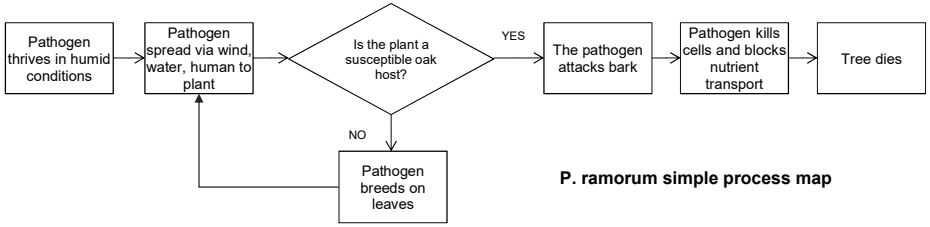
PLANT PATHOGEN THREATENS CALIFORNIA OAK TREES

1 Problem

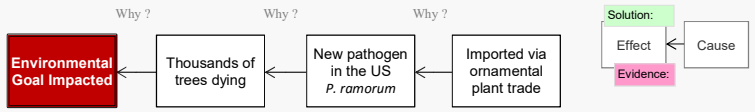
What	Problem(s)	Trees dying
When	Date	mid 1990's
	Different, unusual, unique	Leaves suddenly turned brown and sap leaked
Where	Facility, site	California coastal forests, nurseries
Impact to the Goals		
Environmental		> 1,000,000 California oak and tanoak trees dead



P. ramorum simple process map

2 Analysis

Basic Level Cause Map - Start with simple Why questions.



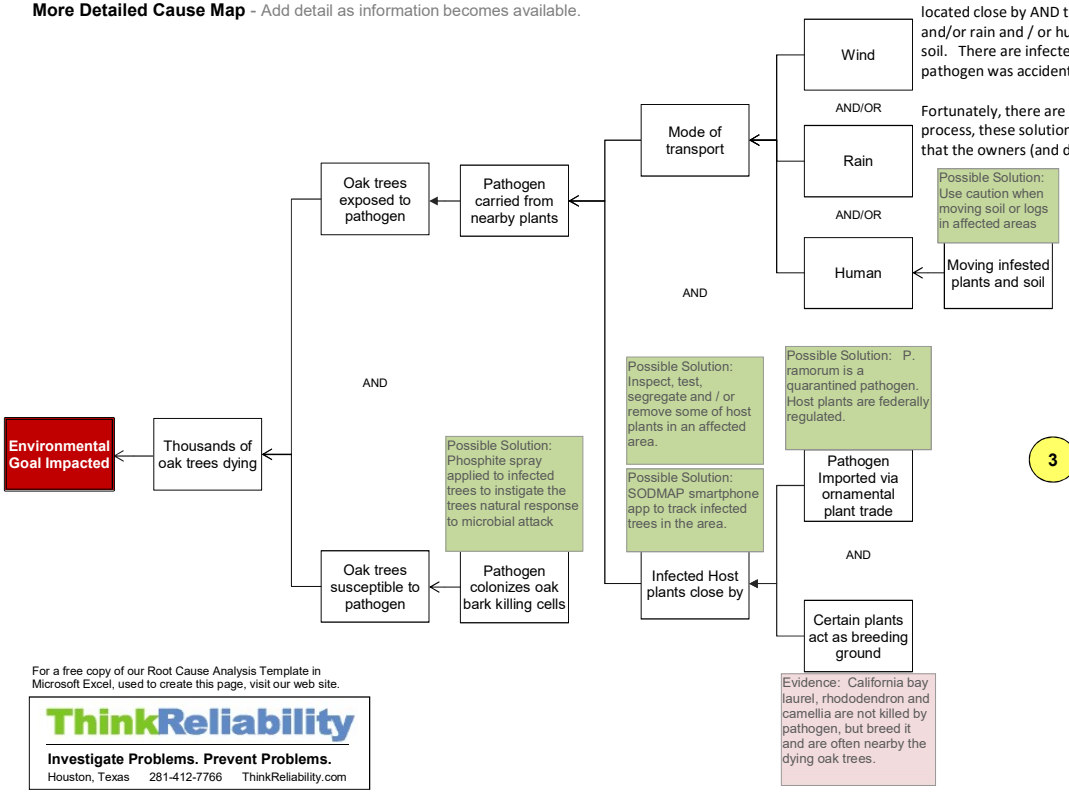
Basic Cause-and-

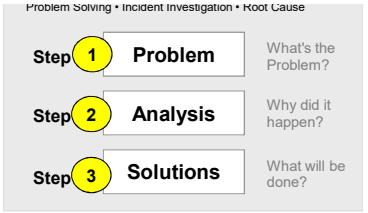
Sudden Oak Death is responsible for the death of over one million California oak and tanoak trees. And as it turns out, a microscopic pathogen called Phytophthora ramorum (P. ramorum) is behind the disease.

Understanding the problem is an important step to identifying solutions. Prior to discovering the pathogen P. ramorum, scientists were baffled by the bleeding trees. They initially suspected insects, but could find no visible wounds or damage typical of insects. Creating a Cause Map can help understand the cause-and-effect relationships that are responsible for an impact to the goals. Asking 'why' questions beginning with the affected goal helps us to learn about the causes of an event. In this case, the environmental goal was impacted by the death of millions of trees. Scientists showed that the trees were dying because they were exposed to the pathogen P. ramorum AND the fact that the trees were susceptible to its affects. The plants were exposed to the pathogen because the pathogen was carried from nearby plants. This was due to the fact that there were infected plants located close by AND the presences of a mode of transportation. This mode of transportation could have been due to wind and/or rain and / or human transport. The human transport could be a result of people accidentally moving infected plants or soil. There are infected plants close by because certain plants act as a 'breeding ground' for the pathogen AND because the pathogen was accidentally imported via host plants and the ornamental plant trade in the 1980's.

Fortunately, there are several identified solutions that can help minimize the impact of this pathogen. Using the Cause Mapping process, these solutions can be tagged to the specific causes that they will impact. Then, a table of solutions can be created so that the owners (and due dates if applicable) can be tracked.

More Detailed Cause Map - Add detail as information becomes available.





3 Solutions

No.	Action Item	Cause	Owner(s) (Names)
1	P. ramorum is a quarantined pathogen. Host plants are federally regulated.	Pathogen Imported via ornamental plant trade	Government
2	Use caution when moving soil or logs in affected areas	Moving infested plants and soil	Humans in affected areas
3	Inspect, test, segregate and / or remove some of host plants in an affected area.	Infected Host plants close by	Nursery Workers, forest professionals
4	SODMAP smartphone app to track infected trees in the area.	Infected Host plants close by	Everyone
5	Phosphite spray applied to infected trees to instigate the trees natural response to microbial attack	Pathogen colonizes oak bark killing cells	Nursery Workers, forest professionals

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