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1 Ecosystem services and non-human labor

A key model for conceptualizing the relational structure of oysters within the socio–ecosystem of the Chesapeake Bay is the ecosystems services model. In this model the labor of non–human organisms is included in the economics of the system by modeling the value of the products of this labor if it was performed by humans within the market [1]. The idea behind the ecosystem services model is that the quantification of market value for the products of non–human labor will incentivize the conservation of the ecosystem that supports that labor through market forces [2]. In the case of oysters, researchers have documented a long list of ecosystem services that are provided by oyster reefs, including water quality improvement, shoreline stabilization, and habitat creation [3]. Grabowski et al. found that the market value of the ecosystem services provide by oyster reefs substantially exceeded the market value of the oysters if they were harvested for meat [4] thereby suggesting that the market should incentivize the creation of sanctuary reefs (i.e., reefs that are not open to harvest). This conceptualization of oyster reefs as the providers of ecosystem services embeds the reefs and the labor of the oysters within the capitalist market system and relies on market forces and capitalist values to define conservation goals. The problem with this approach is that the goals of the capitalist system, to maximize productivity and profit, means that the ecosystem services model does not actually incentivize conservation but in fact incentivises intensification [5] and the maximization of value through optimization and efficiency increases.

An example of the co–option of non–human labor for the maximization of production and profit can be seen in the movement to harness the power of soil microbiota to create soil fertility [6]. There is increasing recognition that

[1](Costanza et al., 1998)

[2](Costanza et al., 1998)

[3](Grabowski et al., 2012; ?, ?)

[4]The highest value ecosystem services provided by the oyster reefs, according to (Grabowski et al., 2012) was shoreline protection. When this service was included in the analysis, the reefs recovered their cost of construction within 2 years of construction. However, even when shoreline protection was omitted from the analysis, the reefs recovered their cost of construction within a decade.

[5]need to see (Bommarco, Kleijn, & Potts, 2013)

[6](Krzywoszynska, 2020)

the fertility of the soil is the result of the labor of soil microbiota and therefore the productivity of a farm has changed from being "an activity carried out predominantly by human bodies to an activity carried out by the soil biota under human management"[7]. The recognition of this ecosystem service (i.e., the creation of soil fertility), by soil biota, has not lead to the conservation of soil ecosystems but has rather lead to the "direct and indirect manipulation [of the lives of the soil biota] in the name of capital accumulation through e.g. greater efficiency and productivity…"[8]. Although (Krzywoszynska, 2020) do not explicitly reference the ecosystem services model in their example, it is clear that the farmers that they interview see the nonhuman labor of the soil biota primarily through the lens of the services they provide. (Krzywoszynska, 2020) notes that for the farmers, "what matters about agrarian soils…is not so much what they are but what they can do" [9]. This emphasis on the "services" that the soils provide when combined with the goals of a capitalist system — namely the accumulation of surplus value — results in a representation of the system that invites reduction. If the system is not a "system" per se, but rather an aggregation of ecosystem services, then there is no barrier to the isolation and optimization of those services in the name of production. For the farmers interviewed by (Krzywoszynska, 2020) the primary goal of their "collaboration" with the soils was "the promise of greater farm productivity that soil biota enable"[10].

An alternative to the ecosystem services model for understanding ecosystems is the foundation species model. In the foundation species model the persistence of an ecosystem is facilitated by one or a few species that create biotic and abiotic habitat for the other species in the system and stabilizes the biogeochemical environment [11]. Unlike the ecosystem services model of ecosystems, the foundation species model is not explicitly defined by its relationship with humans or human activities. Humans are incorporated into the ecosystem in relation to the existing structure and processes created by the foundation species. The nature of human relations is not explicitly defined as in the case of the ecosystem services model, where benefits flow from nature to humans [12]. Because foundation species are strong interactors [13] human–caused alterations to their abundance or function will have disproportionately large effects on the ecosystem. Hemlock forests create a unique physochemical environment due to the impacts of their leaf litter on soil nutrient content, soil moisture, and light availability, that supports a unique community of facilitated organisms[14]. However, hemlock forests do not reestablish themselves following harvest by humans

[7](Krzywoszynska, 2020, p. ?)

[8](Krzywoszynska, 2020, p. 239)

[9](Krzywoszynska, 2020, p. 234)

[10](Krzywoszynska, 2020, p. 243)

[11]cite Foundation species here

[12](Costanza et al., 1998)

[13]Strong interactors are species that have an impact on the structure or function of an ecosystem that is disproportionate to either their abundance or the impact of other species in the system [CITE strong interactors here]

[14](?, ?)

but are replaced by hardwood species[15], so the exploitation of hemlock trees as a raw material results in not only the co-opting of the metabolic labor of the hemlock trees but undermines their creative power within the system.

References

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[15](?, ?)