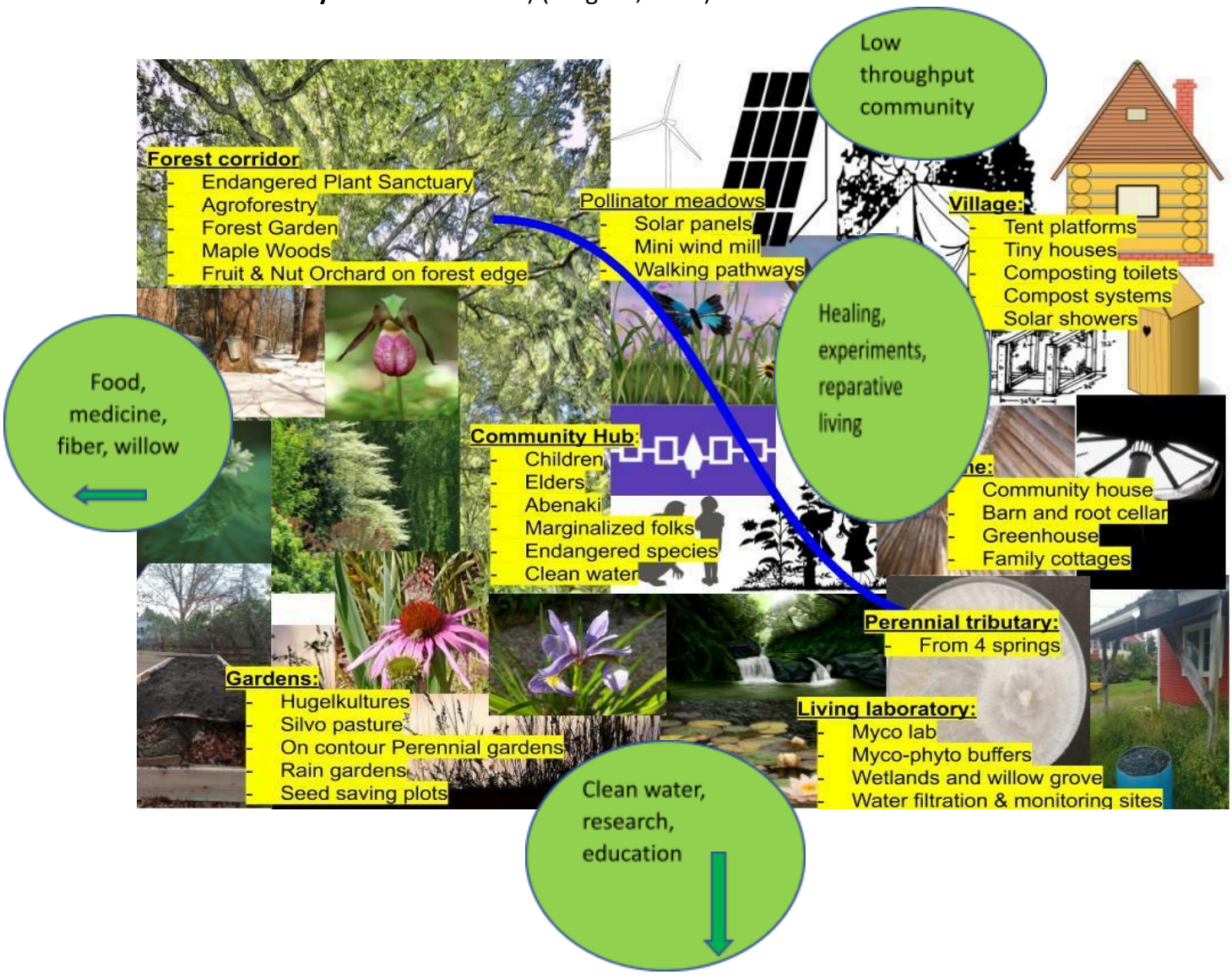
Jess Rubin

Introductory Road Map to 'Cedar heart Center'

On declared* unceded Abenaki territory a multi-racial, multi-generational, interspecies community collaborates with ecosystems nestled between wildlife corridor and a town. A shared mission dedicated to care for earth and each other with shared vision for reparations, rematriation (Penniman, 2018), ethical rewilding, earth repair, and regenerative living unites everyone (National Disability Authority, 2020) onsite in leverage (Meadows, 1999) exchange networks weaving beyond colonially imposed property lines throughout the watershed. Elders, children, marginalized peoples, endangered/threatened species and clean water are at the community's center. Different zones emanating from the hub are informed by the land's intrinsic features: parent material, soil type, topography, waterflow, sun pathways, wind currents, vegetation, and wildlife patterns. These zones bridge culture and nature in material and energy flows which determine collaboration possibilities with the land (Ryn, 2007). These include hearth, pollinator meadows, wild corridor, sanctuary, gardens, home, barn, wetlands, buffers, filter strips, living laboratory/classroom, residential village, and interconnected systems which channel our nutrients, provide energy, and guide abundance to support trophic health and protect water quality.*In educational signs naming territory and original village (i.e. **Abenaki Territory of the Winooskik**) (Megeso, 2020).



1) **Site/Place (specifically, the host environment**)

Forty acres of habitats with 4 interspersed springs can be reached via a well-maintained dirt road lined with seasonally scythed polyculture filter strips. A perennial tributary runs northwest to southeast through the site branching incrementally into a deep pond, smaller tributaries, a mini wetland, and a riparian area. The overall topography faces south west, gently rolling from a 9% slope in the Northwest forest flattening into a less than 3% slope across the remaining site. 15 miles south is a town and 15 miles north is green mountain corridor between which runs a bus line and road with a bike lane. Neighboring land east of the site are perennial hay fields and west looks towards the lake. Natural communities on site include: uplands of oak pine northern hardwood forests, outcrops and upland meadows as well as wetlands of seeps, vernal pools, floodplain forests, marsh and sedge meadows and shrub wetlands (Thompson, 2005).

2) Community, culture, and economics

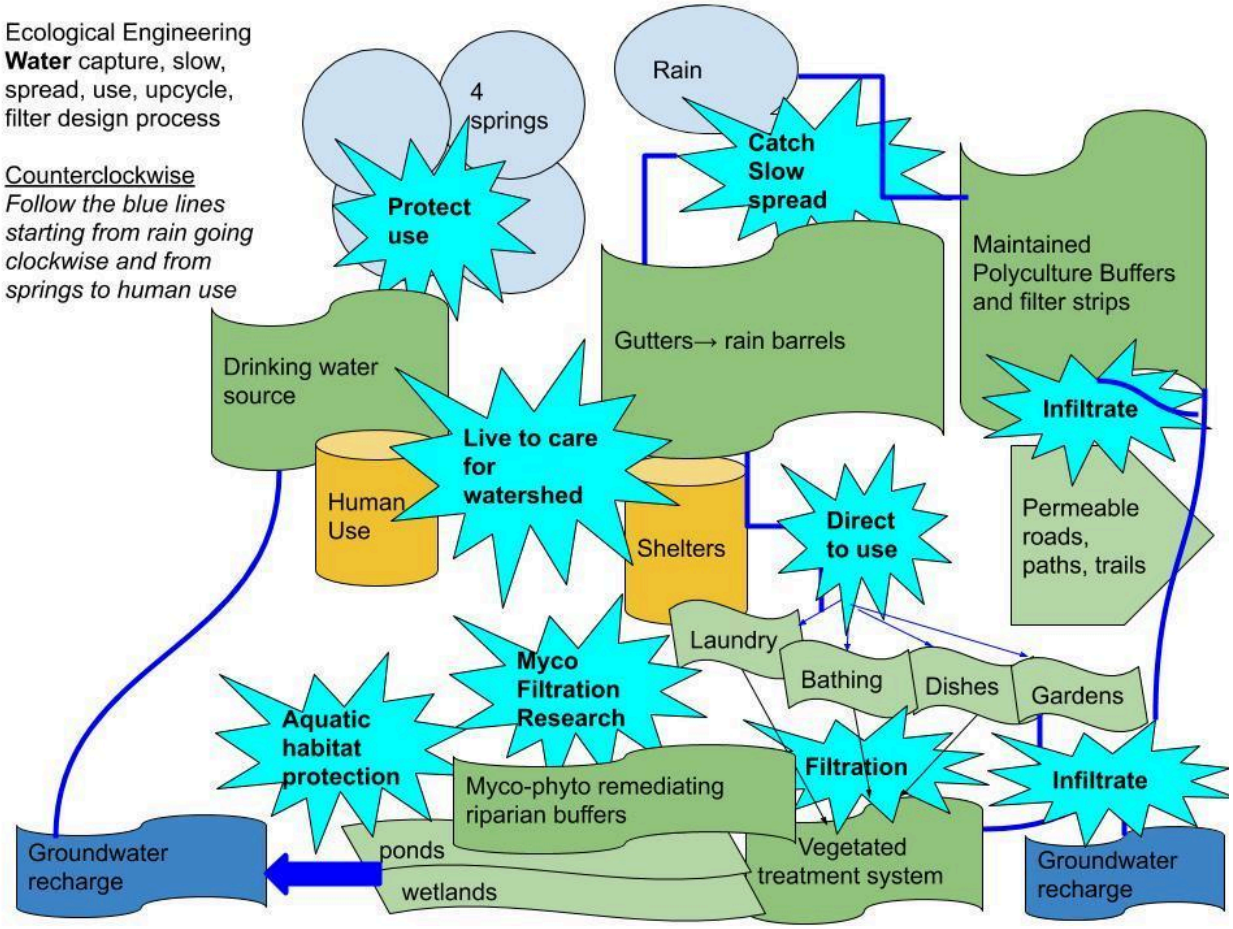
While exchanges between people in the community participate in the capitalist market economy enough to contribute to basic aspects of society (post office, library, town hall, food coop, used book and outdoor gear store, cobbler, seamstress, dentist, naturopath..) the majority of interactions operate according to one of the other 7 forms of capital (Roland, 2011) rooted in gifting, barter, paying it forward or neighborhood tending as part of the needed global 'just transition' to a low-carbon economy (A. S. Atteridge C., 2020). A handcrafted outdoor amphitheater of slate, quartz, and granite cobblestones marks the site of an old Abenaki village where the community gathers to council. Today Abenaki (Alnobaiwi, 2020) are welcome to enter to hunt, garden, live, and/or practice ceremony. Garden harvest beyond community needs is peddled to Food not Bombs weekly (Food Not Bombs, 2020). Inner city youth (The Family Room, 2020) visit to attend educational programs, trainings, and to play. Community gatherings occur at seasonal markers of solstices and equinoxes. Bicycle travelers moving through the region can camp out on the land (Warm showers, 2020) in our tent village. Residents experience this as their home to recharge from their ongoing essential restoration and rehabilitation of a society in transition from extraction to regeneration. This site models where intersectionality of this 'just transition' occurs via leveling the playing fields of: gender, age, ethnicity, economics, disability, sexual orientation, and other inequalities (A. B. I. Atteridge S. C., 2020). Sovereignty and agency is accessible to all involved (Johnson et al., 2020).

3) Water

Protecting water quality guides land management practices at this site. All roads, pathways and waterways on site are permeable & bordered with native perennial mycorrhizally inoculated polyculture buffers which facilitate the slowing, spreading and filtering of water. These buffers are cyclically coppiced for basket, medicine, food, and phosphorus (Bolduc and Hijri, 2011) removal purposes. Species determine harvesting cycles such that biomass harvest only happens with a few species each year leaving ample cover for pollinator habitat and above/below ground resilience. All buildings have gutters which channel rainwater into: cisterns, rain gardens (NRCD, 2020), and on contour bioswales constructed according to VT stormwater calculator data (VTNRCS, 2017). Any wastewater generated onsite is upcycled, filtered, tested, and returned to

groundwater through vegetated treatment systems involving wetlands (Kadlec and Wallace, 2008) which are monitored consistently. Additionally the living laboratory hosts rainwater and wastewater filtration pilot structures at critical source areas testing for heavy metals (Ali et al., 2013), pathogens (Weber and Legge, 2008) and nutrients (Moore et al., 2010). These involve microcosms (Browder, 2004), mesocosms, bench trials, and mini field trials.

Creative version of Materials Flow Diagram(Roy, 2017a) **for Water on Cedar heart Circle**



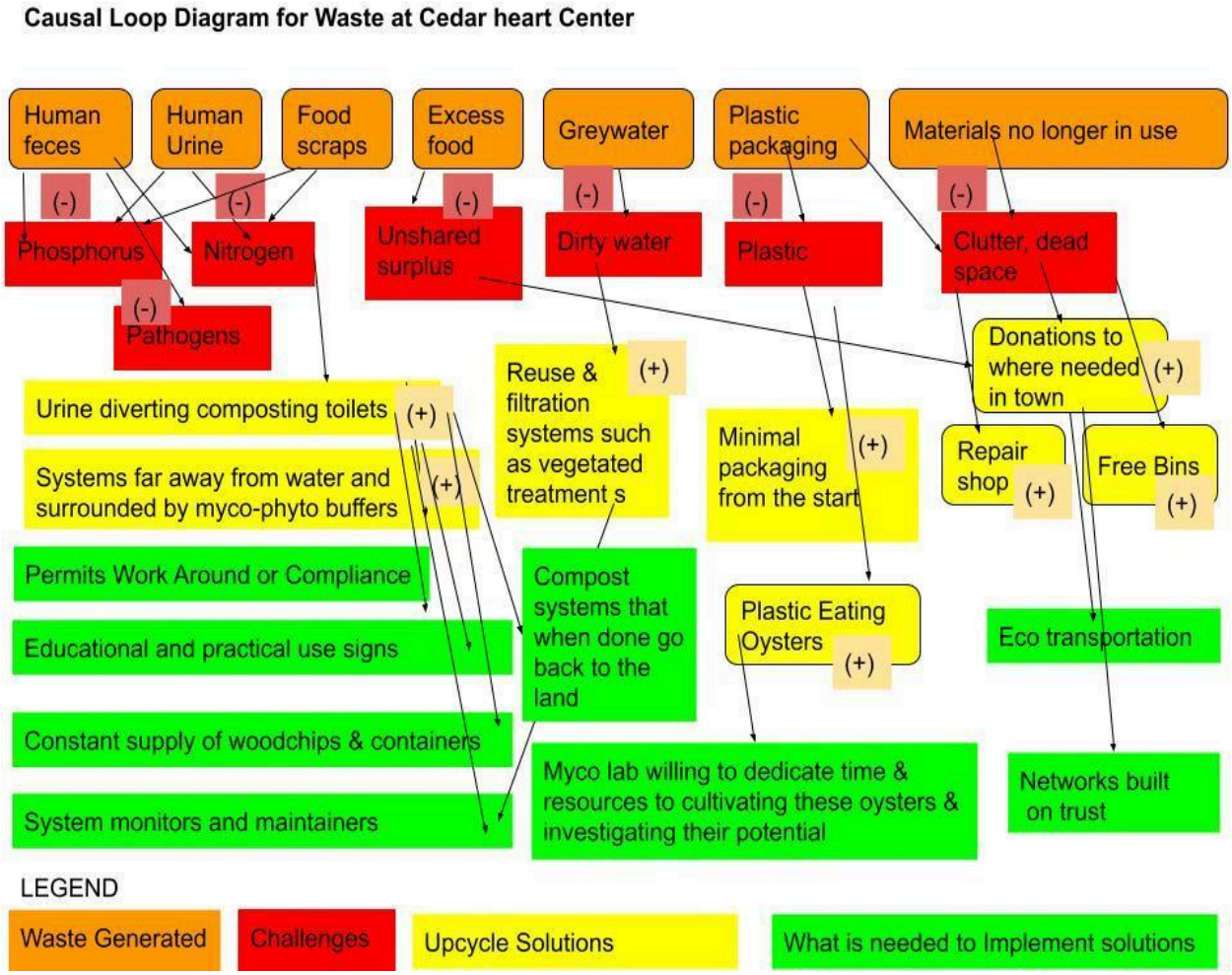
4) Food

Abundant and diverse food and medicines grow throughout the site in gardens, forests, wetlands, and meadows. Site specific techniques to grow food and medicine include: forest gardening (Jacke, 2005), Fukuoka (Fukuoka, 1992) style garden beds, terracing, cover cropping, a polyculture orchard (Phillips, 2017), mushroom cultivation (Cotter, 2014), seed saving of local heirloom and traditional Abenaki crops (United Plant Savers, 2020b), perennial gardens, hugelkultures, silvopasture with ducks (Mudge, 2014), contour swales, pollinator meadows, a passive solar greenhouse, cold frames, agroforestry, maple syrup tapping, and wild/native honey bee tending. A large root cellar, solar dehydrator, herb drying racks, canning and pickling help preserve and store much of each year's harvest. While enough food is grown to support

the residents, students, interns and visitors year round, the excess produced is shared with Food Not Bombs (FNB, 2020), local food shelves, meals for community members in need, and in creative barters with community networks (Penniman, 2018) especially to strengthen the local food hub (Doherty et al., 2020).

5) Waste

In this community, waste is treated as a resource guided to its proper role; it is a valuable input in a circular economy (Otoo and Drechsel, 2018). Urine (and its nitrogen and phosphorus nutrients) (Mihelcic et al., 2011) is diverted, diluted and applied to onsite agriculture enterprises (Rich Earth Institute, 2020). Humanure (and its phosphorus and nitrogen nutrients) (Mihelcic et al., 2011) is composted (Jenkins, 2005); when returned to soil, it is applied to orchards, perennial gardens, forest gardens, and hugelkulture ("Permaculture magazine," 2013) beds. Food waste is composted for future garden input. Trash is minimized via recycling and remediation (i.e. plastic eating oyster fungi are cultivated in our lab). A core community value involves guidelines around purchase of goods with minimal packaging and phosphorus-free products. Other onsite strategies to upcycle materials (i.e. baby clothing, old phones..) that if disposed could become trash include: free bins, donations, a repair shop, reuse material bins, and cradle-to-grave accounting systems which are part of the living laboratory protocols. Carbon is sequestered through hugelkulture, compost, mycorrhizae, and lack of: concrete and high throughput building materials. Phosphorus input is minimized through low P composts (Hurley et al., 2017), no fertilizer, site appropriate phosphorus recycling strategies (Roy, 2017b) such as: compost toilets, wetlands (Mitsch et al., 2009), and application of mycorrhizal plantings with corresponding phytoextraction practices. Nitrogen is uptaken through leguminous plants and wetland systems (Lee et al., 2009) involving nitrification, mobilization, denitrification, and plant /microbial uptake (Reddy, 2000).



6) Energy

A low throughput orientation guides our energy needs. Wood, water, compost, wind, gravity, sunlight, and human muscle are the main sources of power for our various activities. Through a combination of passive solar design, high R value insulation, and multiple small-scale sources of energy, our energy consumption is fairly low. Through use of: solar panels (including hot water), a small windmill, root cellar, passive cooling fridge, LED bulbs, bicycle powered equipment such as a bean thresher, hand cranked appliances, rocket stove, efficient wood stove, masonry stove, compost hot water heater, solar showers, and gravity fed springs, we can remain off grid with a diesel generator for backup in emergencies (Maynard, 2020). This allows us to remain within the limits of the available energy networks within which we are nested while helping counterbalance the excessive and extractive energy dynamics in society as it transitions from fossil fuel dependent to regenerative cycle contributive.

7) Shelter

Several shelters, biophilically designed (Kellert, 2015), provide multi-dimensional infrastructure throughout the site. They are nestled close enough to maintain a small human footprint while

consciously oriented within the land's patterns; determining social dynamics, quality of life, equity and agency (Atanda and Öztürk, 2020). Each shelter is built according to low-throughput guidelines and parameters which include: using granite slabs instead of concrete foundations, SW aspect, passive solar seasonally oriented angles (Passive House Institute, 2018), double paned and screened windows, local upcycled materials, and high R value insulation that is eco friendly material such as hemp crete (Stanwix and Sparrow, 2014), cob, and strawbale. These shelters include: round yurts, a timber framed barn with connected root cellar and community room, compost hot water heated greenhouse, tent platforms, outdoor pavilion, community house, 3 tiny houses, and 3 small cottages. Water and waste systems described above are living edges in and around each shelter which require daily attention and care.

Bibliography

Books and articles:

Ali, H., Khan, E., Sajad, M.A., 2013. Phytoremediation of heavy metals—Concepts and applications. Chemosphere 91, 869–881. doi:10.1016/j.chemosphere.2013.01.075

Atanda, J.O., Öztürk, A., 2020. Social criteria of sustainable development in relation to green building assessment tools. Environment, Development and Sustainability 22, 61–87. doi:10.1007/s10668-018-0184-1

Atteridge, A.B.I., S.C., 2020. Insights from historical cases of transition Background paper for the EBRD just transition initiative.

Atteridge, A.S., C., 2020. Stockholm Environment Institute Report: Seven Principles to just transition to a low-carbon economy. Sweden.

Bolduc, A., Hijri, M., 2011. The Use of Mycorrhizae to Enhance Phosphorus Uptake: A Way Out the Phosphorus Crisis. Journal of Biofertilizers & Biopesticides 02. doi:10.4172/2155-6202.1000104

Browder, J.A., 2004. Review of Ecological Microcosms by Robert J. Beyers and Howard T. Odum. Ecological Modelling 178, 77–80. doi:10.1016/j.ecolmodel.2003.12.007

Cotter, T., 2014. Organic Mushroom Farming and Mycoremediation: Simple to Advanced and Experimental Techniques for Indoor and Outdoor Cultivation. Chelsea Green Publishing.

Doherty, B., Sidhu, Y., Heron, T., West, C., Seaton, A., Gulec, J., Prado, P., Flores Martinez, P., 2020. Citizen participation in food systems policy making: A case study of a citizens' assembly. Emerald Open Research 2, 22. doi:10.35241/emeraldopenres.13609.1

Fukuoka, M., 1992. The One Straw Revolution. Rodale Press.

Hurley, S., Shrestha, P., Cording, A., 2017. Nutrient Leaching from Compost: Implications for Bioretention and Other Green Stormwater Infrastructure. Journal of Sustainable Water in the Built Environment 3, 04017006. doi:10.1061/JSWBAY.0000821

Jacke, D., Eric Toensmeier, 2005. Edible Forest Gardens: Ecological design and practice for temperate-climate... - Google Books. Chelsea Green Publishing.

Jenkins, J., 2005. The Humanure Handbook Third Edition a Guide to Composting Human Manure, 3rd ed. Grove City, PA.

Johnson, O.W., Han, J.Y.-C., Knight, A.-L., Mortensen, S., Aung, M.T., Boyland, M., Resurrección, B.P., 2020. Intersectionality and energy transitions: A review of gender,

social equity and low-carbon energy. Energy Research & Social Science 70, 101774. doi:10.1016/j.erss.2020.101774
Kadlec, R.H., Wallace, S., 2008. Treatment Wetlands. CRC Press.
Kellert, S., Calabrese, E., 2015. The Practice of Biophilic Design.
Lee, C., Fletcher, T.D., Sun, G., 2009. Nitrogen removal in constructed wetland systems. Engineering in Life Sciences 9, 11–22. doi:https://doi.org/10.1002/elsc.200800049
Meadows, D., 1999. Leverage Points: Places to Intervene in a System 18.
Mihelcic, J.R., Fry, L.M., Shaw, R., 2011. Global potential of phosphorus recovery from human urine and feces. Chemosphere, The Phosphorus Cycle 84, 832–839. doi:10.1016/j.chemosphere.2011.02.046
Mitsch, W.J., Gosselink, J.G., Zhang, L., Anderson, C.J., 2009. Wetland Ecosystems. John Wiley & Sons.
Moore, M.T., Kröger, R., Locke, M.A., Cullum, R.F., Steinriede, R.W., Testa, S., Lizotte, R.E., Bryant, C.T., Cooper, C.M., 2010. Nutrient mitigation capacity in Mississippi Delta, USA drainage ditches. Environmental Pollution 158, 175–184. doi:10.1016/j.envpol.2009.07.024
Mudge, K., Steven Gabriel, John Munsell, 2014. Farming the Woods : An Integrated Permaculture Approach to Growing Food and Medicinals in Temperate Forests. Chelsea Green Publishing.
National Disability Authority, 2020. The 7 Principles | Centre for Excellence in Universal Design [WWW Document]. URL http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/ (accessed 11.30.20).
NRCD, U.E., Sea Grant, 2020. The Vermont Rain Garden Manual “Gardening to Absorb the Storm.”
Otoo, M., Drechsel, P. (Eds.), 2018. Resource recovery from waste: business models for energy, nutrient and water reuse in low- and middle-income countries. Routledge, New York, NY.
Passive House Institute, 2018. Active for more comfort: Passive House: Information for property developers, contractors and clients.
Penniman, L., 2018. Farming While Black: Soul Fire Farm’s Practical Guide to Liberation on the Land. Chelsea Green Publishing.
Permaculture magazine, 2013. The Many Benefits of Hugelkultur.
Phillips, M., 2017. Mycorrhizal Planet: How Symbiotic Fungi Work with Roots to Support Plant Health and Build Soil Fertility. Chelsea Green Publishing.
Reddy, K.R., E.M.,. D’Angelo, W.G. Harris, 2000. Handbook of Soil Science, in: Biogeochemistry of Wetlands. CRC Press, pp. G89-119.
Roland, E., 2011. 8 Forms of Capital. Permaculture 68, 58-61.
Roy, E.D., 2017a. Phosphorus recovery and recycling with ecological engineering: A review. Ecological Engineering 98, 213–227. doi:10.1016/j.ecoleng.2016.10.076
Roy, E.D., 2017b. Phosphorus recovery and recycling with ecological engineering: A review. Ecological Engineering 98, 213–227. doi:10.1016/j.ecoleng.2016.10.076
Ryn, S.V.D., Cowan, S., 2007. Ecological Design, 10th ed.
Stanwix, W., Sparrow, A., 2014. The Hempcrete Book: Designing and Building with Hemp-Lime, Illustrated edition. ed. Green Books, Cambridge.

Thompson, E.H.& E.R.S., 2005. Wetland, Woodland, Wildland. The Nature Conservancy & VT Dept. Fish & Wildlife, Lebanon.
VTNRCS, 2017. Vermont Stormwater Management Manual 180.
Weber, K., Legge, R., 2008. Pathogen removal in constructed wetlands, in: Wetlands Ecology Conservation and Restoration.

Organizations and Individuals:

Alnobaiwi, a 501c3 in the Abenaki way dedicated to reclaiming the Abenaki heritage education, ceremony, and cultural programs https://www.alnobaiwi.org/

Food Not Bombs in Burlington https://champlainvalleydsa.org/blog/interview-with-the-burlington-food-not-bombs-collective, one of the places we will donate some of our excess food and medicine

Lifecycling http://www.lifecycling.net/ is a mini-intentional community/education center where colleague and friends David Maynard and Mary Fettig live and model these skills. Much of what is described in this paragraph is successfully practiced in their home.

Megeso, Abenaki Elder of the Nulhegan Tribe (personal correspondence) requested that land tenders put educational signs naming the original tribe & village to help shift the colonial paradigm of property.

Rich earth institute https://richearthinstitute.org/urine-diversion-guide/ has blueprints for urine diverting toilets and other systems of application that will guide our practices on the land.

The Family Room https://www.thefamilyroomvt.org/ The Janet S. Munt Family Room is a place that builds healthy, connected communities by supporting families and young children. Since 2017, the Family Room offers programming accessible to all; flexible enough to meet our changing community's needs. The Family Room helps parents grow their support networks, and creates a vibrant & diverse community that integrates new Vermonters with those whose families have lived here for generations. Here differences of class, race, language and religion are celebrated and honored, and cultural awareness grows.

United Plant Savers a. https://unitedplantsavers.org/40-our-mission-ups/ has a Botanical Sanctuary Network for Endangered/threatened plants which this land would host through grants, plantings, trail and sanctuary maintenance

United Plant Savers b. https://unitedplantsavers.org/sacred-seeds-at-the-the-intervale-cente-the-abenaki-heritage-garden/ Sacred Seeds Initiative involves Abenaki Heritage Garden which has networks branching out growing and returning seed each year. This is part of the Seeds of Renewal Project: https://www.vpr.org/post/project-revives-abenaki-crops-one-seedtime#stream/0

https://www.warmshowers.org/ is an international networks in which bicyclists can be hosted as they pass through the areas. We will be in their list service to support the low carbon footprint transportation community.