to county forestry professionals. This has increased since the 2019 survey.



But there is still a distinct lack of financial resources available to tackle climate change in county forests. 76% of Foresters in 2022 have not identified funding sources to address climate change.



Not only is funding an issue, but there is a distinct lack of discussion on climate change adaption and mitigation strategies during county board meetings. This sentiment is clearly not limited to discussion, as the implementation of such strategies is also lacking in our county forests.



Discussion and Conclusions:

We were surprised to find that there was not a greater level of climate change impacts observed from the 2019 study (Albert, N. et al. 2019) until now. We found the perceived level of worry about the impacts of climate change on county forests higher among the more experienced foresters compared to their younger counterparts. While the younger foresters did express worry, unexpectedly, it was not much more than the older foresters. The abundance of accurate climate change information at the disposal of foresters was one of the few expected results that our survey echoed. The distinct lack of funding, discussion and implementation of climate change adaptation and mitigation strategies was very apparent. This leads to a conclusion that there is still much work to be done in this area of study to bring these management solutions into practice. We have crossed the hurdle of "we are experiencing climate change in our county forests" and are actively working to adapt and mitigate it, at least in theory, but there is still a long way to go before county foresters implement these management strategies at a wide and effective level.

Resources for Further Study:

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Howe, Peter D., Matto Mildenberger, Jennifer R. Marlon, and Anthony Leiserowitz (2015). "Geographic variation in opinions on climate change at state and local scales in the USA." *Nature Climate Change*, doi:10.1038/nclimate2583.

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