Standing at almost 84 meters tall,

this is the largest known living tree on the planet.

Nicknamed General Sherman,

this giant sequoia has **sequester**ed roughly 1,400 tons of ………. carbon

over its estimated 2,500 years on earth.

Very few trees can compete with this carbon **impact**,

but today, humanity produces more than 1,400 tons of carbon every minute.

To combat climate change,

we need to **steep**ly ………. fossil fuel emissions,

and draw down excess CO2 to **restore** our atmosphere’s balance

of greenhouse gases.

But what can trees do to help in this fight?

And how do they sequester carbon in the first place?

Like all plants, trees consume atmospheric carbon

through a ………. reaction called photosynthesis.

This process uses energy from sunlight

to **convert** water and carbon dioxide into oxygen

and energy-storing carbohydrates.

Plants then consume these carbohydrates in a reverse process

called respiration, converting them to energy

and releasing carbon back into the atmosphere.

In trees, however, a large ………. of that carbon isn’t released,

and instead, is stored as newly formed wood tissue.

During their lifetimes, trees act as carbon **vault**s,

and they continue to draw down carbon for as long as they grow.

However, when a tree dies and **decay**s,

some of its carbon will be released back into the air.

A ……… amount of CO2 is stored in the soil,

where it can remain for thousands of years.

But eventually, that carbon also **seep**s back into the atmosphere.

So if trees are going to help fight a ………. problem

like climate change,

they need to survive to sequester their carbon

for the longest ………. possible, while also reproducing quickly.

Is there one type of tree we could plant that meets these **criteria**?

Some fast growing, long-lived, super sequestering species

we could **scatter** worldwide?

Not that we know of.

But even if such a tree existed,

it wouldn’t be a good long-term ……….

Forests are complex networks of living organisms,

and there’s no one species that can **thrive** in every ecosystem.

The most **sustainable** trees to plant are always ……… ones;

species that already play a role in their local environment.

Preliminary research shows that ecosystems

with a naturally occurring ………. of trees have less competition

for resources and better resist climate change.

This means we can’t just plant trees to draw down carbon;

we need to restore **deplete**d ecosystems.

There are ………. regions that have been clear cut

or developed that are **ripe** for restoring.

In 2019, a study led by Zurich’s Crowtherlab

analyzed satellite imagery of the world’s existing tree cover.

By combining it with climate and soil data

and excluding areas necessary for human use,

they determined Earth could ………

nearly one billion hectares of additional forest.

That’s **roughly** 1.2 trillion trees.

This **stagger**ing number surprised the scientific community,

**prompting** additional research.

Scientists now cite a more **conservative** but still remarkable figure.

By their **revise**d estimates, these ……… ecosystems

could capture anywhere from 100 to 200 billion tons of carbon,

accounting for over one-sixth of humanity’s carbon emissions.

More than half of the potential forest **canopy**

for new restoration efforts can be found in just six countries.

And the study can also …….. **insight** into existing restoration projects,

like The Bonn Challenge,

which aims to restore 350 million hectares of forest by 2030.

But this is where it gets **complicated**.

Ecosystems are incredibly complex,

and it’s unclear whether they’re best restored by ……… **intervention**.

It’s possible the right thing to do for certain areas

is to simply leave them alone.

Additionally, some researchers worry that restoring forests

on this scale may have **unintended** ……….,

like producing natural bio-chemicals

at a pace that could actually **accelerate** climate change.

And even if we succeed in restoring these areas,

future generations would need to protect them

from the natural and economic forces that ……….. depleted them.

Taken together, these challenges have damaged confidence

in restoration projects worldwide.

And the complexity of rebuilding ecosystems

…………….. how important it is to protect our existing forests.

But hopefully, restoring some of these depleted regions

will give us the data and **conviction** necessary to combat climate change

on a larger scale.

If we get it right, maybe these modern trees will have time to grow

into carbon carrying **titan**s.