Hot Topics in the Sky Islands:

Tree-rings and Forest Fires

In this introduction to trees and forests, National Forest visitors will examine “cookies” collected from trees after a wildfire. Tree cookies with fire scars demonstrate tree adaptations to fire. Using images of fire scarred trees, students will use several types of evidence derived from tree-ring analysis to determine the date of a forest fire and map its impact in the forest.

Original exercise developed by:

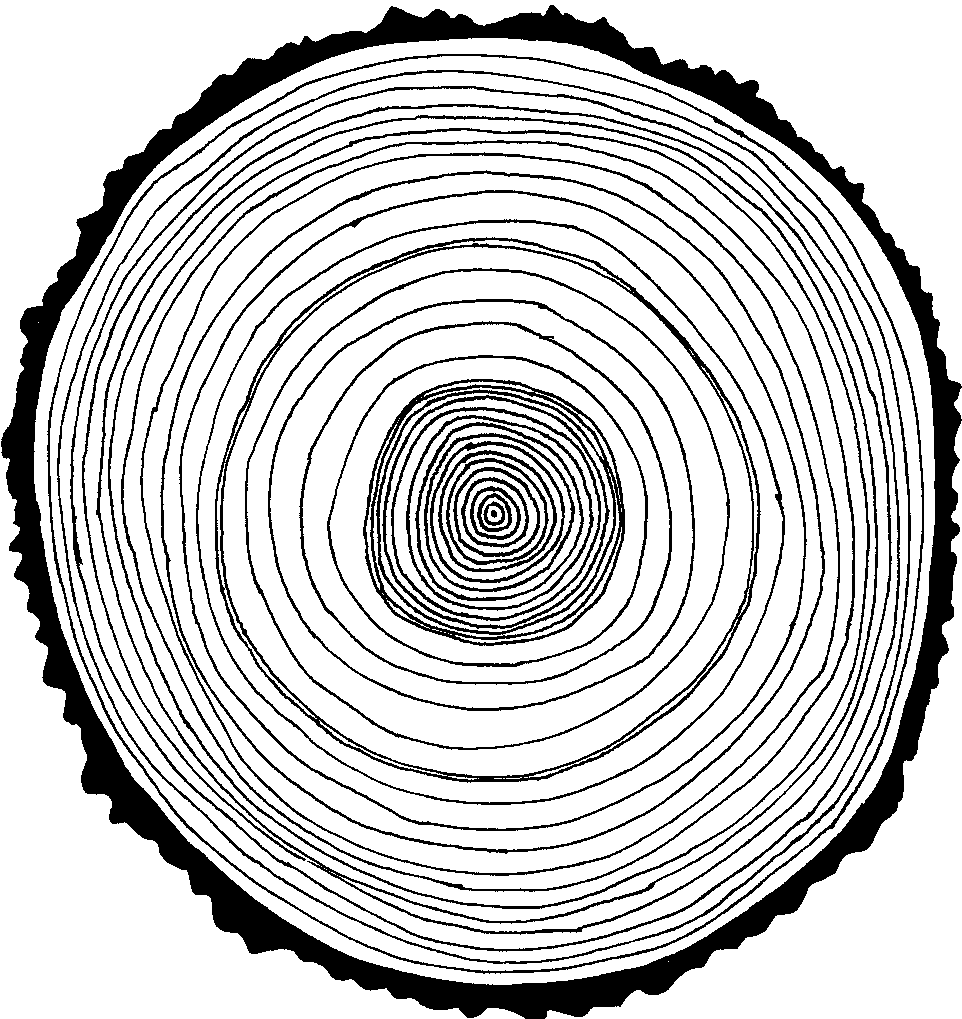
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Consider the picture of this tree cookie. Its growth shows some unusual patterns in the tree rings.

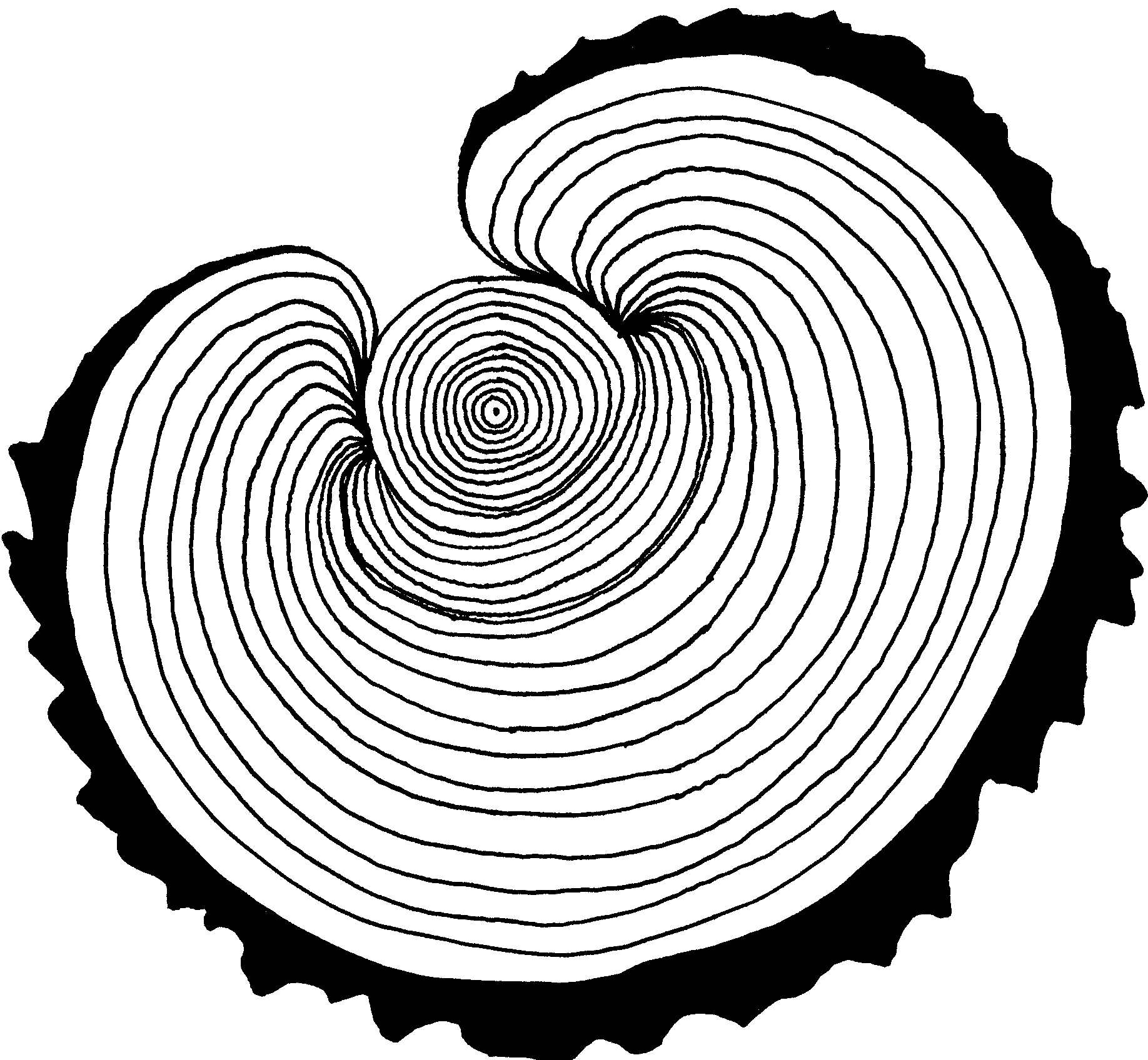


*Can you see trends in the ring patterns?*

You can trace the life of the tree by examining the rings from the *pith toward the bark*. Look for times when the tree rings were relatively narrow or wide.

* The transition from narrow to wide rings is called a ***release***. A release **has at least five wide rings following more than five narrow rings**. Releases occur when resources suddenly become available to trees (e.g. adding fertilizer, watering or rain during long droughts).
* The transition from wide to narrow rings is called a ***suppression***. A suppression **has at least five narrow rings following more than five wide rings**. Suppressions are caused when resources are not available for trees (for example drought or competition when trees grow very close to each other).

What about this tree cookie. Its growth shows some even more unusual patterns in the tree rings.

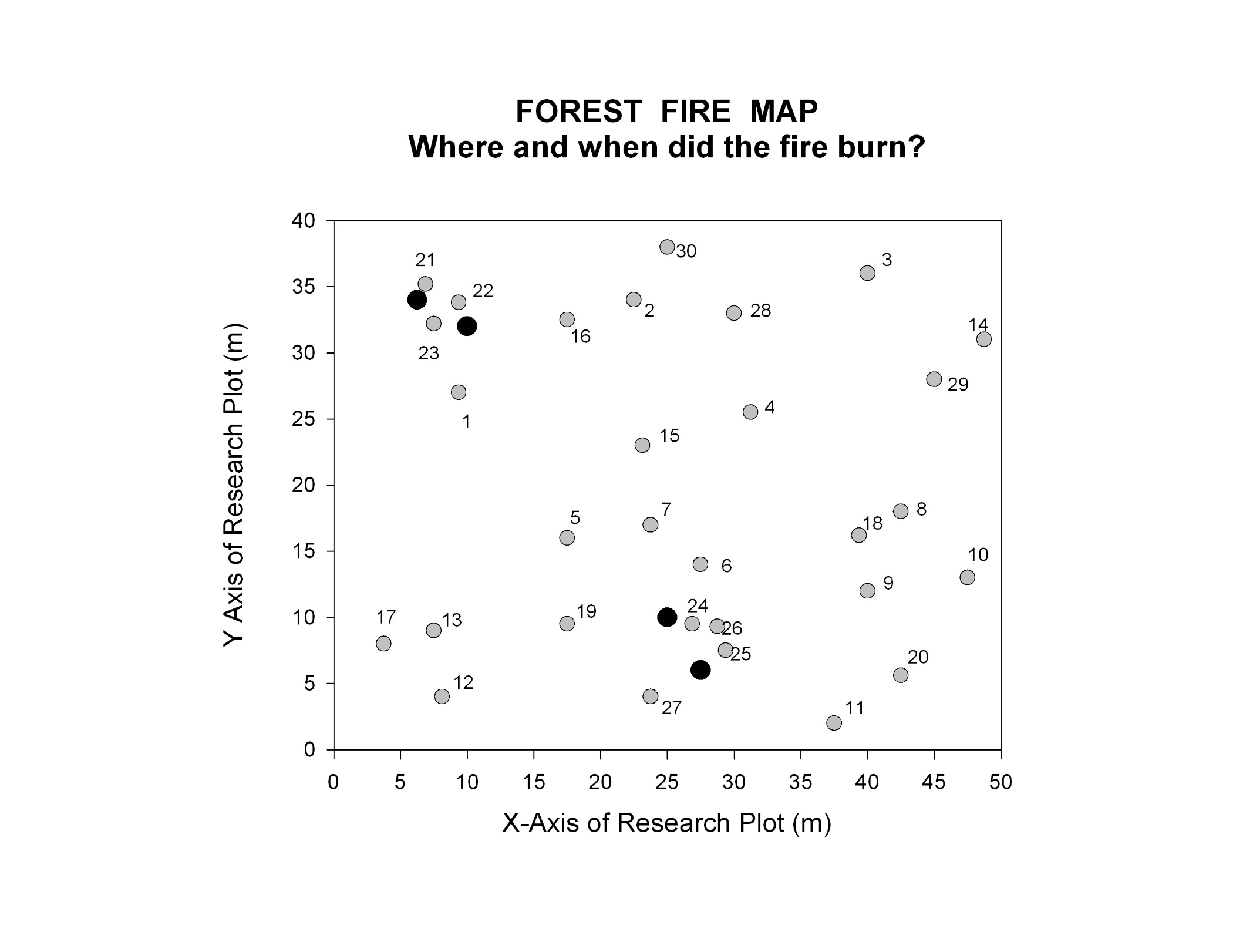


*Can you see anomalies in the tree rings? What might have caused this scar?*

* Scars are caused by fires, animals, insects, people, and trees that fall and strike a neighboring tree.
* assume the ring next to the bark was formed in the year 1999:
* what is the last year in which the tree has a complete ring?
* what year does the tree’s growth become disrupted?
* what year was the tree damaged?

Fire History Study

**Part 1. Tree Rings**



Use your new skills as a dendrochronologist to determine the history of the patch of forest shown on this map. In this forest, there are some dead trees, some trees with charcoal on them and some trees with weird “cat-face” scars at the base of the stem. What do you think might have happened here? *Fire*

Our goal in this exercise is to determine *when* and *where* the fire burned. What kind of clues can we look for? In other words, how does a forest fire impact the trees?

During a fire, some trees will die (negative effect). But many trees survive and actually benefit after the fire (positive effect). With some trees removed there is more space for the trees to grow and they may grow quickly. Often the ash from the fire adds nutrients to the soil, providing more essential minerals to the trees. With more space and more nutrients, new trees establish.

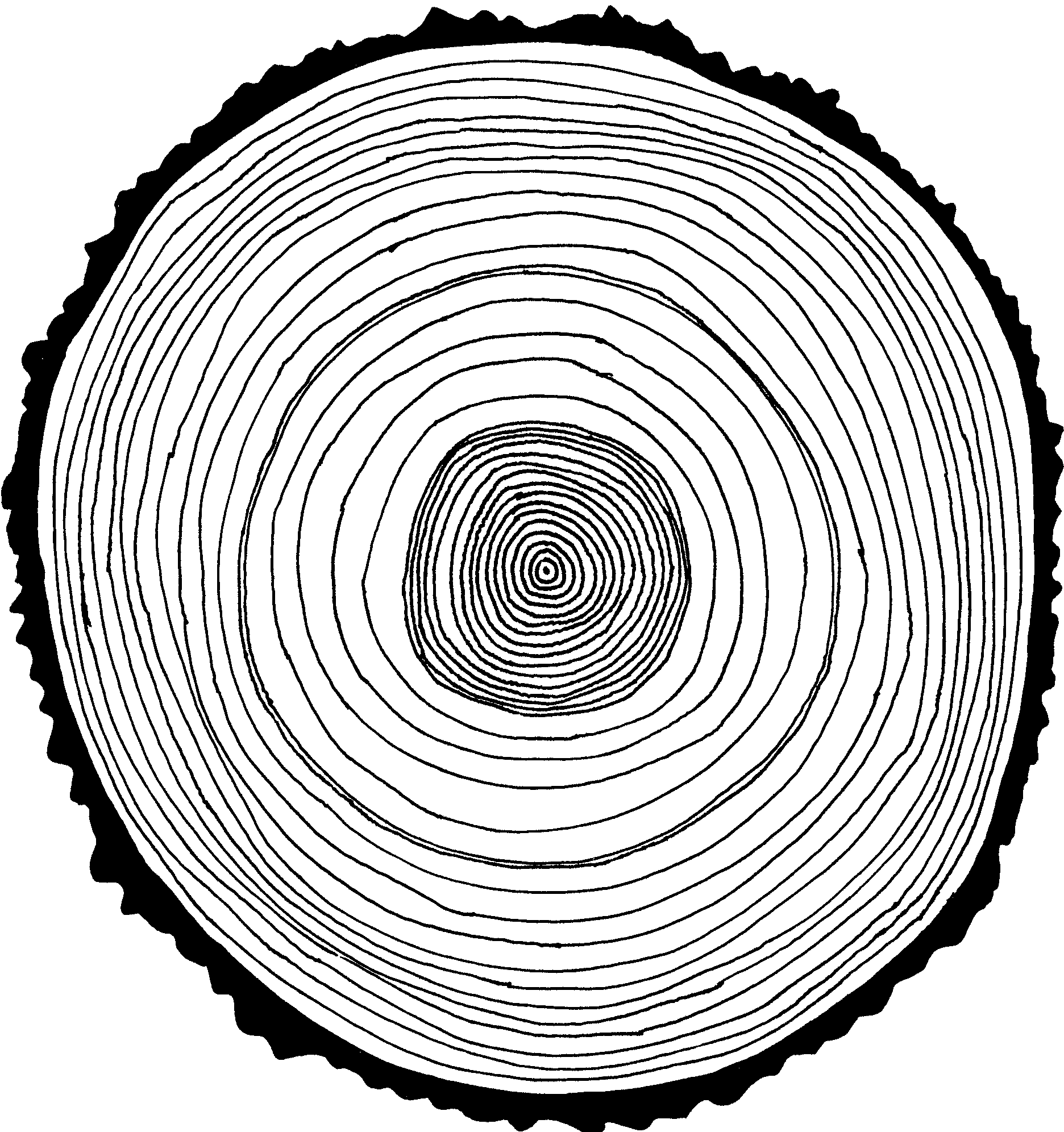
We can use dendrochronology to study the tree rings and look for clues of the fire. Some trees that survive the fire will have a scar – we will know the year of the fire if we can determine the year of the scar. Some new trees will begin to grow – we can determine when the fire burned from their age. Other trees survived the forest fire, do not have a scar, but they do release or grow quickly after the fire – using the extra resources not used by the trees that died. If we determine the year that they release, we have more evidence of when the fire burned. Finally, if we consider where the trees are located in the forest, we can figure out where the forest fire burned - what part of the forest burned and what part did not.

**Part 2. The Forest Fire Map**

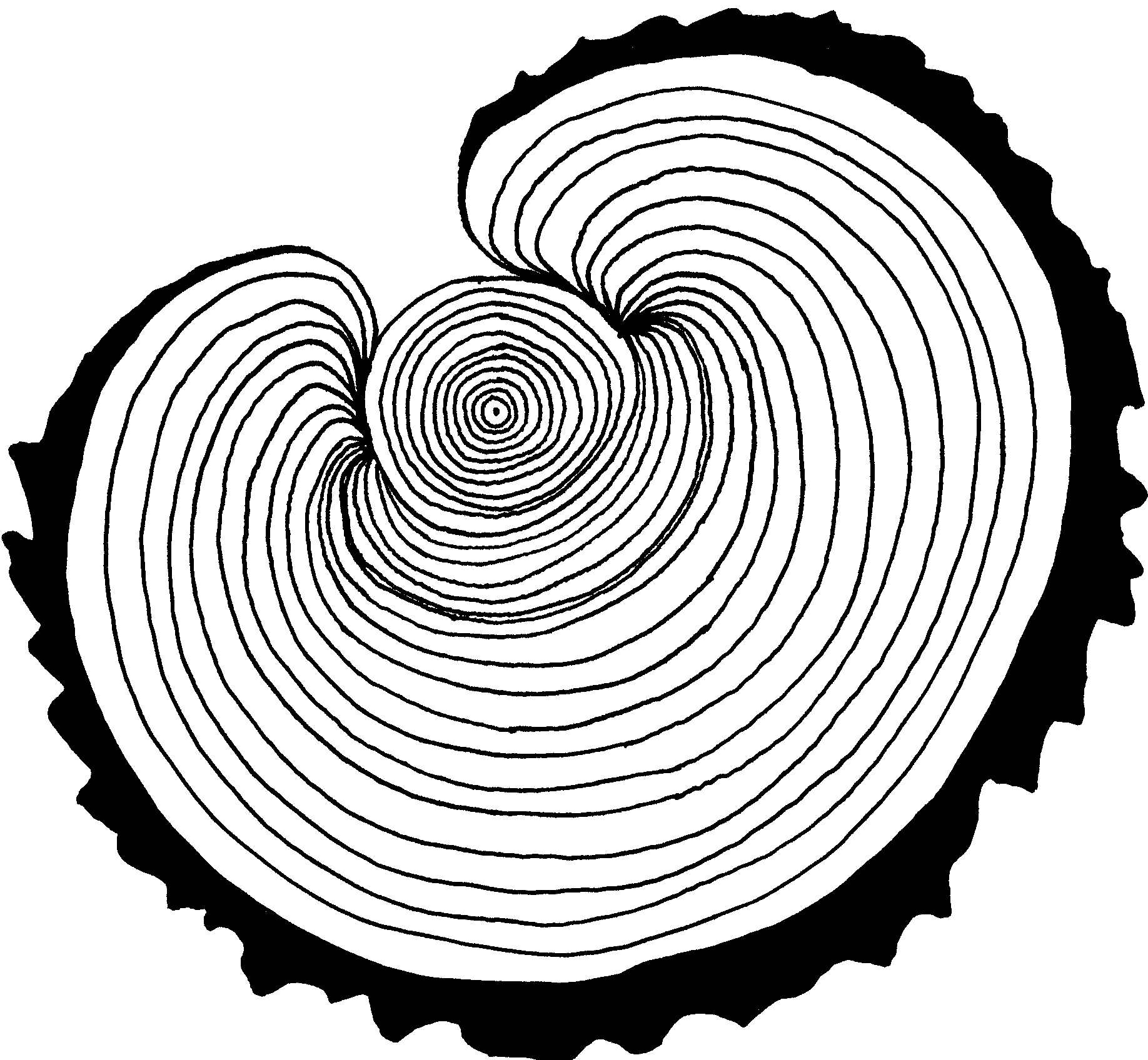
The map shows the location of 30 trees that were sampled in September of 2001. Each of you has a picture of a tree cookie from one of the trees. The tree rings of this cookie have been enlarged to make it easier to study the rings. Study your cookie to determine its *age* and to find *marker rings*, *fire scars*, or *releases*. Then we will add your data to our map and see if the clues tell us when and where the forest fire occurred.

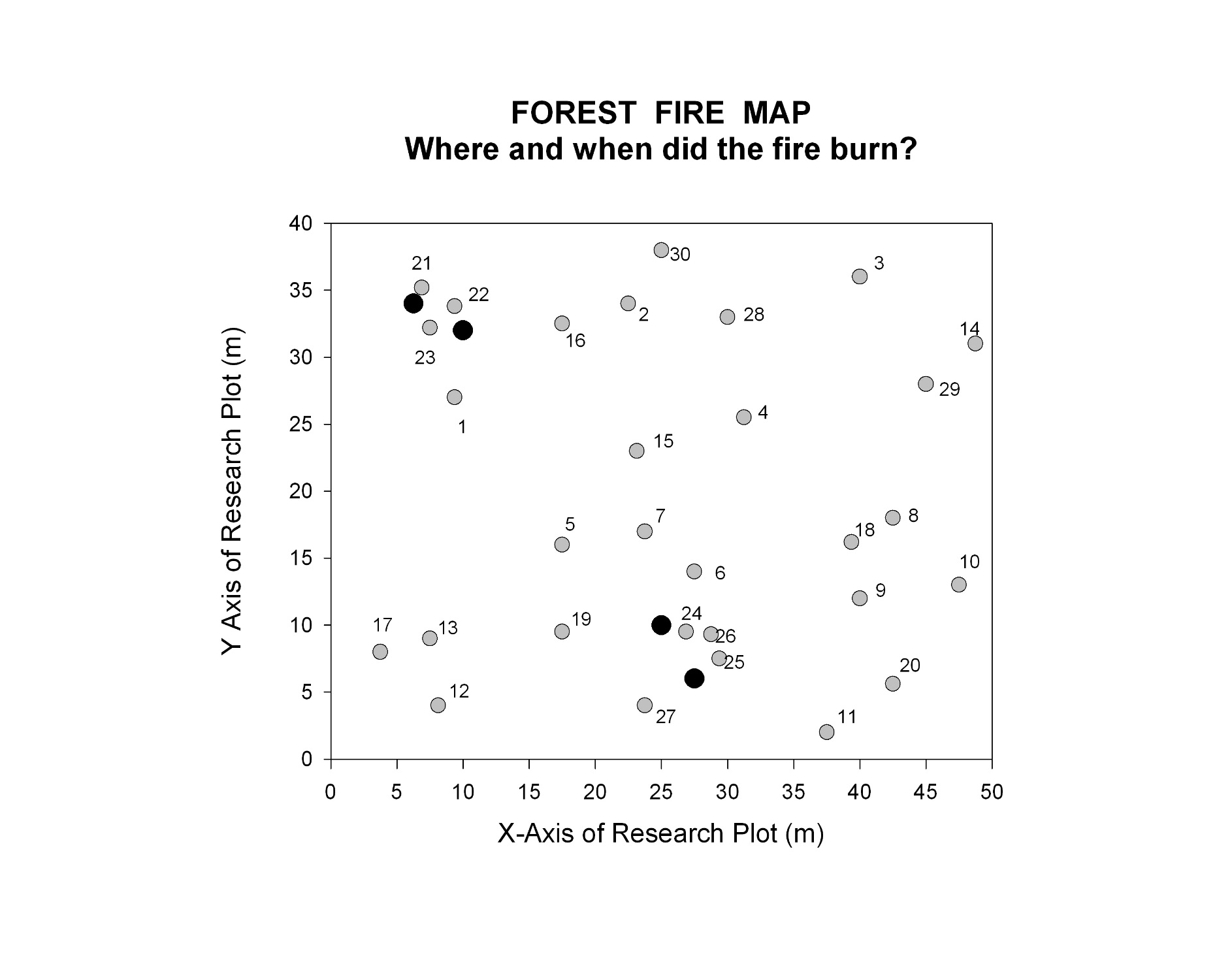
**III. HANDOUTS FOR GROUP Exercises**

GROWTH RELEASE

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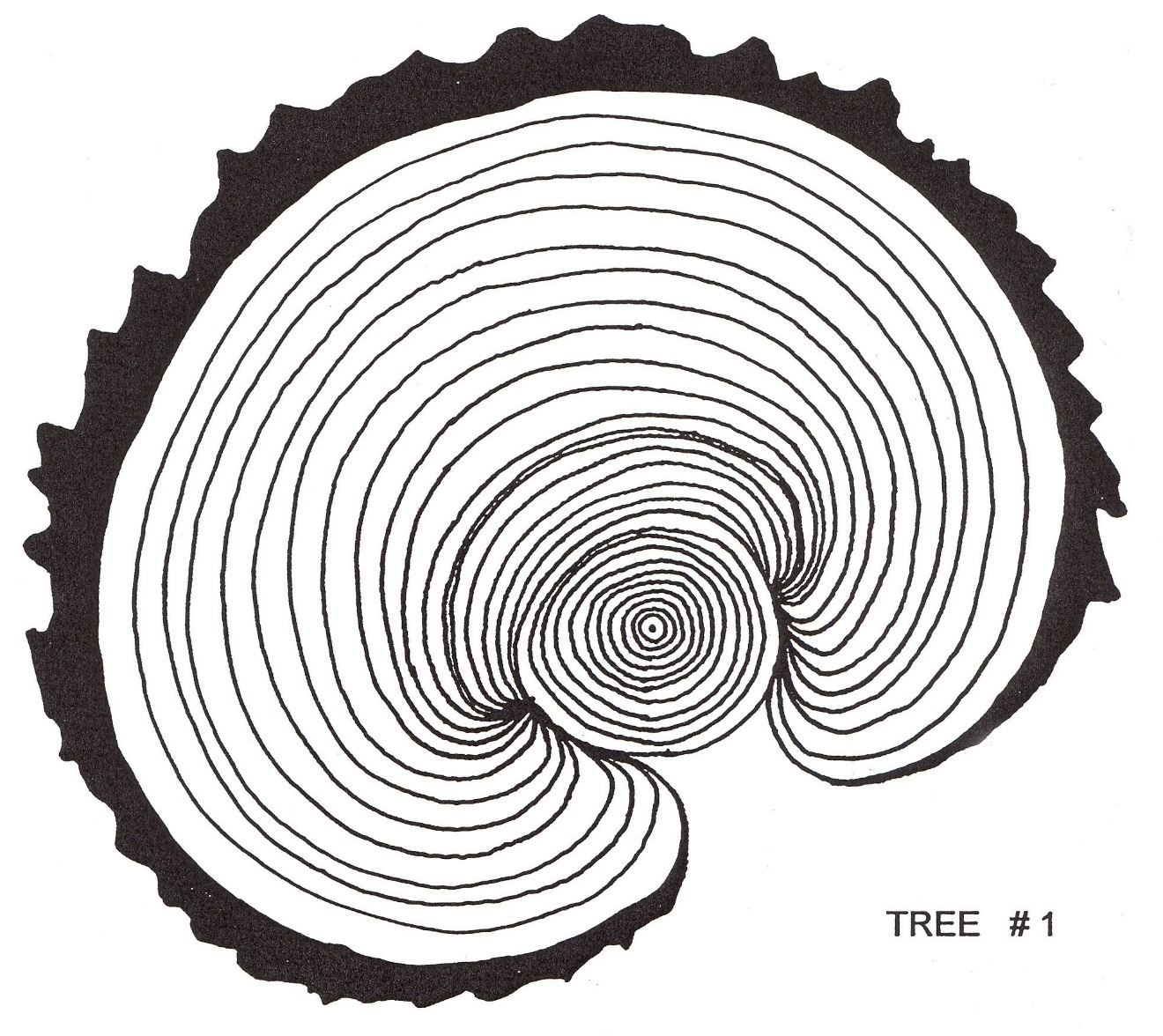
FIRE SCAR

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Note: Black dots mark the location of dead trees and

grey dots are living trees.



1. If the outer-most ring grew in 2001, what is the year of the first ring, the ring closest to the “pith” or center of the tree?

2. How old is your tree?

3. Does your tree have a “marker ring” or very narrow ring?

If yes, in what year?

4. Does your tree have a fire scar?

If yes, in what year?

5. Did your tree “release” or start to grow quickly?

If yes, in what year?