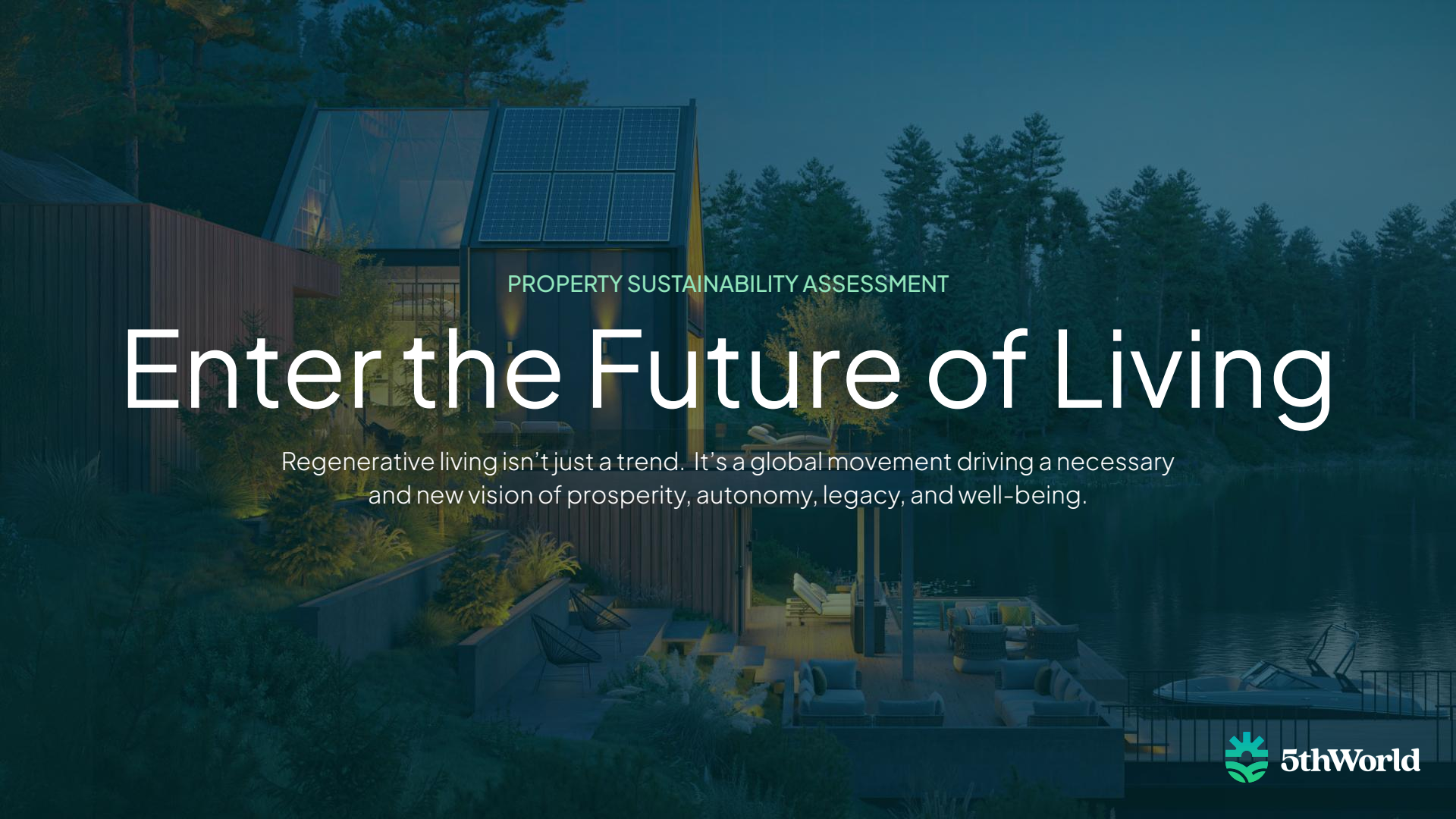

PROPERTY SUSTAINABILITY ASSESSMENT

Enter the Future of Living

Regenerative living isn't just a trend. It's a global movement driving a necessary and new vision of prosperity, autonomy, legacy, and well-being.

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PROPERTY SUSTAINABILITY ASSESSMENT

Site Background

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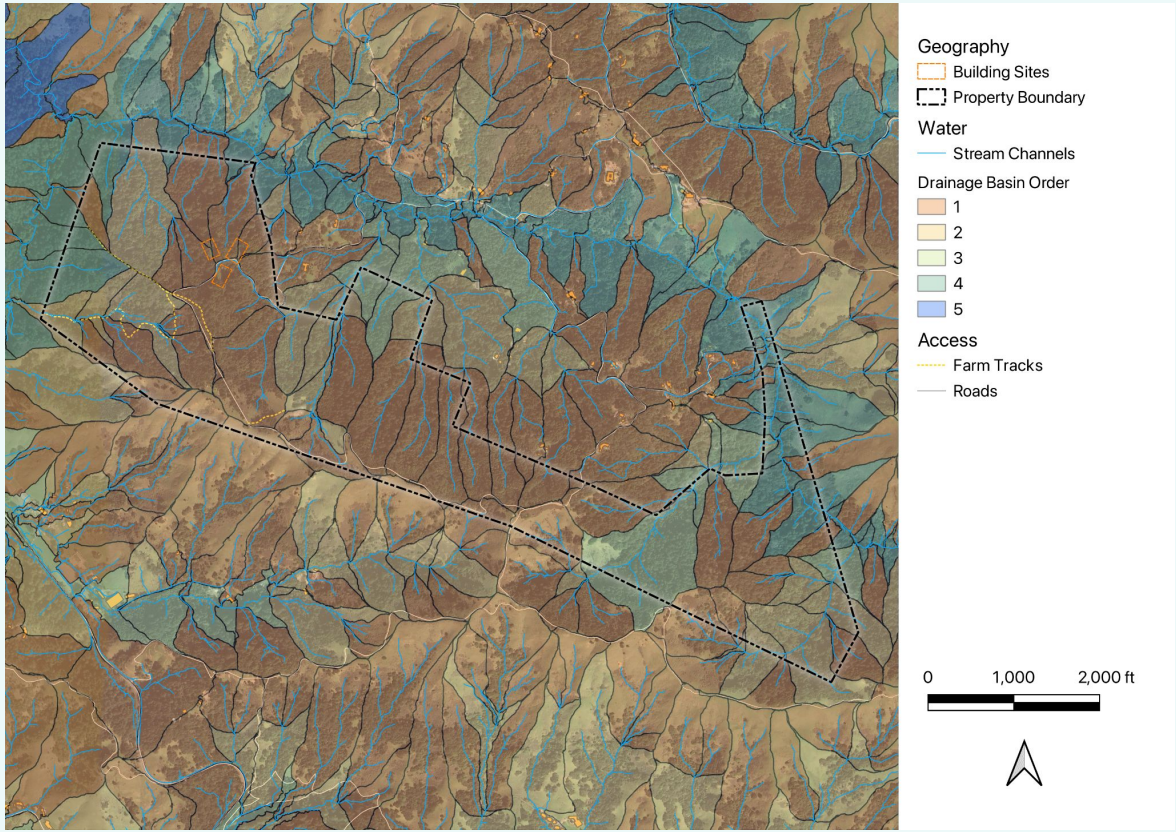
Watershed & Drainage

- Since this property is situated along a ridge, there is not significant watersheds flowing on to the property, except on the extreme eastern edge of the property



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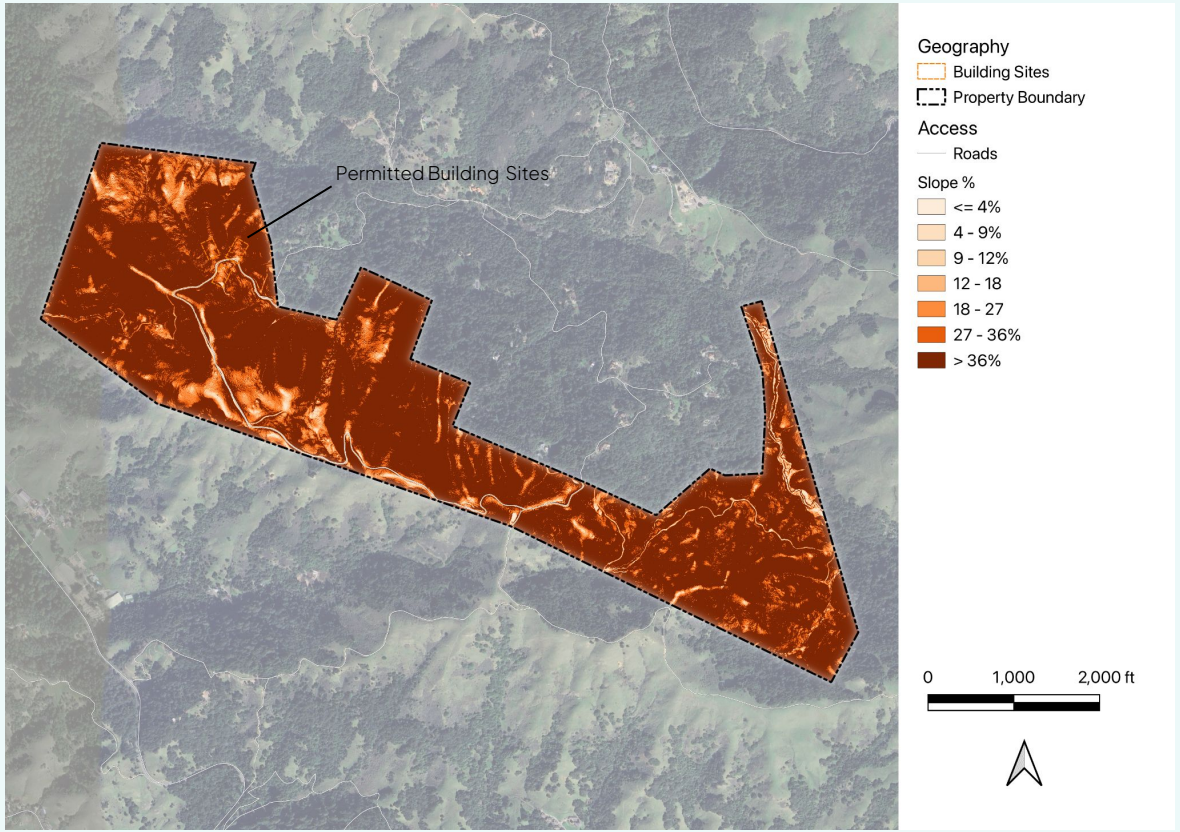
Slope

- The majority of this property is very steep, with slopes over 36%.
- Most of the property is at or over 25% slope, which is considered the threshold for site development. While it is still possible to develop, more energy and expense is required to build on sites beyond this threshold.
- Some areas of mode mild slope exist throughout the site
- The site has existing roads, which appear to be less than 15%



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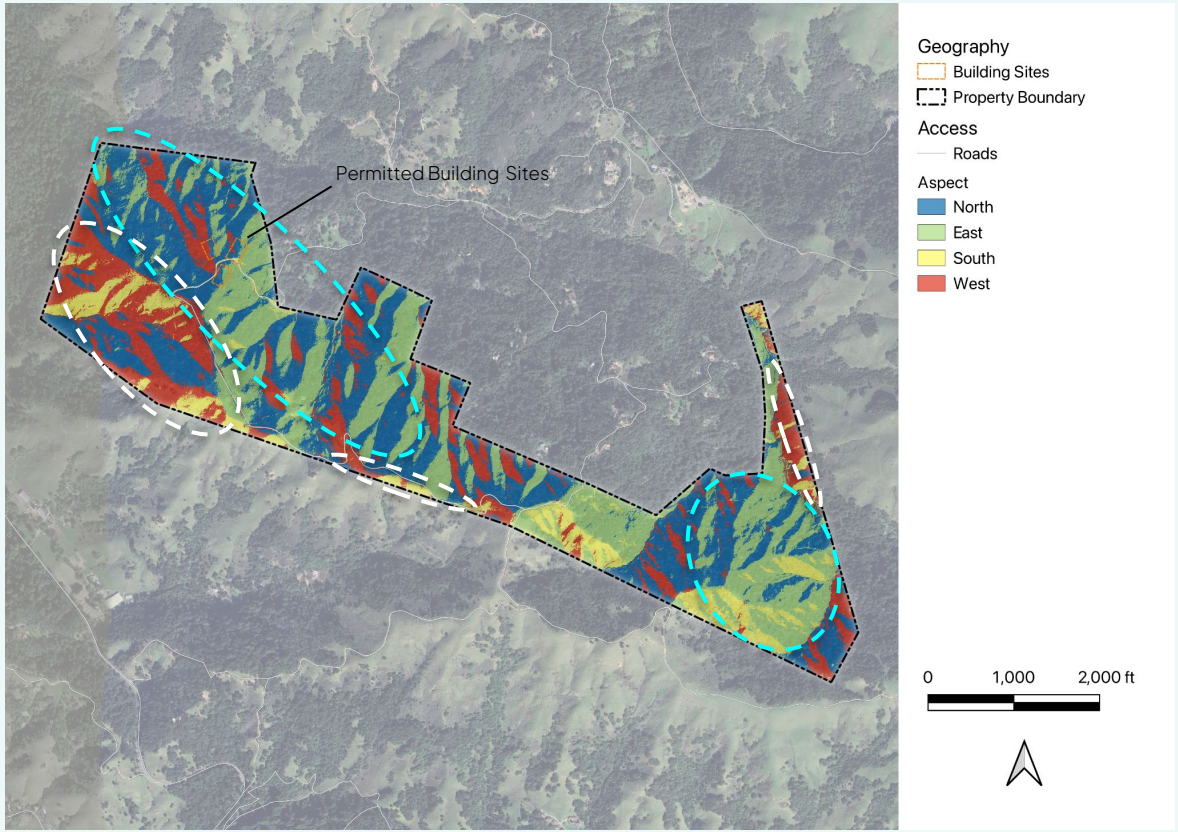
Topographical Aspect

- The dominant slope aspect of this property is to the north, northeast, and east.
- Areas outlined in white denote expected hotter & drier microclimates
- Areas denoted in blue denote expected cooler & moist microclimates



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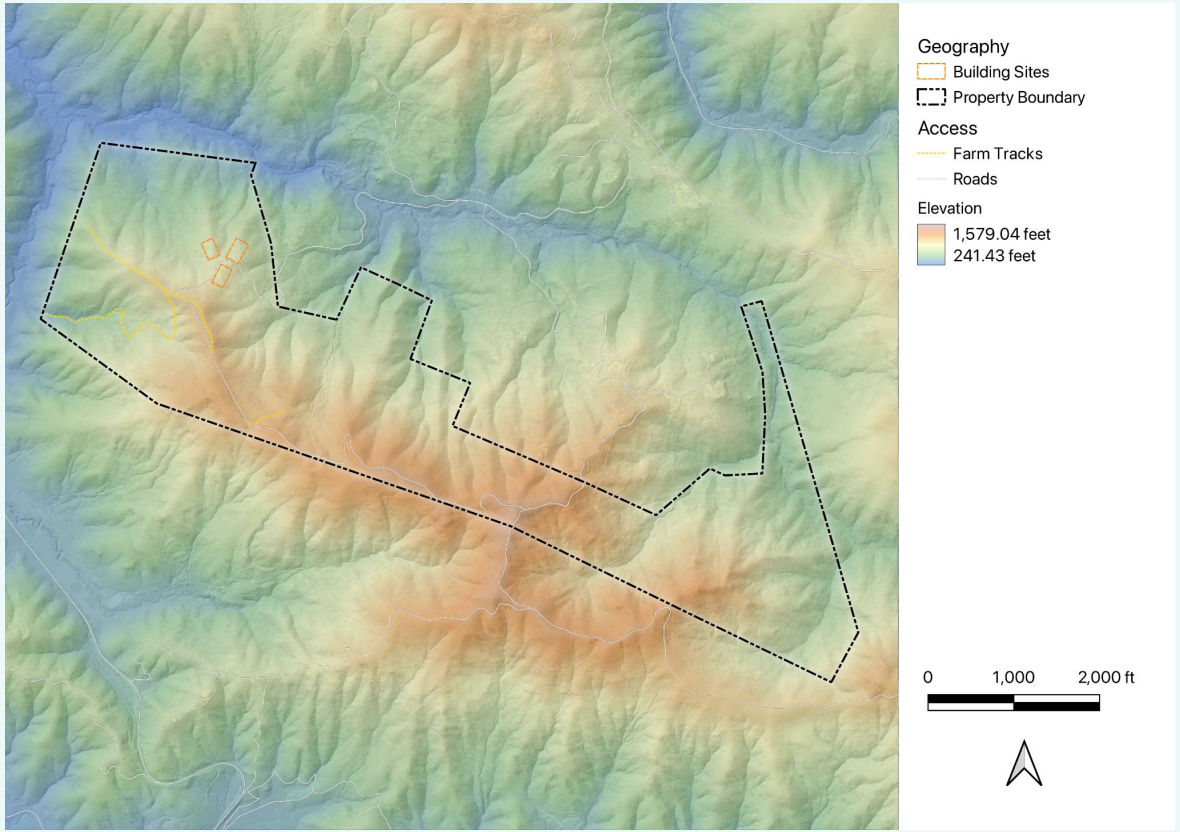
Elevation Relief

- There's approximately 1016 feet of elevation difference across the site.
- The key landform of this site is that it is a ridge in an east-west orientation.



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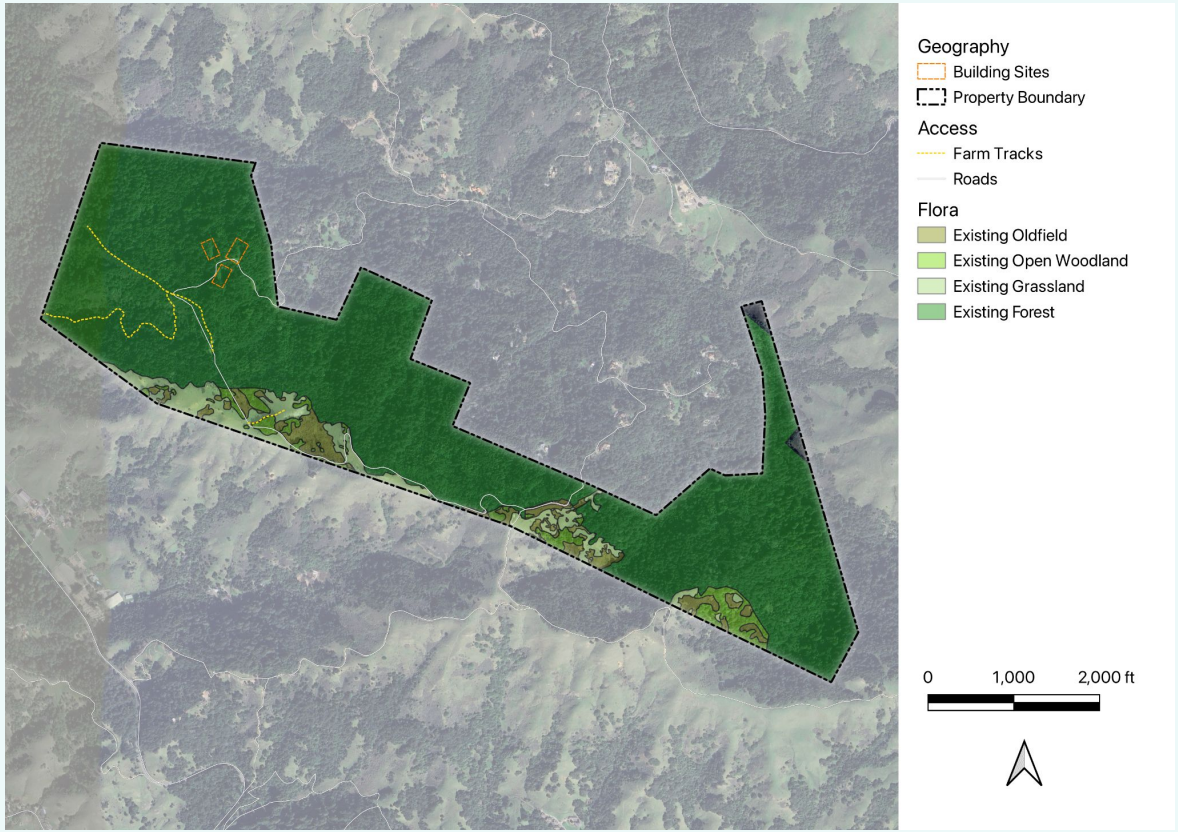
Vegetation Types

- This property is nearly entirely forest.
- At the ridge and its south side, other vegetation types including shrublands and grasslands are occuring.



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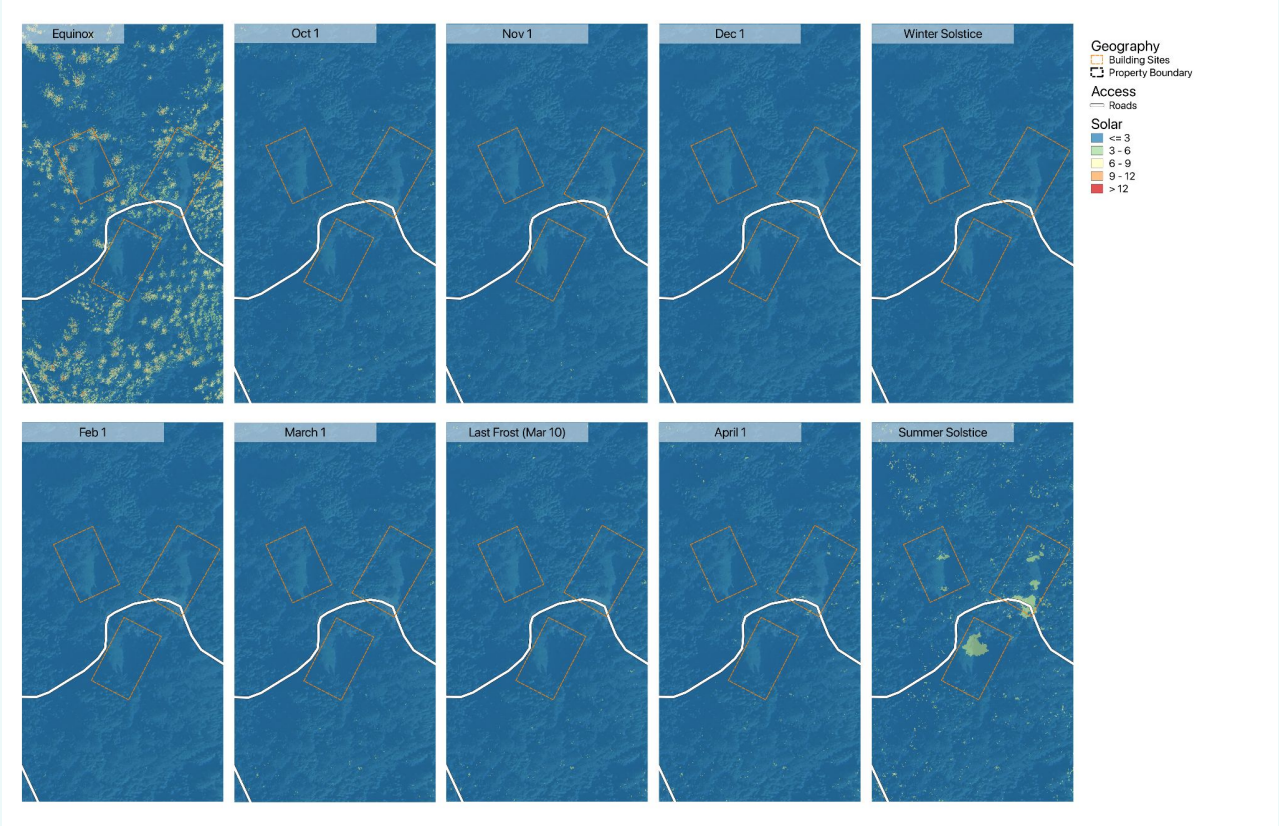
Solar Exposure

- We based this study on the area containing the three permitted building sites.
- All three sites are in shadow for the day, each receiving at or less than 3 hours of direct sunlight per day, except in Midsummer, where some of the building sites receive between 3 and 6 hours of direct sunlight.



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PROPERTY SUSTAINABILITY ASSESSMENT

Regenerative Living Solutions

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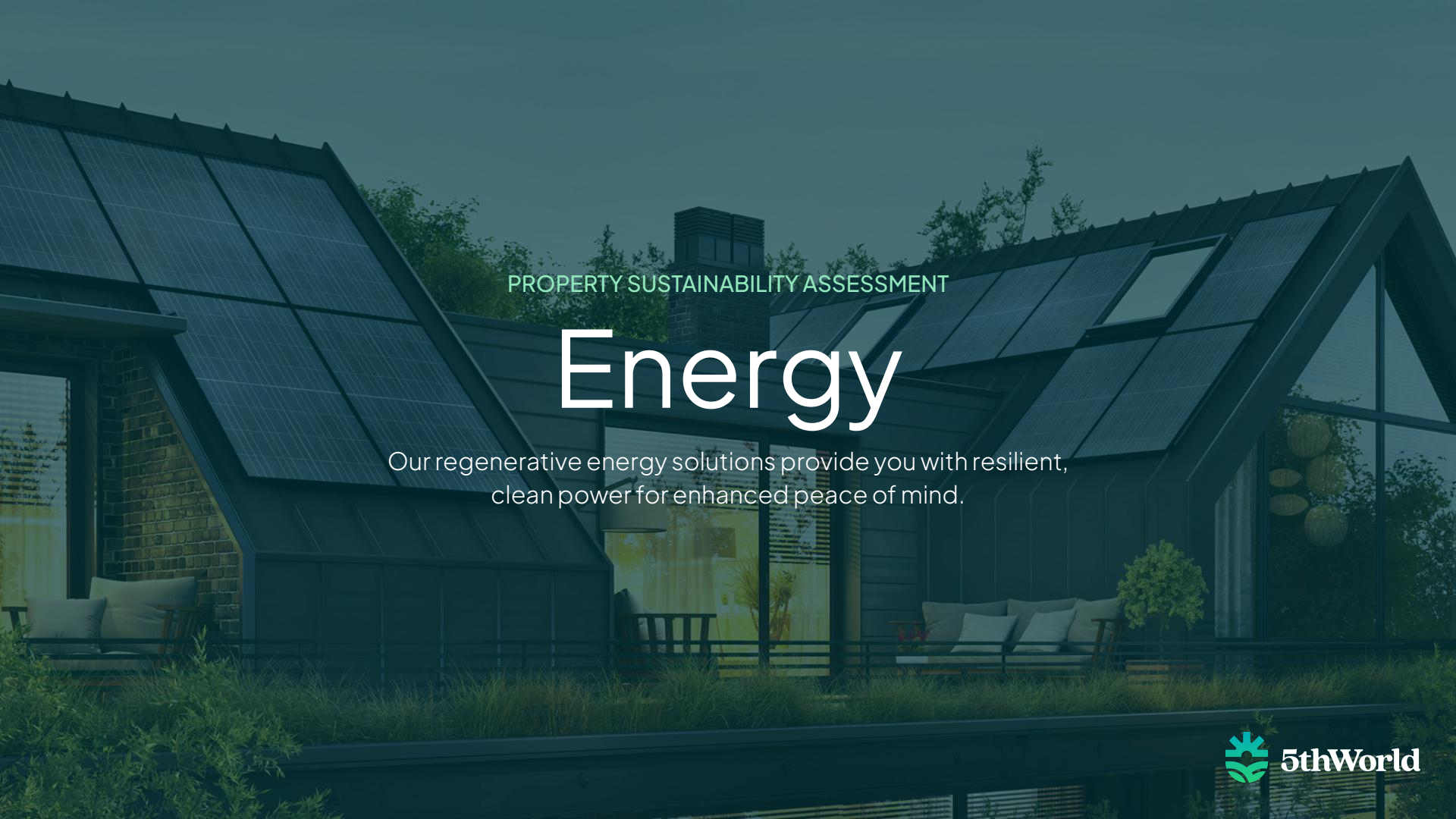

PROPERTY SUSTAINABILITY ASSESSMENT

Energy

Our regenerative energy solutions provide you with resilient, clean power for enhanced peace of mind.

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Energy: Opportunities

- This property is located in a fairly sun-rich area, although winters have more cloud cover.
- Nearly the entire south portion of the property has excellent solar gain throughout the year.

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Energy: Constraints

- Winters in this region have more cloud cover, particularly between October and March. Fog is also frequent in this area during the summer months.
- This property is primarily forested with very tall coniferous trees. The three permitted dwelling sites are completely shaded.

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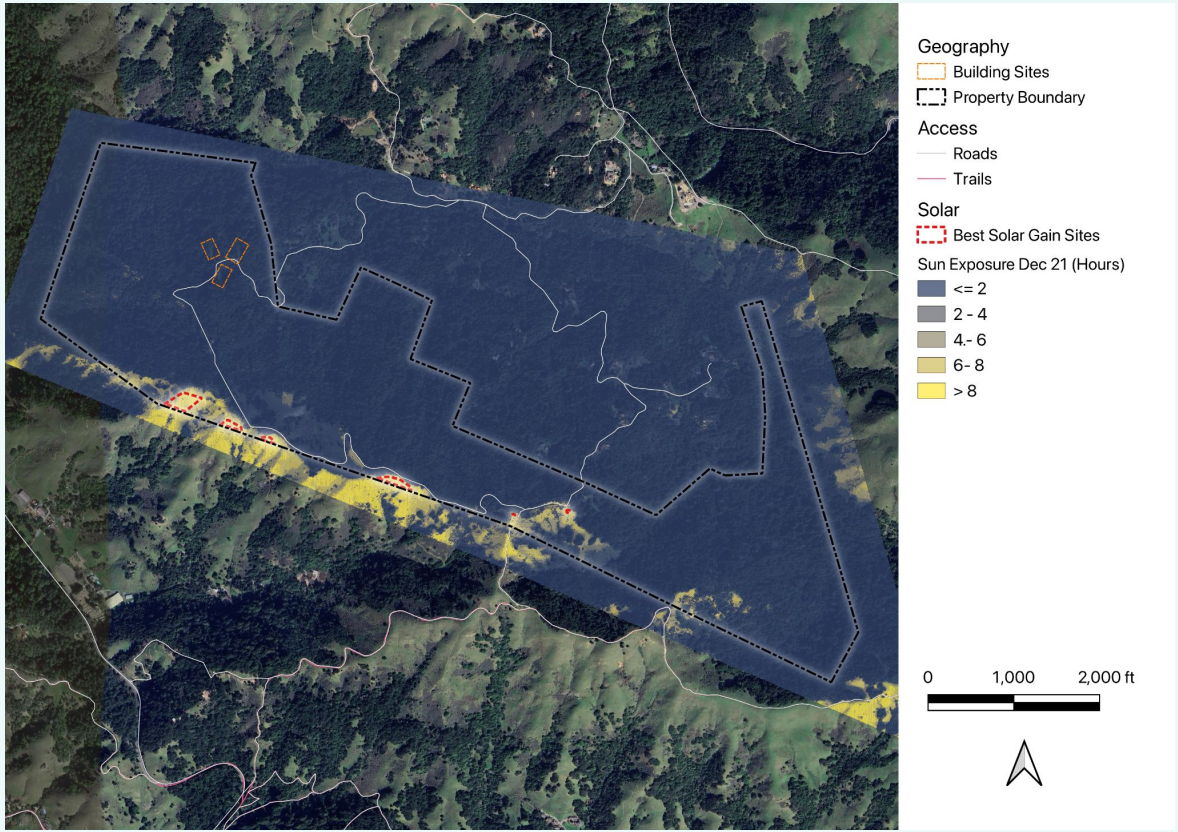
Solar Energy

- Relative to the entire property, there are minimal sites for solar accumulation for PV and for passive solar building sites, although this could be expanded through the clearing of trees.
- However, there are naturally ideal sites along the south property boundary as shown in red.
- If a passive solar home is desired, these sites represent the most ideal locations.



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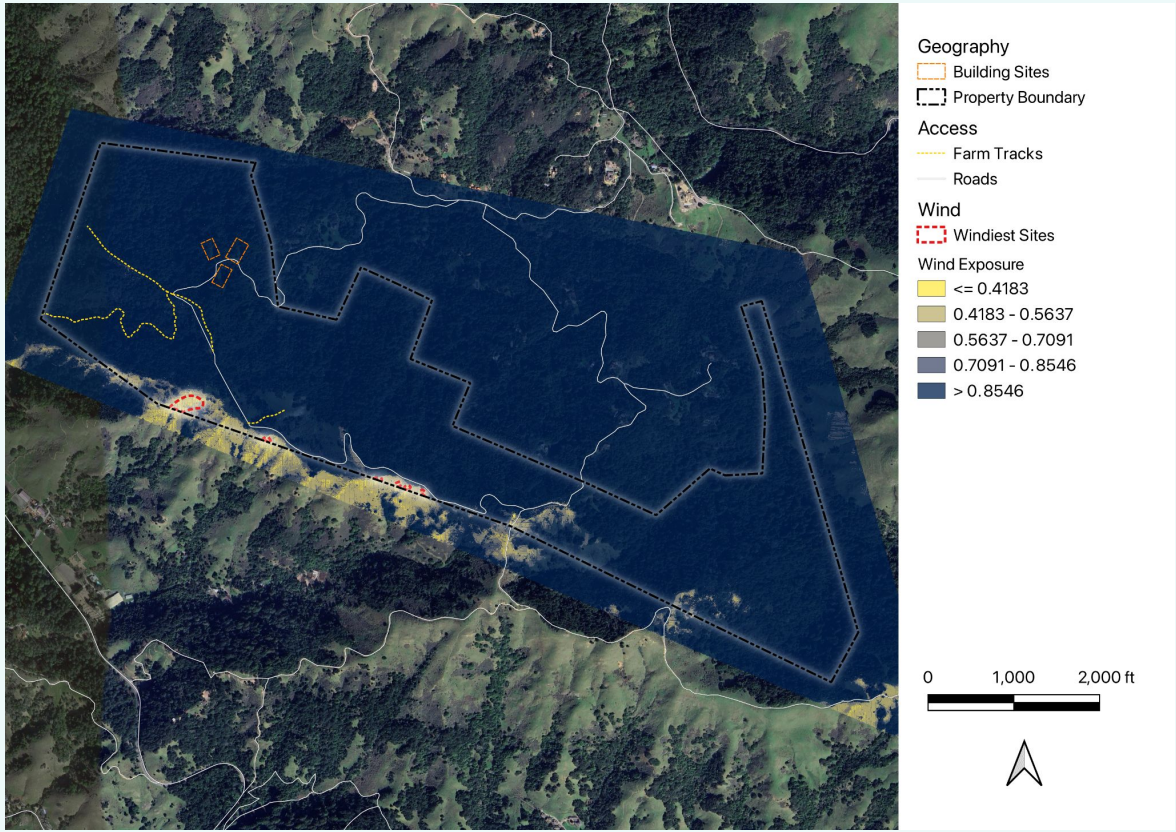
Wind Energy

- There is a relatively small areas on the site as shown that are able to receive winds.
- This property is generally not well suited for wind power generation, due to the fact that this site receives only approximately 4% of days where wind is sufficient strength for wind power generation.



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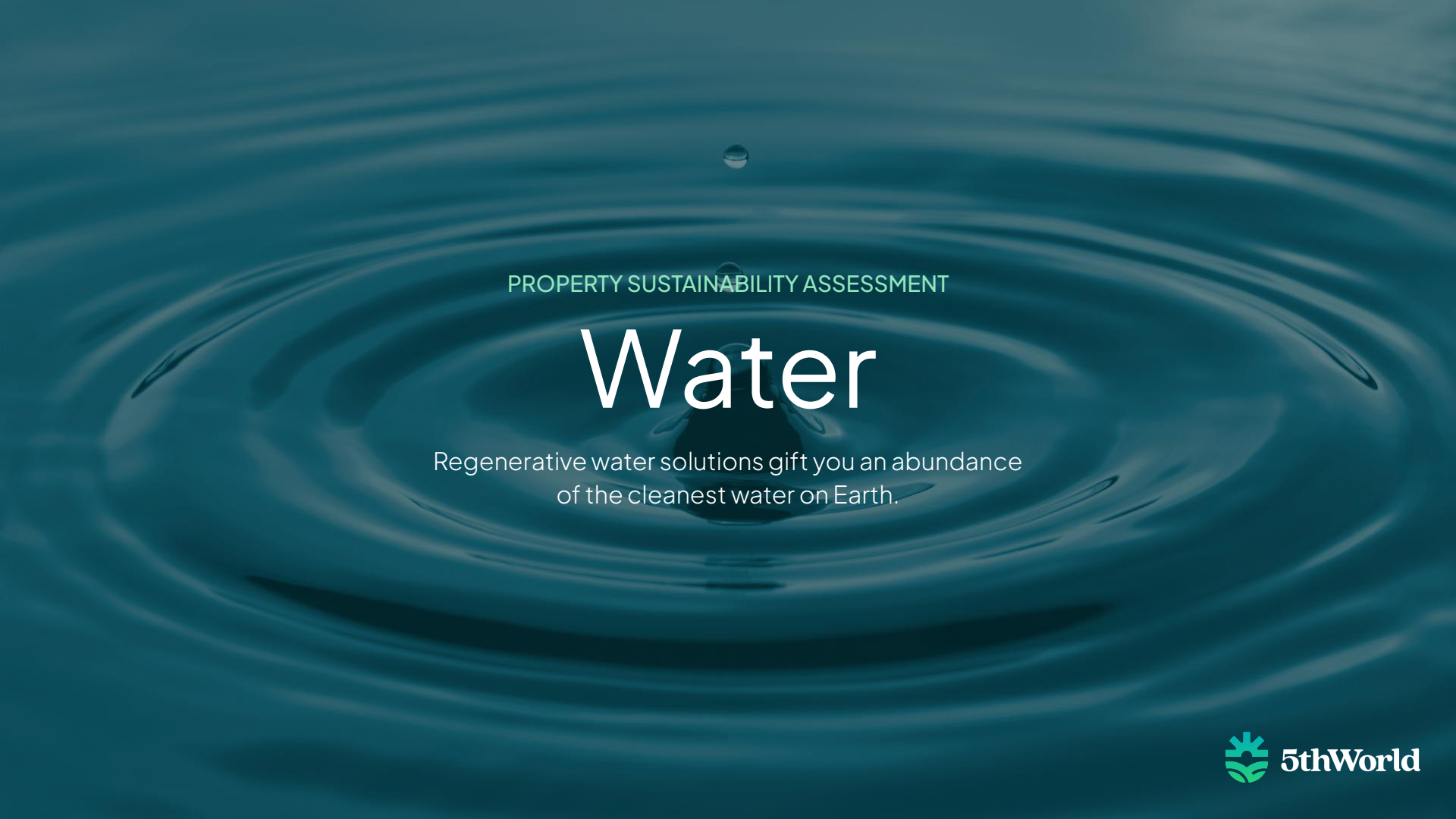

PROPERTY SUSTAINABILITY ASSESSMENT

Water

Regenerative water solutions gift you an abundance of the cleanest water on Earth.

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Water: Opportunities

- Because the top of the watershed is contained in this site, it will be possible to store water in large tanks up high, and use that water throughout the site, transported by gravity.
- Tanks could additionally be filled by taking water from an ephemeral stream that is on site.
- With enough tank storage, a potable water supply could be created, as well as reserve water for fire fighting.
- Due to the large amount of tall & mature Redwood and Douglas Fir trees, this property has an active water cycle. While rainfall is low during the summer here, a measurable amount of water falls to the site as *fog drip*, when moisture laden air touches large coniferous trees

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Water: Constraints

- There is no wells on the site
- This area is relatively close to regions that are reporting an increase in groundwater wells that are drying out. See https://storymaps.arcgis.com/stories/f2b252d15a0d4e49887ba94ac17cc4bb for more information.
- Due to the well- and extremely-well drained nature of the soils, as well as the significant steepness of the site, there is no good opportunity for storing water in ponds on site.
- Gravelly soil layers will demand additional soil building and irrigation for most annual vegetable crops.
- In general, there is little opportunity for larger scale water storage on this property higher in the landscape. This site is also not well suited for ponds due to the topography, as well as the lack of clay. This means that installing ponds will require higher expense and energy.

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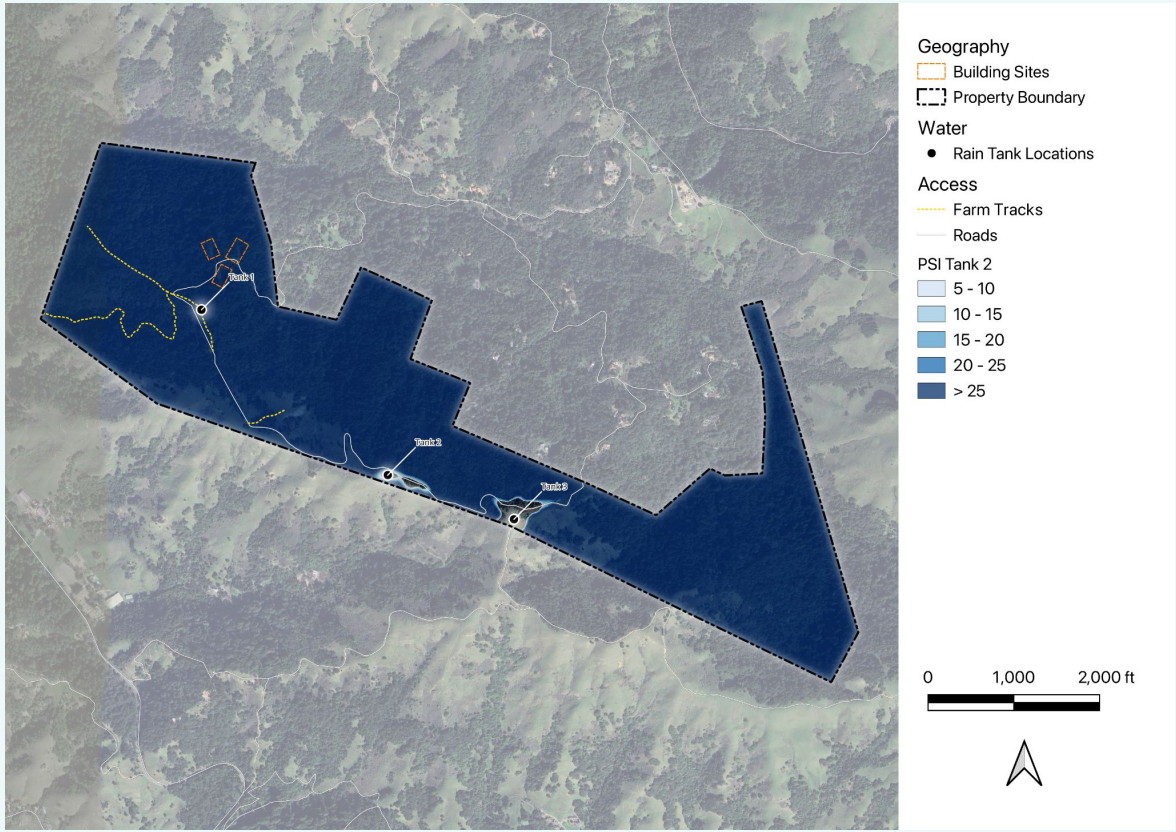
Water Availability

- This map shows the location of water tanks that serve as potable water storage as well as for fire fighting.
- This map also shows the ‘reach’ that stored water can be moved throughout the property without needing energy; through gravity.
- The majority of the property is within the reach, representing an opportunity for water use and fire mitigation.



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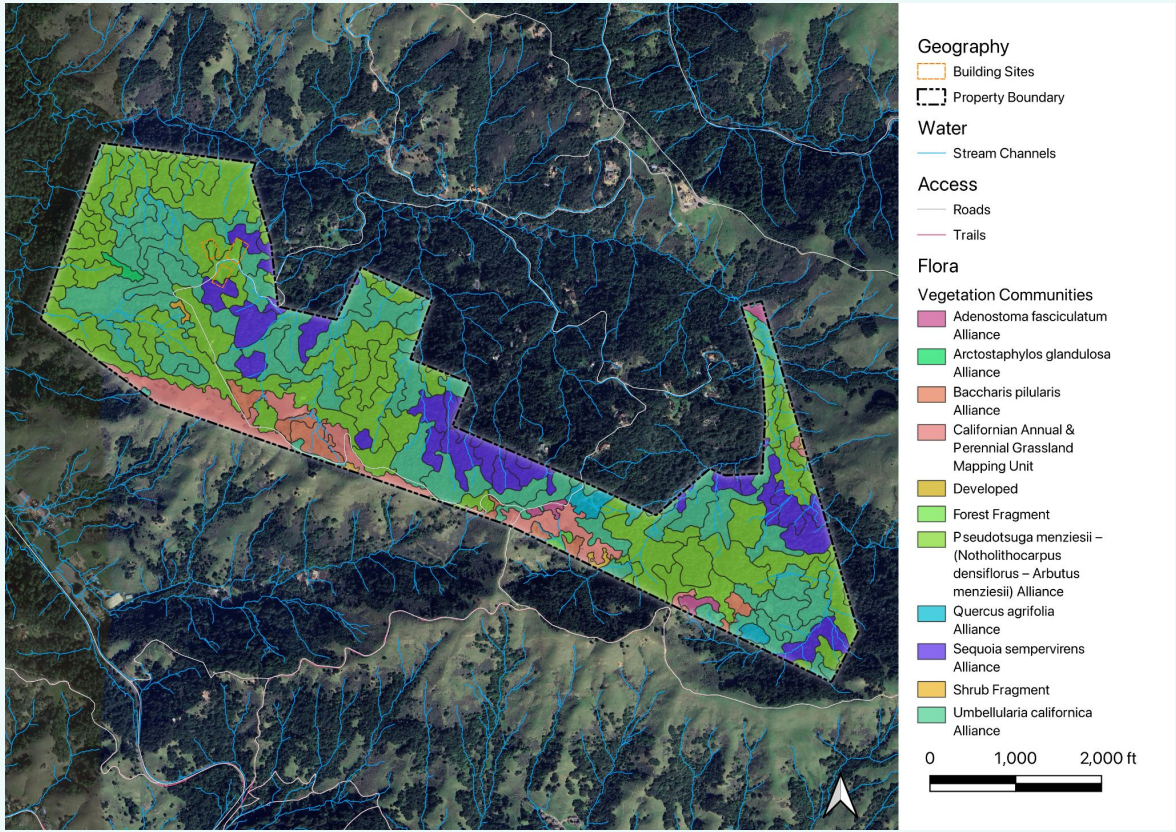
Ecosite

- This majority of this property is occupied by forested ecosites that are north to northeast facing.
- Along the south edge of the property, ecosites exist where high heat and low water availability restrict the growth of trees, promoting deeper rooted species.
- The forested ecosites are capable of harvesting fogdrip.



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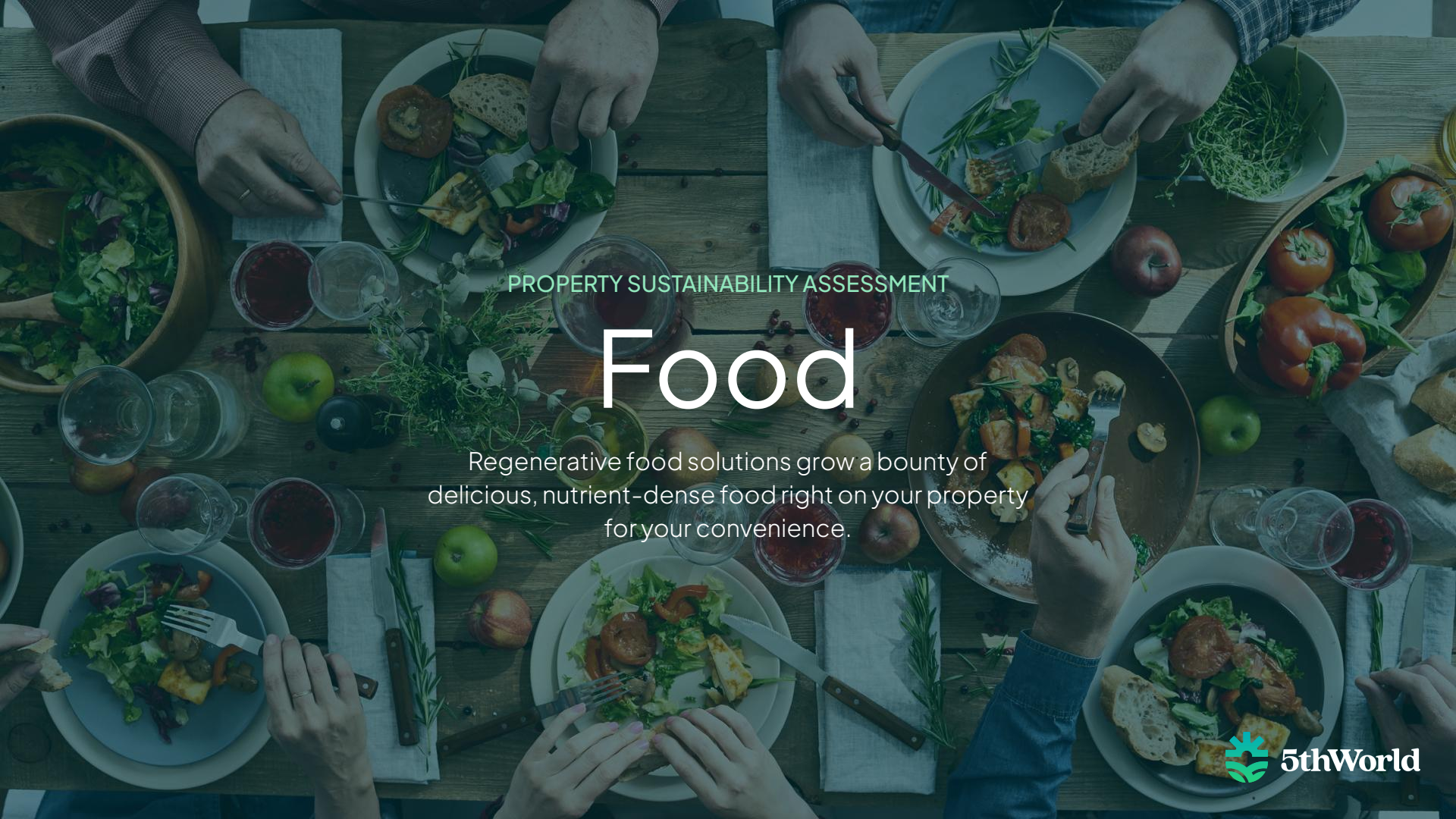

PROPERTY SUSTAINABILITY ASSESSMENT

Food

Regenerative food solutions grow a bounty of delicious, nutrient-dense food right on your property for your convenience.

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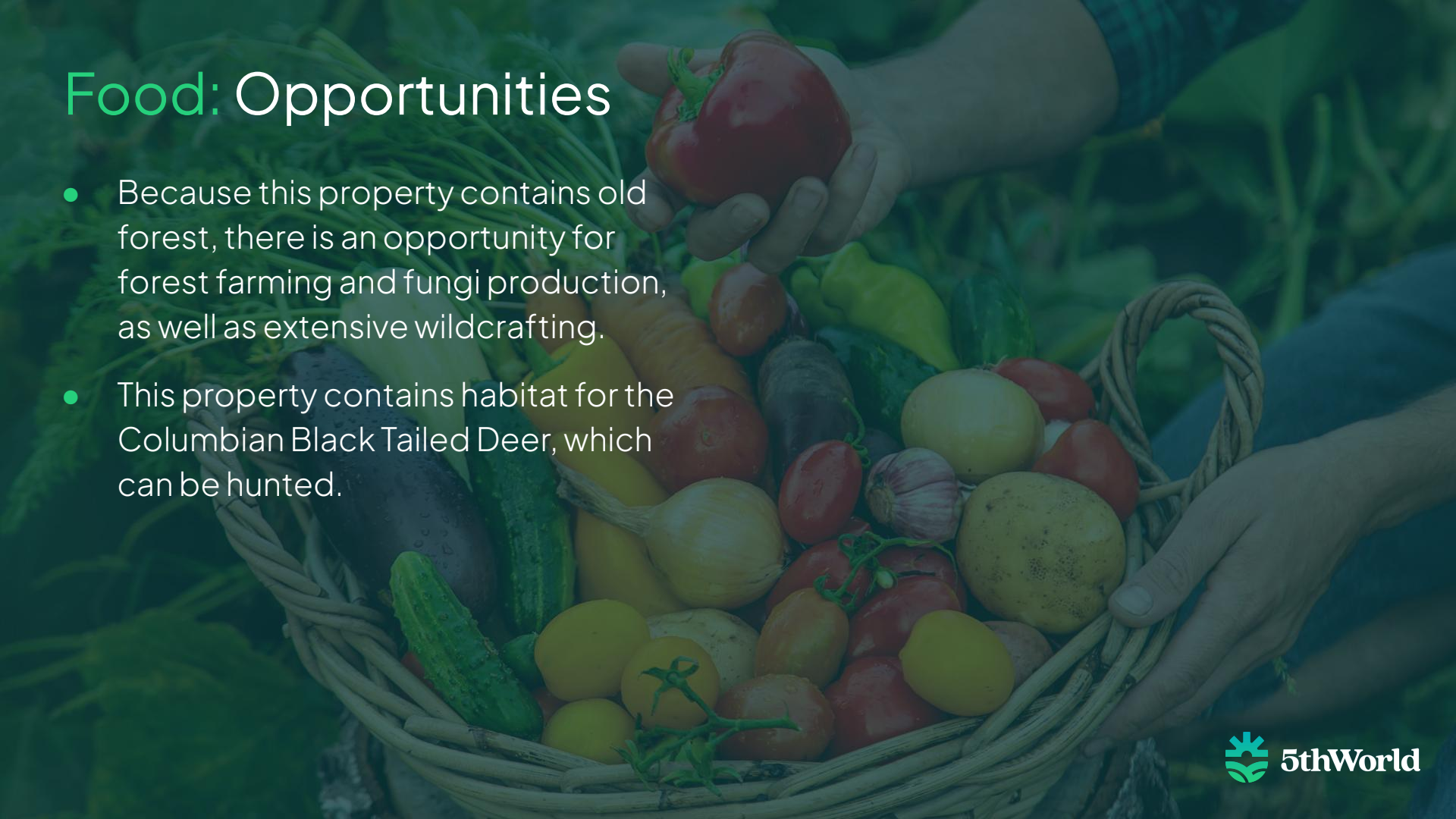
Food: Opportunities

- Because this property contains old forest, there is an opportunity for forest farming and fungi production, as well as extensive wildcrafting.
- This property contains habitat for the Columbian Black Tailed Deer, which can be hunted.



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Food: Constraints

- An important constraint for food production on this site is to do with soil available water, as the upper soil layers are gravelly and well drained. Soil water holding capacity and irrigation ability will be a main constraint.
- Another important constraint will be the soil nutrient availability. The soils on site are heavily influences and bear the characteristics of its origin, which is schist and bedrock, and high degree of tannins from the coniferous-dominated environment
- Most of the property does not have good access to sunlight (<3 hours is dominant)
- This site is within ungulate wildlife habitat, therefore appropriate wildlife fencing will be required.

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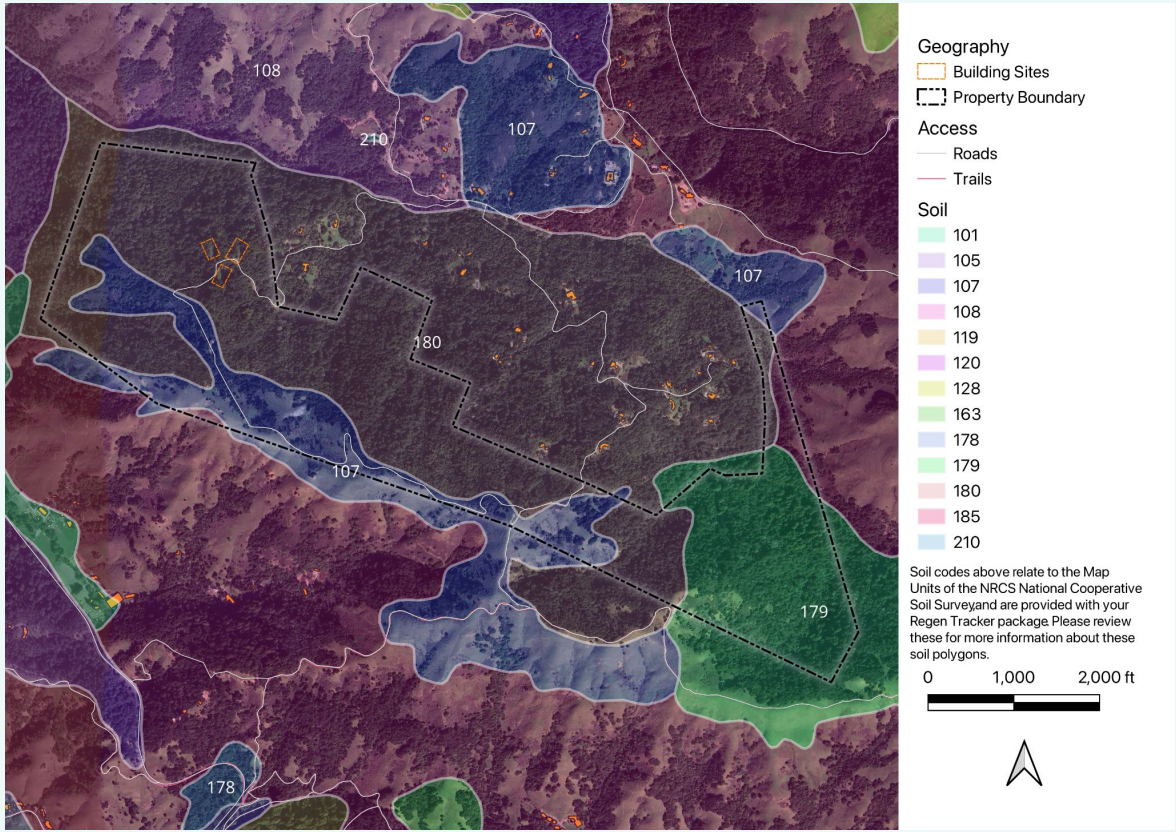
Soil

- We anticipate that the soil nutrient availability on this site is mostly in the Medium range, putting an extra emphasis to utilize holistic soil building methods, such as composting, mulching, and micro-livestock to improve soil nutrient-holding ability.
- While the soils are classified as loams, they are also gravelly with high drainage, meaning that water is not held in the soil very well.
- This map shows the dominant soil types. The majority of this site is gravelly loam. Dominant soils within the property include:
  - 107 → Bonnydoon gravelly loam
  - 179 → Tocaloma-McMullin complex, 30 to 50 percent slopes
  - 180 → Tocaloma-McMullin complex, 50 to 75 slopes



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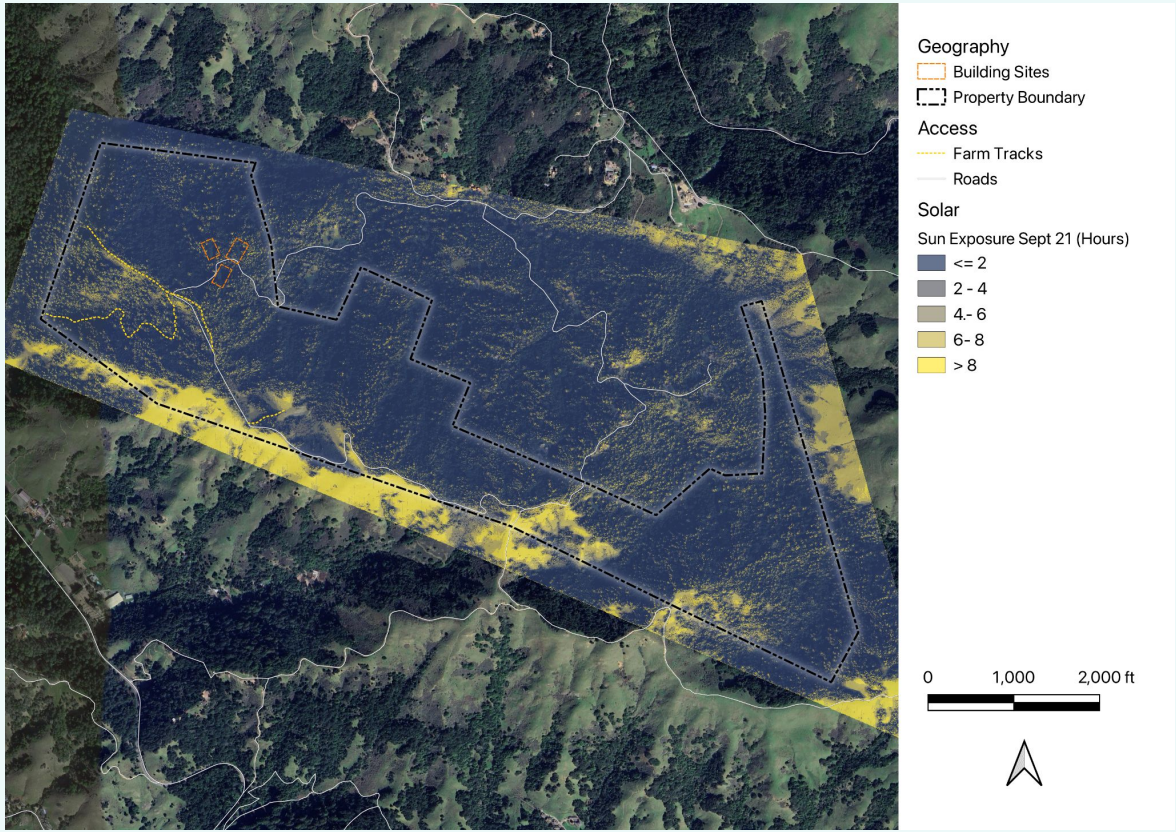
Sun Exposure

- This map shows the time the site receives direct sunlight for growing most crops. The equinox is chosen to conservatively constrain the opportune areas.
- While this site is significantly forested, there are significant areas receiving 8 or more hours of sunlight, typically along the south property border.



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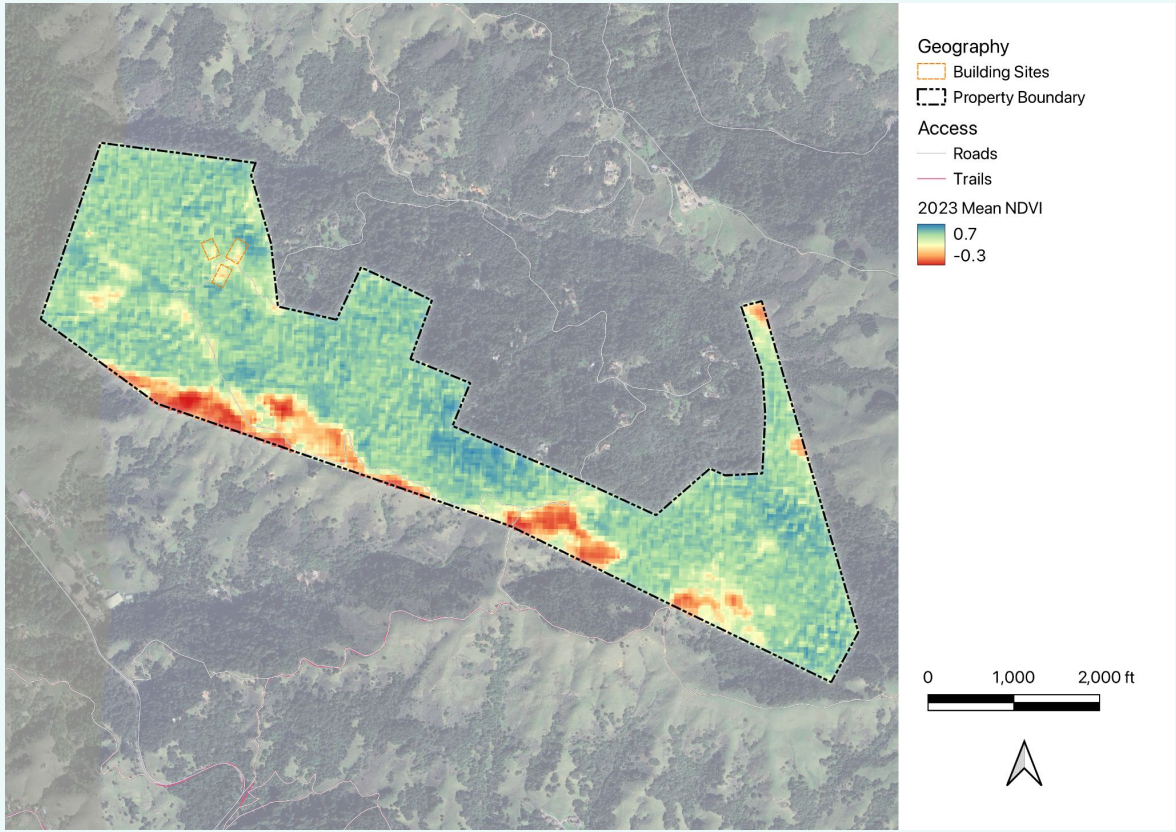
Vegetation Vigour

- The average vigour reported throughout 2023 is moderate to high. This suggests that the environmental conditions for supporting vegetative growth is are moderately good.
- However, more information needs to be collected from a site visit. Coniferous tree species have a tendency to show higher NDVI values, of which are heavily present on this site.
- The lower NDVI values on the southern grassland portion of the property likely indicate the growth pattern of the herbaceous plant species there, where their strategy is to only grow when water is available seasonally, and assume dormancy otherwise.



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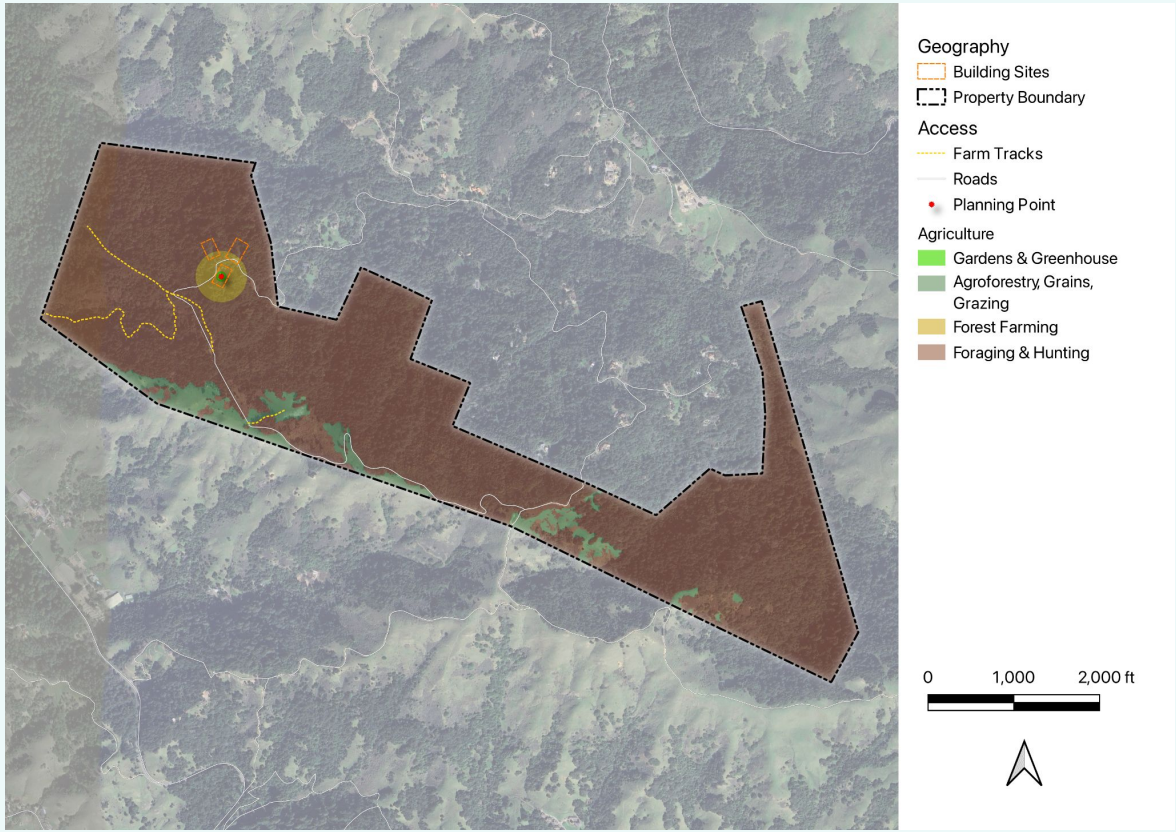
Agriculture Types

- Shown in this map are opportunities for how the land could be used to produce food.
- These designations are based on how many trips would be required from the house to reduce time and energy.
- The designations are also based on the nature of the site, how energy influences the site, and the existing vegetation and land use types on the site.
- Due to the type of vegetation, soils, sunlight availability, and scale of the site, the main opportunity for this site is foraging and hunting.



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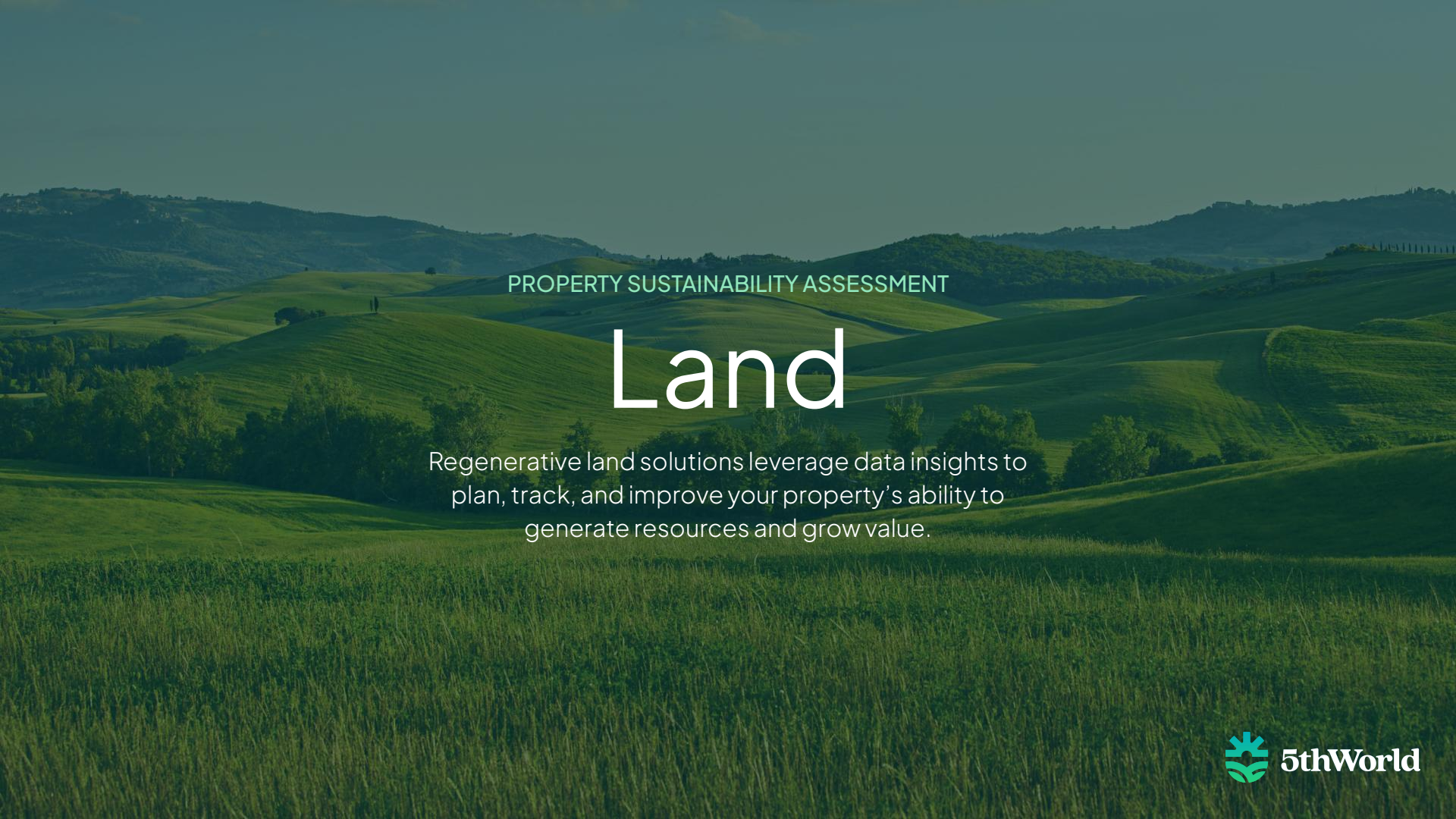

PROPERTY SUSTAINABILITY ASSESSMENT

Land

Regenerative land solutions leverage data insights to plan, track, and improve your property's ability to generate resources and grow value.

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Land: Opportunities

- This is a beautiful land!
- The land contains rich old growth forest
- There is an existing road that lies through the property, and provides two accesses

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Land: Constraints

- Wildlife fencing is going to be required to support most gardening types and plants selections from herbivory.
- Other than roadways, this property contains little in the way of existing infrastructure, however a site visit will reveal the true extent of valuable infrastructure.
- This property is located in a very fire-prone area; fire mitigation strategies will be essential.

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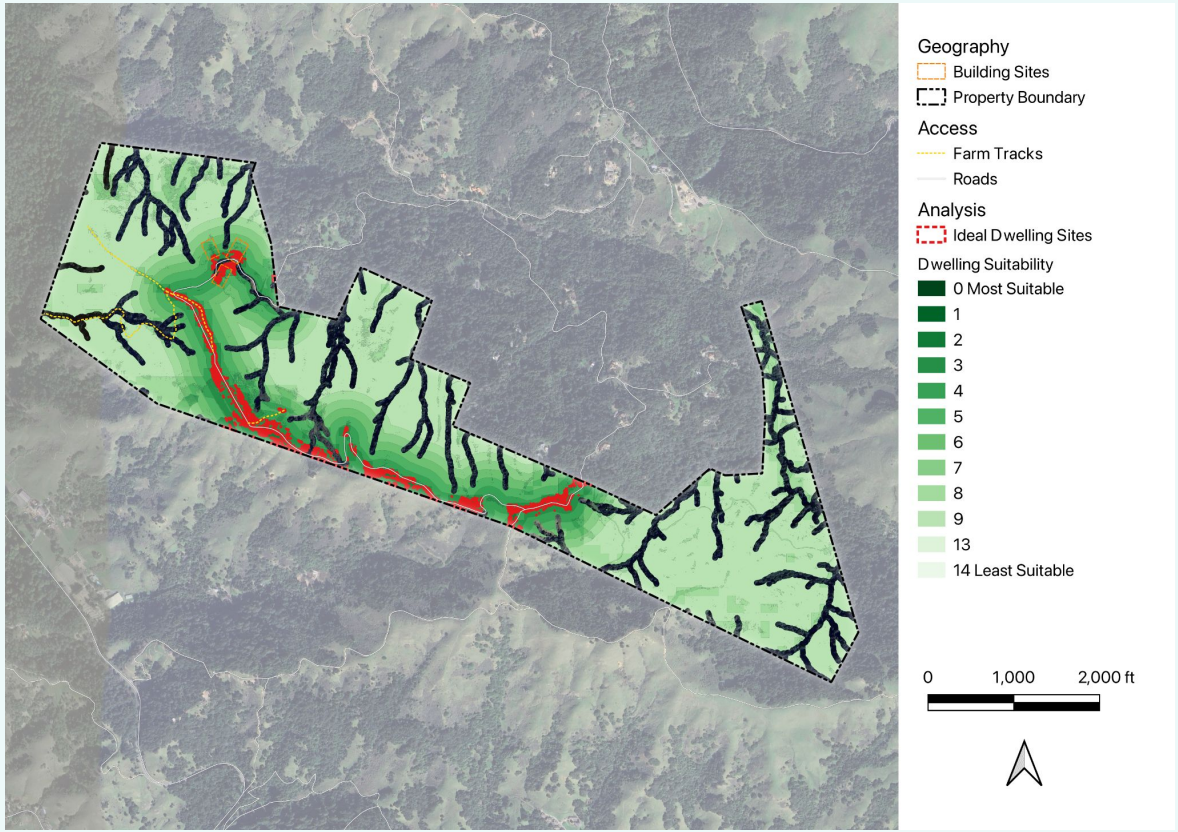
Ideal Dwelling Sites

- Based on the regulatory framework, three sites are permitted for building, labelled on the map.
- However, only one of them contains a significant amount of ideal dwelling sites (outlined in red). The permitted building site to the south is the most suitable of the three sites.
- The most ideal sites are located along mid south property edge. The fire susceptibility of the site has been the key driver for this, as these locations have the least fuel, and also contain the most gentle slopes.
- The most ideal sites along the south property edge also have the highest solar gain potential.



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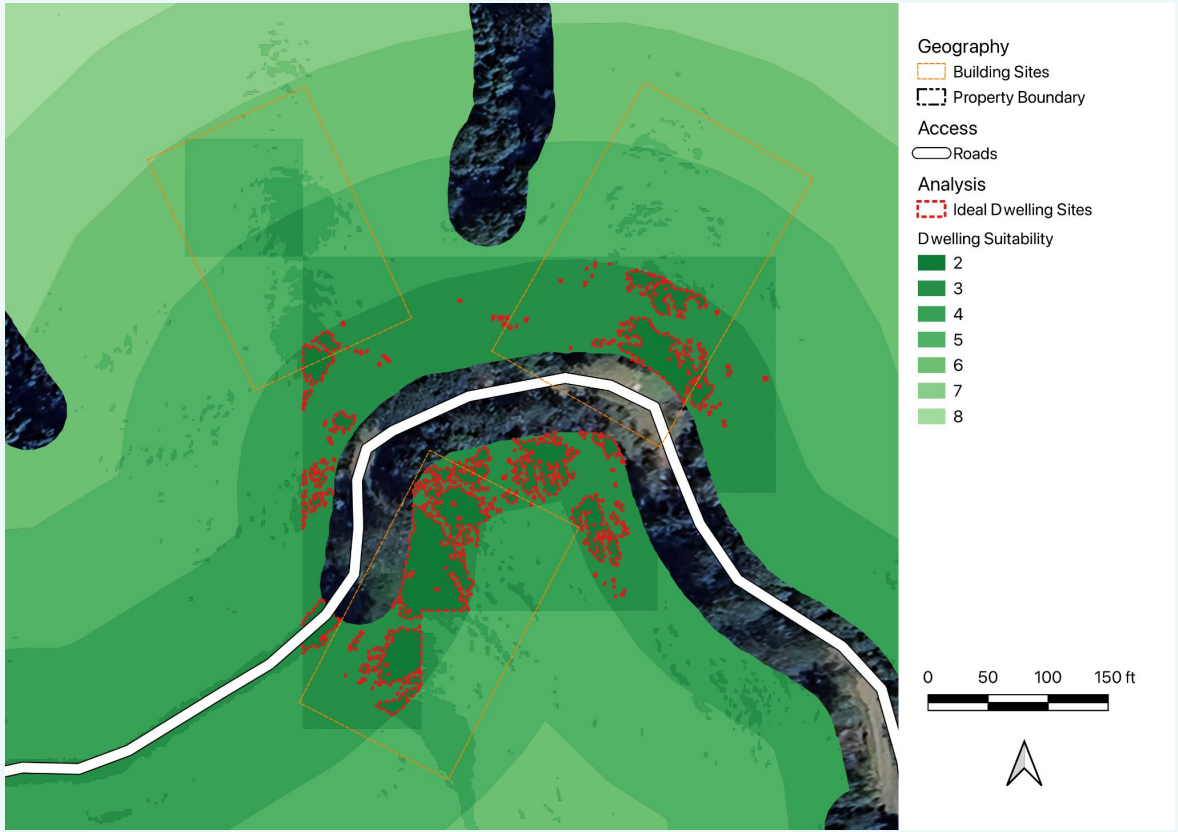
Ideal Dwelling Sites

- This map is focused on the three permitted building sites, where the south site has the highest degree of suitability for building
- Note, all three of these sites are in high fuel areas for fire; fuel reduction strategies will need to occur within at least 100' from the chosen dwelling site



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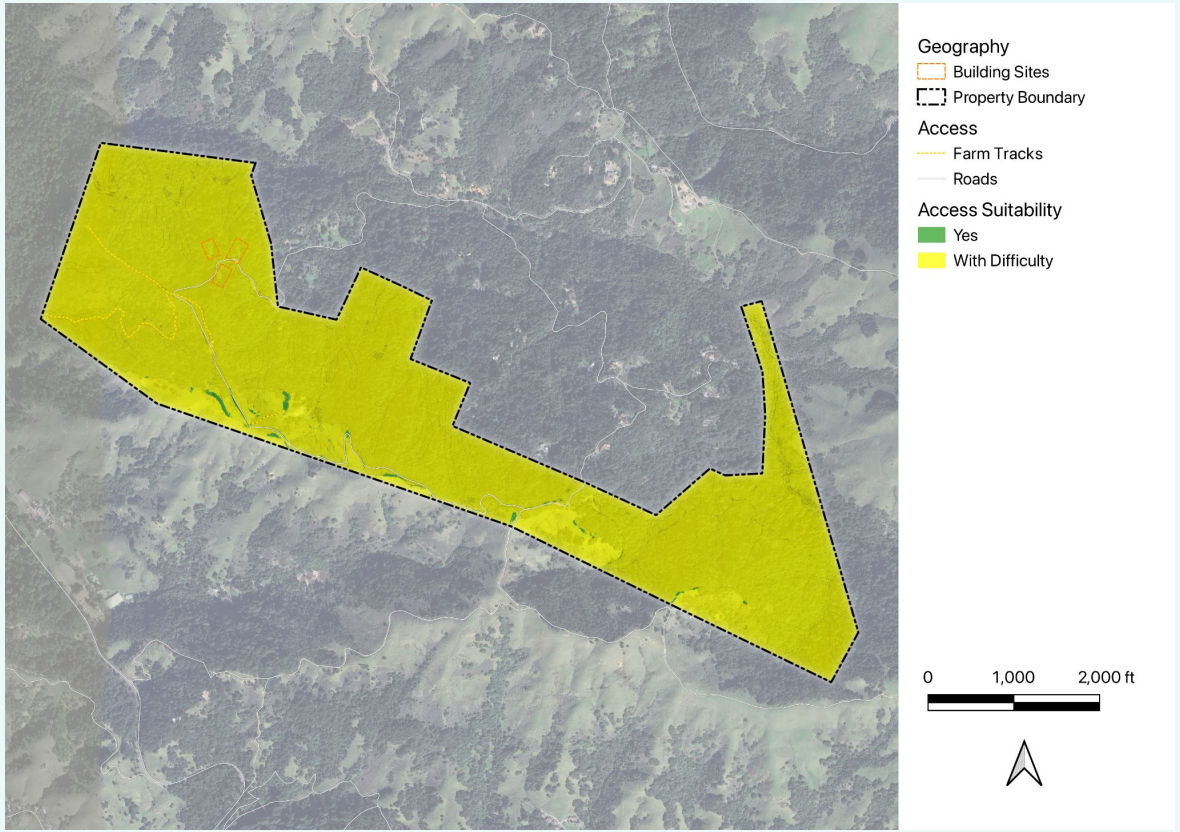
Access Suitability

- The majority of the site will allow for new access routes where needed, however there will be difficulty and extra expense needed.
- This is due to the steeper slopes throughout the property, combined with large and mature woody vegetation throughout.



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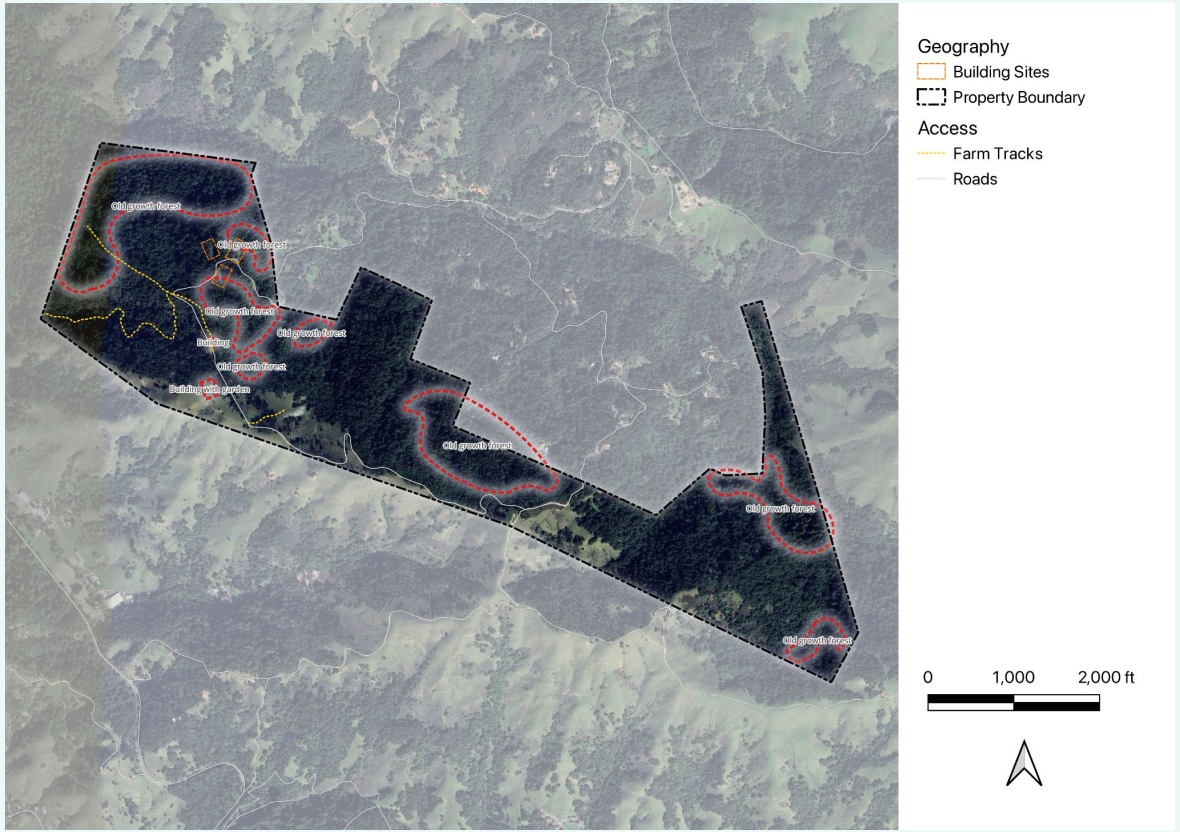
Existing Assets

- This property has a well-graded road that passes through, and provides two access points on the land
- There are two buildings on site, but condition needs to be assessed.
- There are intact old growth forests on the property.
- This site has no water wells.
- There is no existing septic system on this property.



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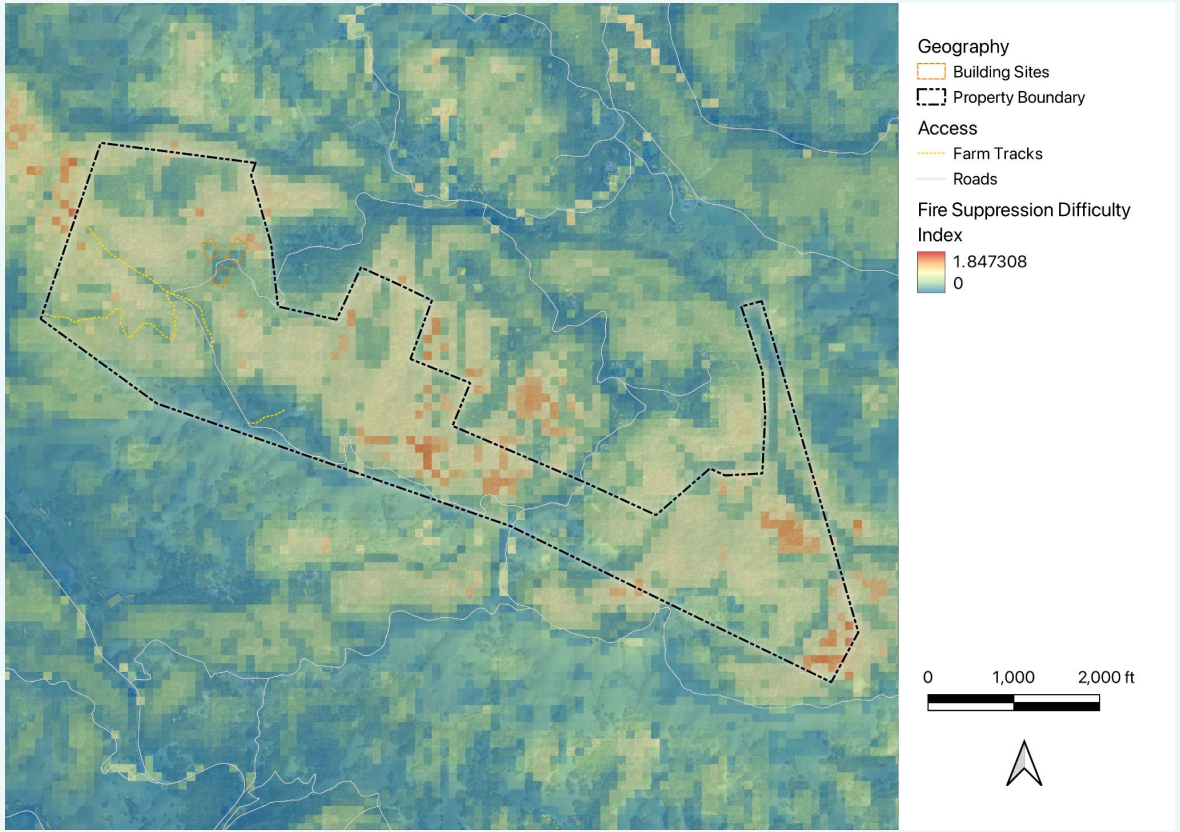
Fire

- This map shows the degree of difficulty for extinguishing a wildfire, should it occur.
- Values closer to 2 indicate high difficulty, and therefore represent areas of significant danger.
- Much of this property is moderately significant in terms of the difficulty index, which generally follows the forested parts of the property.
- The grasslands to the south are notably lower on the index.
- More information/ Source: https://vegmap.marincounty.org/pages/fuel-modelshttps://vegmap.marincounty.org/pages/fuel-models



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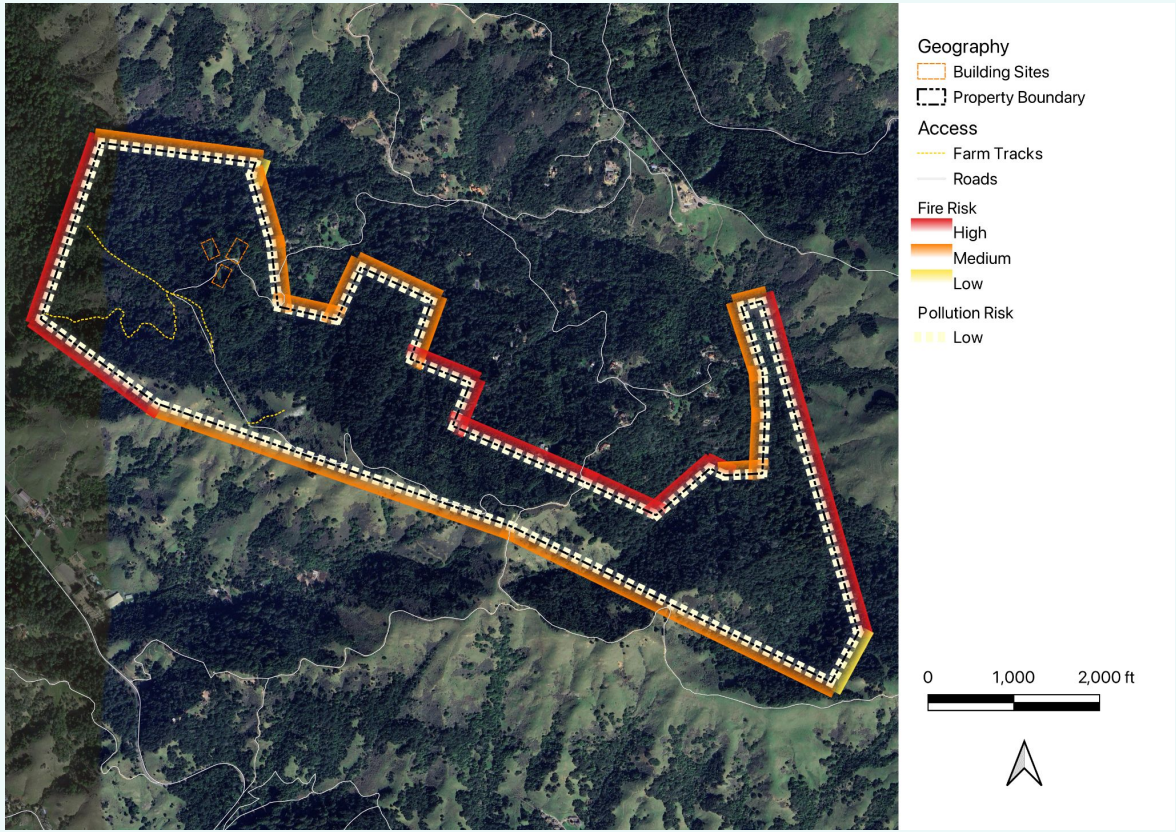
Influential/Hazardous Sectors

- There is a notable fire risk from the west and east, due to sloped coniferous forest, however the risk is lower to the south and north due the lesser amounts of fuel. However, this property lies in significant fire ecology, and is an inherent risk.
- No significant point sources of pollution have been noted.



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PROPERTY SUSTAINABILITY ASSESSMENT

Landscape Health

Strengths, weaknesses, and opportunities in the ecological potential of the land

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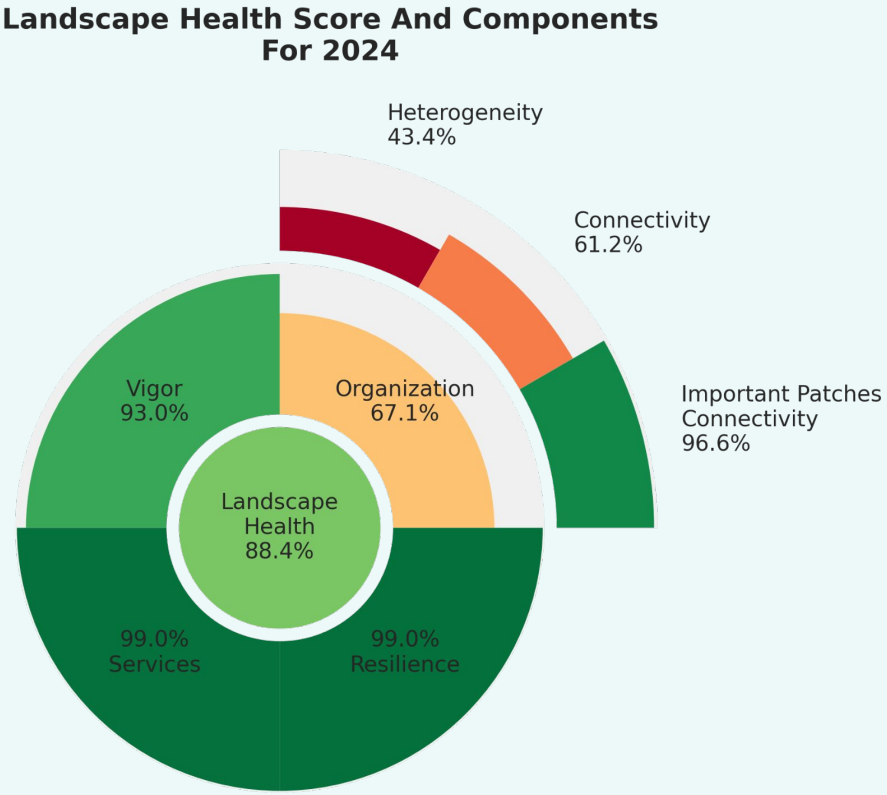
Landscape Health Scores

- Great landscape health score: 88.4% of the full potential.
- Mostly forested areas leading to high resilience and quality of provided ecosystem services (see details in later slides).
- High vigor score thanks to the very active vegetation in the forested area in all seasons (see details in later slides).
- Weaknesses lie in the organization of the landscape with low heterogeneity and connectivity overall, except for the forested areas.



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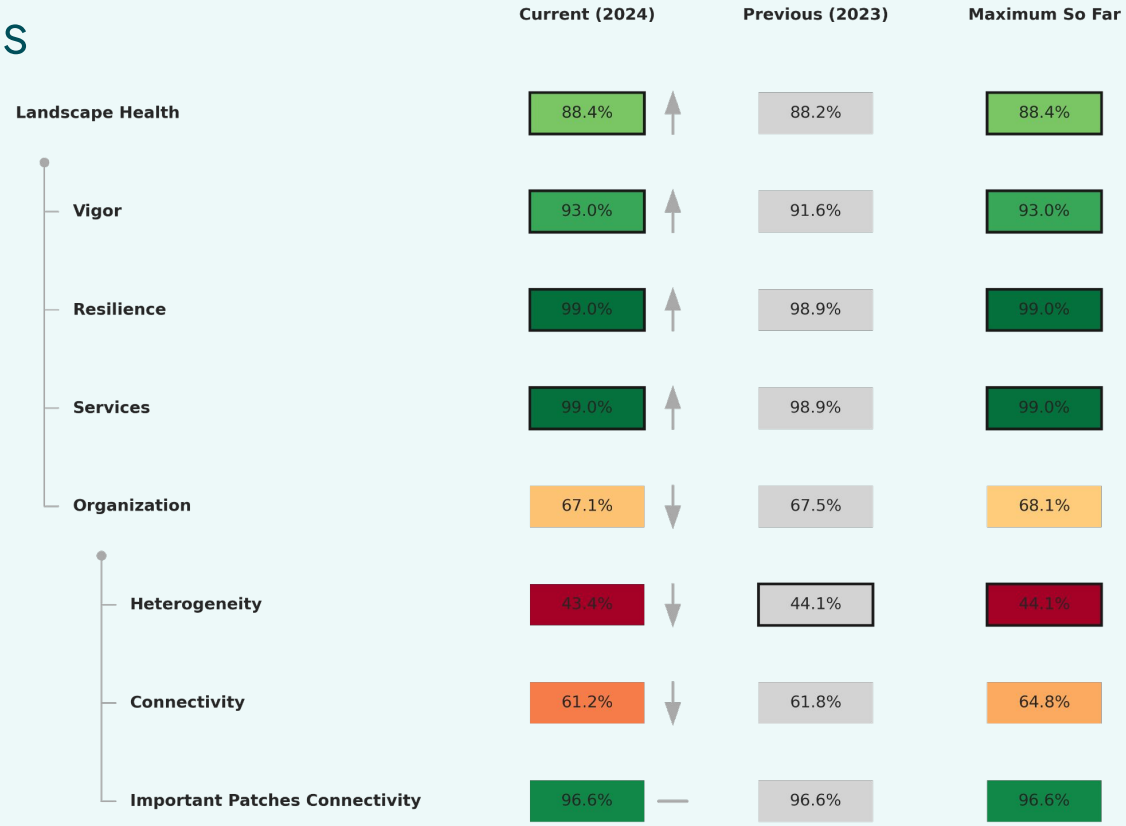
Landscape Health Scores

- Recent changes of all scores are given in comparison to last year's values and maximum values obtained since 2019.
- Scores for Vigor, Resilience and Services have all increased reaching their maximum values so far.
- Organization score has decreased, although not significantly.



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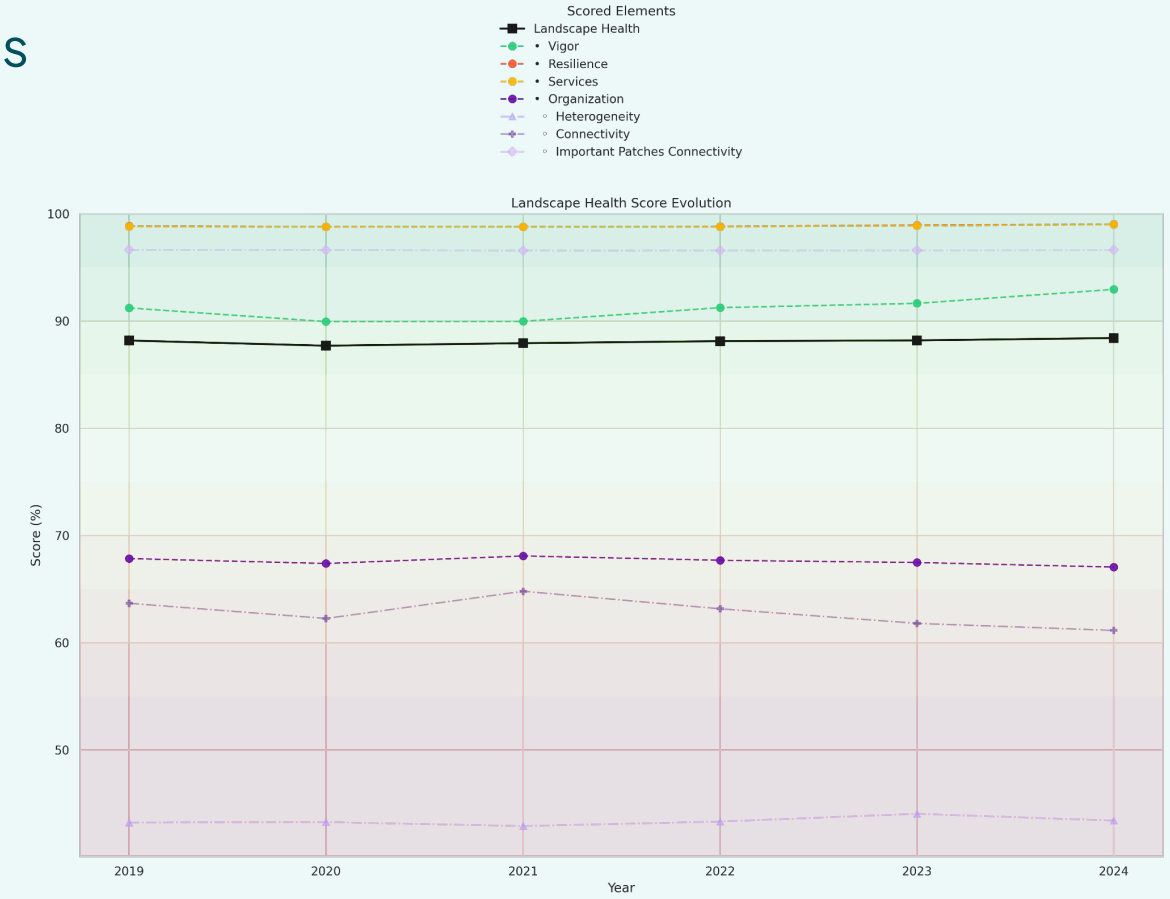
Landscape Health Scores

- Full variations from 2019 are here depicted.
- We can see the different scores lie in different ranges with a relative stability.
- Confirming the most recent changes, Vigor has the most beneficial trend lately, while Connectivity, thus Organization in a lighter way, are decreasing.



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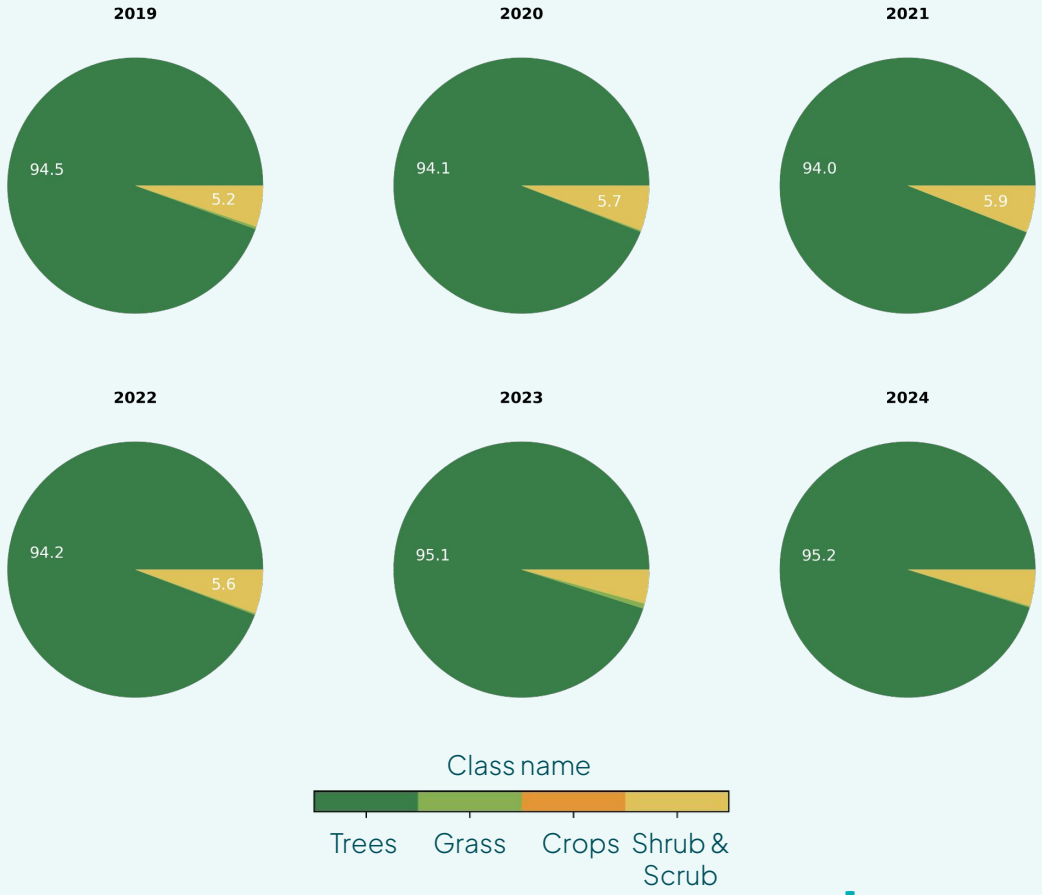
Landscape Composition

- Scores for Resilience and Services rely on the proportions of land use / cover.
- Annual maps of most representative land covers are produced from Dynamic World dataset, from which proportions are extracted.
- The site is consistently composed of ~94–95 % of forested areas and ~5–6 % of shrubs/scrubs over the years.
- Both covers have high scores, respectively 100 and 80% leading to an overall stable ~99% of corresponding scores.



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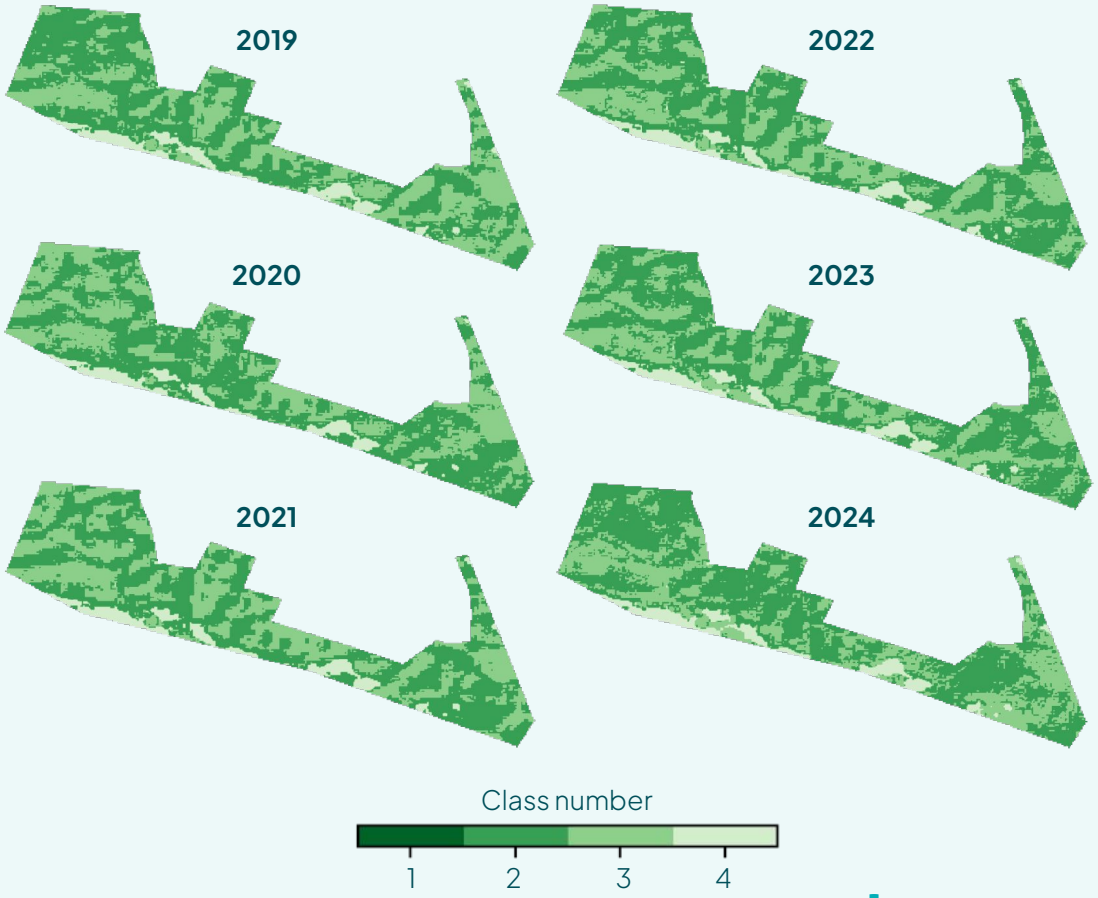
Landscape Mosaic

- Depiction of the landscape mosaic in consistent classes throughout the years associated to one of the 3 main categories: non-crop vegetation, croplands, and non-vegetated areas. Here, only the category “non-crop vegetation” is present.
- These mosaics are the basis to compute metrics that quantitatively measure the organization of the landscape, allowing us to score it and investigate changes (see next slide), even subtle ones that the human-eye can’t detect.



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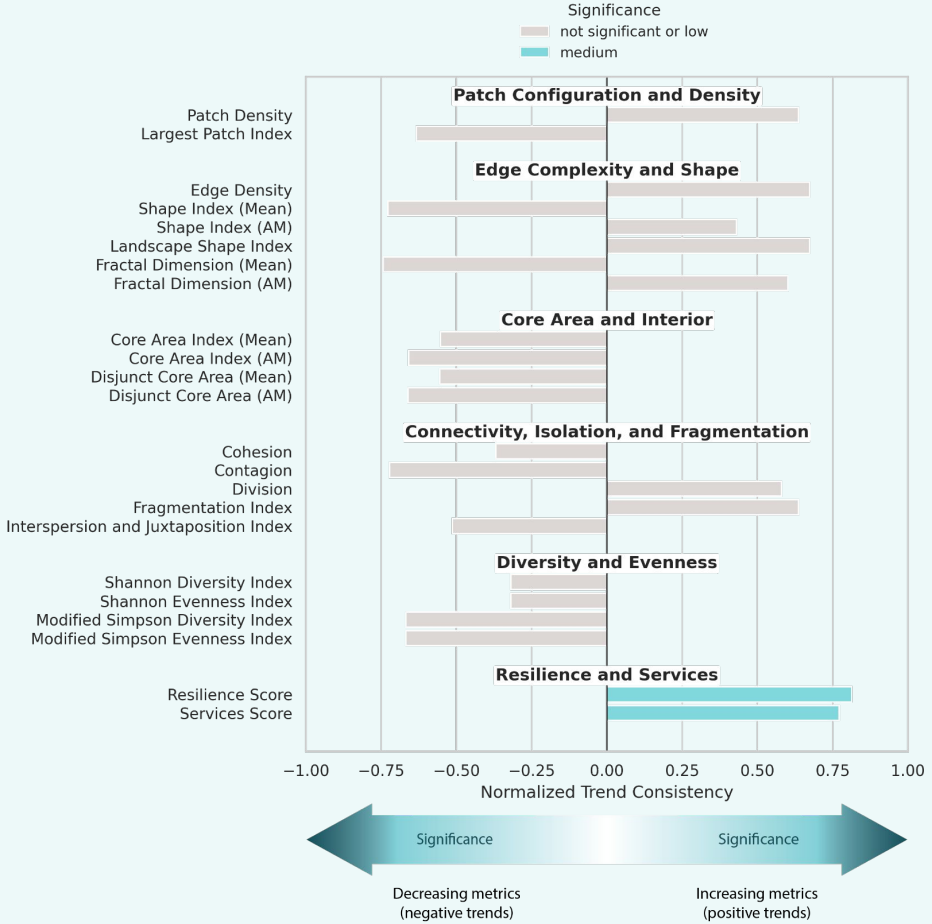
Focus on Landscape Organization

- Multiple tens of metrics are computed, many being categorized as measuring an aspect of a general property, e.g. patch shape complexity, core area, fragmentation and connection, or diversity and evenness.
- Some of these metrics are being evaluated to score the organization of the landscape, as a whole or focusing on the important patches (forested areas by default).
- Although all data are provided, the focus is here on the evolution of the most common metrics for the most interesting categories. This figure depicts the big picture trends since 2019.
- Even if all trends for organization metrics are considered having low significance here, we can notice:
    - Increasing edges at the cost of decreasing core areas (patch interiors);
    - Patch shapes tending to be a bit more complex, except for the smallest patches (affecting the “Mean”more that the “AM” = Area-weighted Mean versions of the metrics);
    - Landscape more fragmented with reduced connections;
    - Less diversity and evenness (likely a class tending to dominate more).



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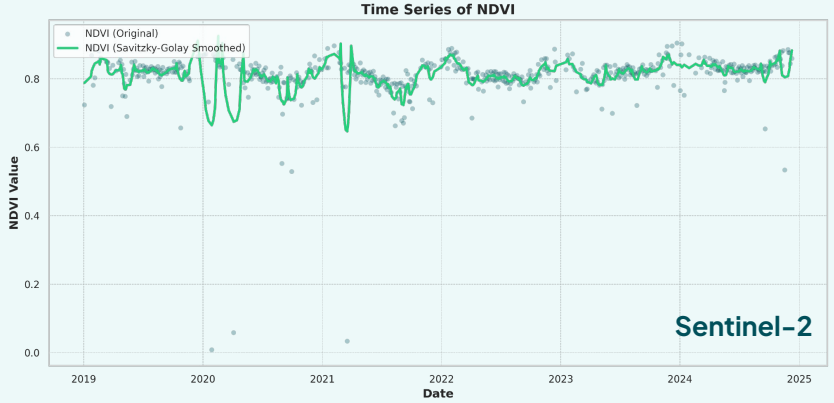
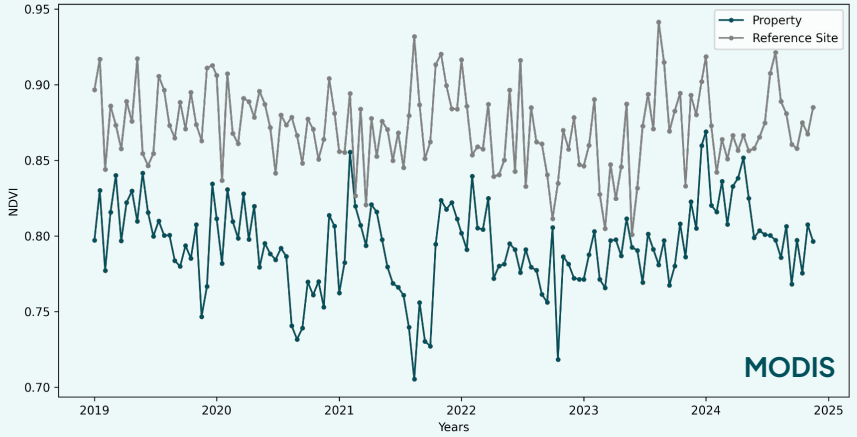
Focus on Vigor: Property Scale

- Vigor is estimated from NDVI (Normalized Difference Vegetation Index) obtained from 2 different instruments/satellites at the property scale:
    - Sentinel-2 for 10–m resolution;
    - MODIS at low resolution for reference site identification (chosen as the most vigorous site under similar conditions in a 20–km radius circle around the property) and scoring.
- Very stable high overall NDVI value of ~0.80 thanks to the fact that the property is mostly forested. Reference site a bit more vigorous with overall NDVI value of ~0.87.





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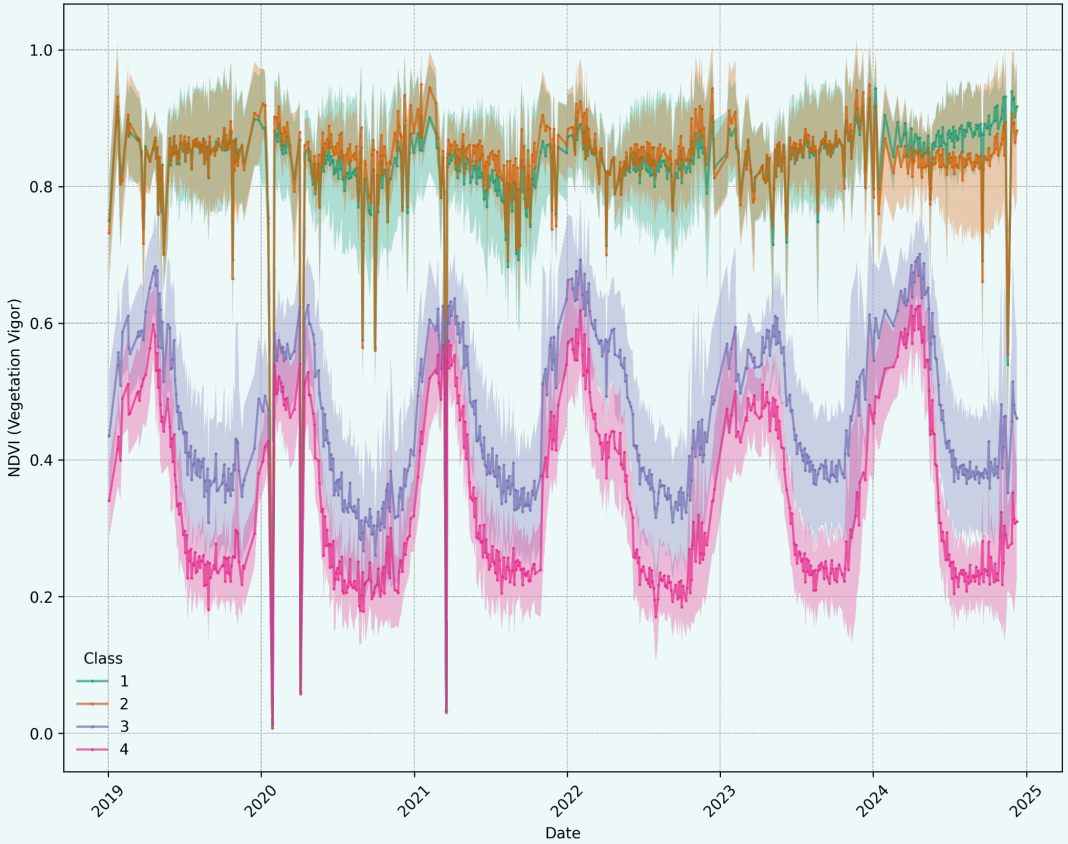
Focus on Vigor: Class Scale

- Thanks to the high-resolution data, each class evolution can be investigated independently.
- Class 1 and 2 are forested areas, displaying high stable values of NDVI, i.e., great vigor. Class 1 has been getting clearly more vigorous this year (2024) than class 2.
- Class 3 and 4 are classified as shrubs/scrubs; logically, they have lower vigors and are more sensitive to seasonal variations.



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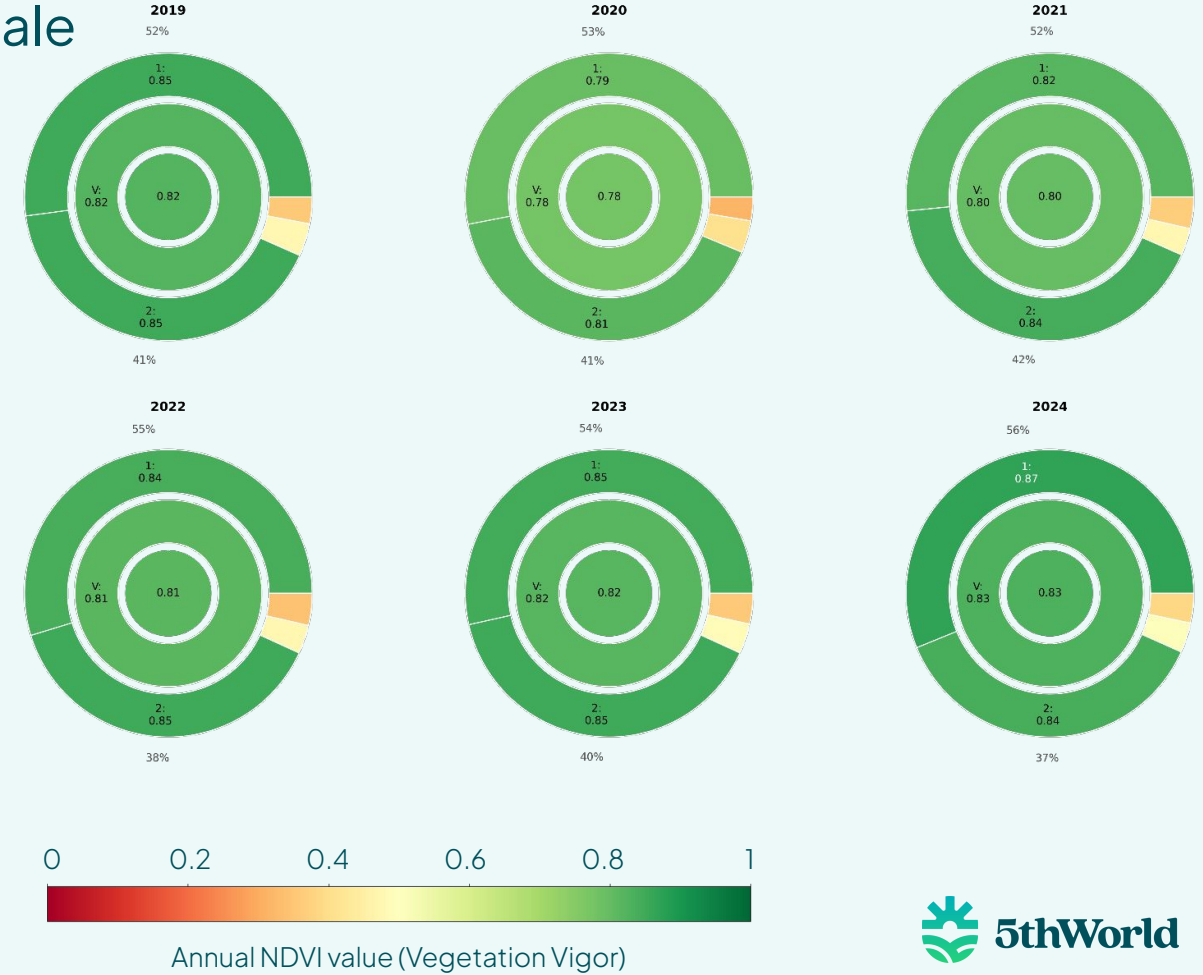
Focus on Vigor: Class Scale

- A way to visualize the evolution of the distribution and intensity of the vigor in the landscape is to depict both the proportion and annual vigor through pie charts.
- On these figures, the 3 scales are given:
  - property (central disk),
  - category (middle ring, here only one part: “V” for non-crop vegetation),
  - and class (outer ring).
- Proportions are given by the relative sizes of the parts while the colors indicate the annual vigor (NDVI) value.



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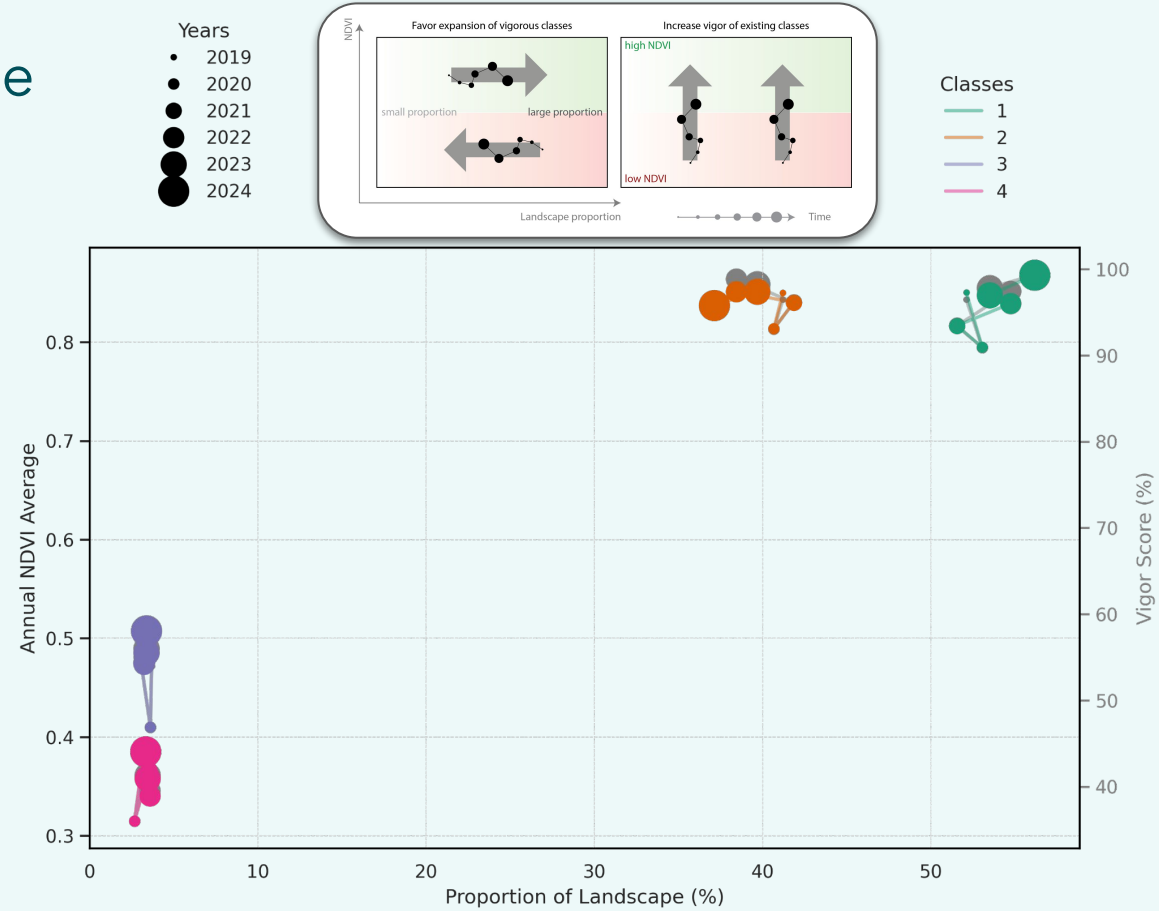
Focus on Vigor: Class Scale

- To focus on classes individually, we can check how each evolved in terms of their extent, i.e., proportion they represent, and annual vigor values.
- This figure presents these parameters, plus the associated vigor scores via grey symbols behind colored ones (visible only if pattern is different).
- The top sub-figure indicates wanted evolutionary paths: higher vigor, or higher proportions for the most vigorous classes.
- What is observed here:
  - Among forested classes, class 1 is increasing both in vigor and proportion, while class 2 is shrinking.
  - Class 3 and 4 are stable in their extent but have tend to be more vigorous.



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PROPERTY SUSTAINABILITY ASSESSMENT

Climate

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Wind

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Thank You
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