

This table is supplementary materials to the following manuscript: *Climate adapt. strategies and motivations*, in prep (citation to updated upon acceptance). This codebook contains only codes utilized in analysis for the manuscript and does not include all codes generated throughout the research project.

Supplement 2

Abbreviated Codebook

Theme	Code	Description	Example
Challenges			
Environmental challenges			
	Temperature	<i>Changes in temperature intensity and patterns, including warmer temperatures, less time with frozen ground in winter, longer growing season, urban heat island effect</i>	“The other biggie is what’s the weather going to be like, and there’s no-- because I mean here we are in the middle of winter by the clock and we haven’t had winter yet. The ground’s not frozen.” – TH6
	Extreme weather events	<i>Droughts and drying events, extreme storms and flooding events, fires</i>	“...you now get three- and four-inch rainstorms. They say, ‘This is a 500-year storm, 100-year storm.’ Well, 100-year storms are now 10-year storms. The 10-year storms are now annual storms.” – TH8
	Changing precipitation patterns	<i>Changes in intensity and duration of seasonal wet and dry periods, e.g. wetter springs, leading in some cases to notable erosion and water quality issues</i>	“But every year seems to be really variable and so things seem wetter, in general. That’s like one thing that I feel like I could say across the board... It affects our planting season timing. Like, for example, in the spring, we start planting in like late March, and like it is just so wet out there! And it’s been really hard, in the spring especially, to plant in just like a mucky site.” – TH4
	Invasive plants	<i>Native and non-native, e.g. barberry, honeysuckle, knotweed, bittersweet, hay-scented fern</i>	“So, once one of these large oaks comes down, we had to act right away. If we don’t, we’re going to lose that section of the forest because there’s all this invasive seedbank waiting to be released.” – TH5
	Beech	<i>Overabundance & beech bark disease, includes inhibition of</i>	“I mean, now, we went through the '90s, and as we started getting the nectria, the first thing we did when we move

	<i>regeneration of other desirable species (maple)</i>	into these stands, is cut all the beech. And now we go back-- we went back 20 years, and going, 'What the hell? We cut all the beech! And now it's all we got.' You got a field of it in the understory..." – TH12
Pests and pathogens	<i>Native and non-native, and associated pathogens e.g. emerald ash borer, Asian longhorn beetle, hemlock wooly adelgid, browntail moth, spruce budworm, oak wilt</i>	"Well, the thing that we all ask, and whether it's climate change or just the spread of disease and insects is, you know, what are we going to be left with? You know, what are we going to be planting? You know, we-- if, you know, that outbreak of Asian longhorn beetle in our forest population in the [ANONYMIZED] area isn't that far from here." – TH24
Browse	<i>Overbrowsing by deer and/or moose preventing adequate regeneration of desired species</i>	"Just an overall lack of diversity where just more red maple, more black birch and this inability like – sugar maple? Just forget it, it just doesn't-- the deer go right after it, the oak, we have a lot of oak in the overstory but hardly any coming in." – TH1
Coastal and wetland challenges	<i>Difficulty growing trees in high levels of wind, salt, and flooding, and under the threat of sea-level rise</i>	"Just in my 25, 26 years, we're seeing-- it's, you know, it's filled land or parkland right on the edge of our bay, our harbor, and it's flooding with greater and greater frequency. And so we are finding areas where our salt content is getting higher and higher." – TH24

Other challenges

Markets	<i>Including loss of demand (such as for biomass) and resulting loss of local industry infrastructure, international trade relationships including tariffs and their impact on local industry</i>	"The low-grade markets kind of dropped out a lot, and so it was really hard for loggers, and so a lot of loggers got out of the business... So I think that the question of whether there's going to be really loggers in 50-100 years is a big question of mine. Are there actually going to be people in the woods there to implement our forest management, is a huge concern." – TH25
Labor	<i>Limited human resources, sometimes related to shrinking workforce; harder to find trusted loggers or set desired timeline</i>	"We are having a really hard time finding log-- not just finding loggers. We can find loggers, it's easy. But finding loggers that have all the proper insurance, that do a good job, that are thoughtful and careful, that retain their employees, that's really, really hard to find." – TH19
Equipment	<i>e.g. logging equipment too big (cause too much damage), too small (inefficient) to perform all desired silvicultural prescriptions,</i>	"We don't prescribe single tree selection at all anymore and that's mainly an equipment thing, the equipment's just so much bigger, you know, these big mechanical

	<i>or not enough equipment to get the job done</i>	harvesters, it's really hard to do single tree selection plus deer browse, it just doesn't work..." – TH1
Resourcing	<i>Lack of available planting materials or trees for urban settings</i>	"We've been trying to plant more spruce, I'd like to plant some hemlock but we can't get, we can't bring, nobody grows it in [ANONYMIZED] and we can't bring it in because of the quarantines for HWA." – TH21
Public perceptions	<i>Public and landowner's perceptions of the importance of forests and the impacts of forest management; also includes challenges associated with maintaining visual aesthetics of an area for recreation</i>	"So we wanted to try to do some even aged management, do some other stuff, and we got a lot of pushback from the public. Which we were kinda surprised about. but... And maybe it was just the way we addressed it or brought it up, or I don't know, people thought we were gonna clearcut the whole property... The public really pushed back on that and we were like, 'Okay fine.'" – TH-25
Governance	<i>E.g. desired action is prohibited or at risk of being prohibited, or bureaucratic process too expensive/slow or ineffective at meeting adaptation goals</i>	"...an example of a very well-meaning policy that unfortunately was not completely thought out is tree removal – trees over six inches DBH – we need permission from the city to remove them, and then based on the size of that tree there needs to be restitution based on basal area and board feet. ...The idea, of course, initially was to protect trees in New York City and make it difficult for people to remove big trees and it meant well, but unfortunately, they didn't take invasive species into account..." – TH-14
Economics	<i>Investment of money too large/return too little; available funds guiding the scope of management, limiting job opportunities, desire for additional support (from municipalities) to meet management goals</i>	"... no one's going to come up with a lot of money to go do work in an unimproved forest when there's so much to do in your city." – TH-30
Balancing objectives	<i>Challenge of balancing conflicting objectives</i>	"No the biggest challenge for me is just that because we're such a small shop, there's a balance point between trying to utilize the land and do the management of the land and also try to preserve new land." – TH15

Adaptive practices

Silvicultural prescriptions	<i>Altering what kind and how many trees are harvested or planted, e.g. larger patch cuts, pre-salvage cut of ash</i>	“So I did shift for sure. I just in the-- it’s really been since, basically since the Raymond paper came out in ’96, that we started looking at irregular shelterwood in a big way, and so being-- implementing that management strategy has been a shift in my management.” – TH7
Planting trees	<i>Direct seeding, planting of seedlings and saplings as a silvicultural technique to create, enhance, or alter forest; includes discussion of sourcing/propagating planting stock and targeted species selection</i>	“So typically on that we’re planting in the transition zones. We’re planting in those areas where you’re transitioning from a forested, natural area over into more of a meadow setting or into manicured back yards and such things. So we do some planting in the forests themselves, and that’s to try and kind of help things along more than really reshape things.” – TH9
Invasive plant management	<i>Removal of undesirable plant species (invasives, beech) through chemical or mechanical treatment</i>	“So we use a little bit of herbicide when we need to, but the main thing is we’re trying to use a lot of manual removal. Digging up root systems of invasive things.” – TH14
Ungulate management	<i>Install fencing around sensitive areas to prevent deer from browsing on desirable new growth; hire hunters or encourage recreational hunting</i>	“So one of the thoughts that I’ve had, and I’ve talked about it with several people, is even on land-- at a landowner basis, that if we look at group selection in a way of implementing and using deer exclosure fencing, so that we’re keeping the deer out of the group or the gap, you know, whatever it is, quarter-acre, two acres.” – TH7
Equipment stipulations	<i>E.g. hire loggers with specific machinery to limit operational impact; include contract stipulations for clean equipment to decrease spread of invasive plants and pathogens, bring on additional contractors to deal with storm clean up</i>	“...we had, like, buckthorn and other kind of nasty things around the agricultural areas. And, well, if you had a logging job down on [ANONYMIZED], then you move that skidder up into the hills... we would talk about you should pressure wash the skidder.” – TH19
Change in management activity timeline	<i>Extend length and change timing of planting timelines, invasive plant management, harvest contracts with loggers</i>	“Now it's really, you know, you don't know if you're going to have a real winter. So I'm starting to plan harvests for like the late summer and early fall, which is - you're likely to get dry ground at least at that time.” – TH17

Redesign access	<i>New layouts for roads and trails, larger culverts and more bridges to address increased flooding and warmer winters</i>	“We're able to do crossing upgrades through those too as well and actually build roads that'll stand up to this type of weather.” – TH18
Monitoring	<i>Intentionally monitoring stands (or increasing monitoring of stands), often to look for presence of invasive plants or pests, or to guide future harvest activities; can include keeping up-to-date inventories beyond the scope of the management plan</i>	“So we're seeing like ‘Okay, what is the relationship between-- in our silver maple wetland forests what's the relationship between the knotweed and ostrich fern? And in our wetlands what's the relationship between the canary reed grass and different regenerative plantings we're doing?’ So we're paying attention to those things and monitoring them...” – TH29
Pest management	<i>Integrated pest management, specifically for insect pests and diseases. Includes “biocontrol”</i>	“So, essentially, you take an area around known locations of EAB, you put in these clusters of trap trees... They'll lay their eggs in that. And then, in the fall, we come back, cut them down, and that essentially reduces the first and second instar larval stages of EAB.” – TH26
Water management	<i>Watering trees and other municipal green spaces during periods of drought; stormwater pits or other installations</i>	“Trying to do more sustainable practices, as far as maintenance goes, trying to re-collect storm water or rainwater to irrigate and water trees.” – TH22
Conserve forest land	<i>Prevent development and retain/expand forest, often through buying/selling of easements</i>	“...ultimately, all the final solutions are going to be worked out by Mother Nature, not by us... We can tip the scale a little, but ultimately, Mother Nature has to find a new steady-state. Your best contribution is just to protect as much land as humanly possible to give the largest canvas possible for Mother Nature to come up with an answer. So just keep preserving land.” – TH15
Contracts	<i>Establishment of expectations, roles and responsibilities between stakeholders, also a learning process for bid-seekers</i>	“Pine has had a needle blight disease and we've-- That's a species that you really do not want to cut in the dry part of the summer when they're already stressed. So we've made some modifications to our contracts and specified more of a winter operating season.” – TH16
Engaging with public	<i>Public outreach, workshops, taking time with landowners, writing comprehensive management plans, etc. in order to increase public interest in land and understanding of</i>	“And people have questions, and we're harvesting timber where people are hiking, and they're asking us questions, and we're bringing people out on harvest tours, and we're providing educational opportunities for people, and that's a really, really large part of our chunk of time” – TH27

	<i>active forest management; incl partnerships with public organizations</i>	
Advocate	<i>Work in policy cycle for variances or changes in rules and regulations, or for natural landscapes in the context of municipal settings</i>	“There is a years' long process that came up with a new kind of overall vision for managing forests on state properties. The reason that's relevant to [my organization] is that we participated in that process...” – TH3
Collaborations	<i>Cross organizational collaborations to meet shared goals, also collaborations between different types of organizations, departments, institutions etc. to meet management goals</i>	“Because of the political pressure not to do it, the approach of working with [the Audubon chapter] and others, saying, ‘If you want more birds, if you want different birds, you need to do more cutting and you need to do heavier cutting’ And working with the Ruffed Grouse Society and other groups like that, the Wild Turkey Federation, they all got on board...” – TH-20
Vertical integration	<i>Consolidation of supply chains under one organization to address labor gaps or quality concerns</i>	“But finding loggers that have all the proper insurance, that do a good job, that are thoughtful and careful, that retain their employees, that's really, really hard to find. So we're actually starting our own logging business...” – TH19