



Tribal Knowledge and Climate Response and Adaptation:

Tolowa Dee-ni' Traditional Ecological Knowledge, Land Management, Archaeology, and the Future of Climate Change Impacts on the Del Norte Coastline

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Senior Archaeologist**

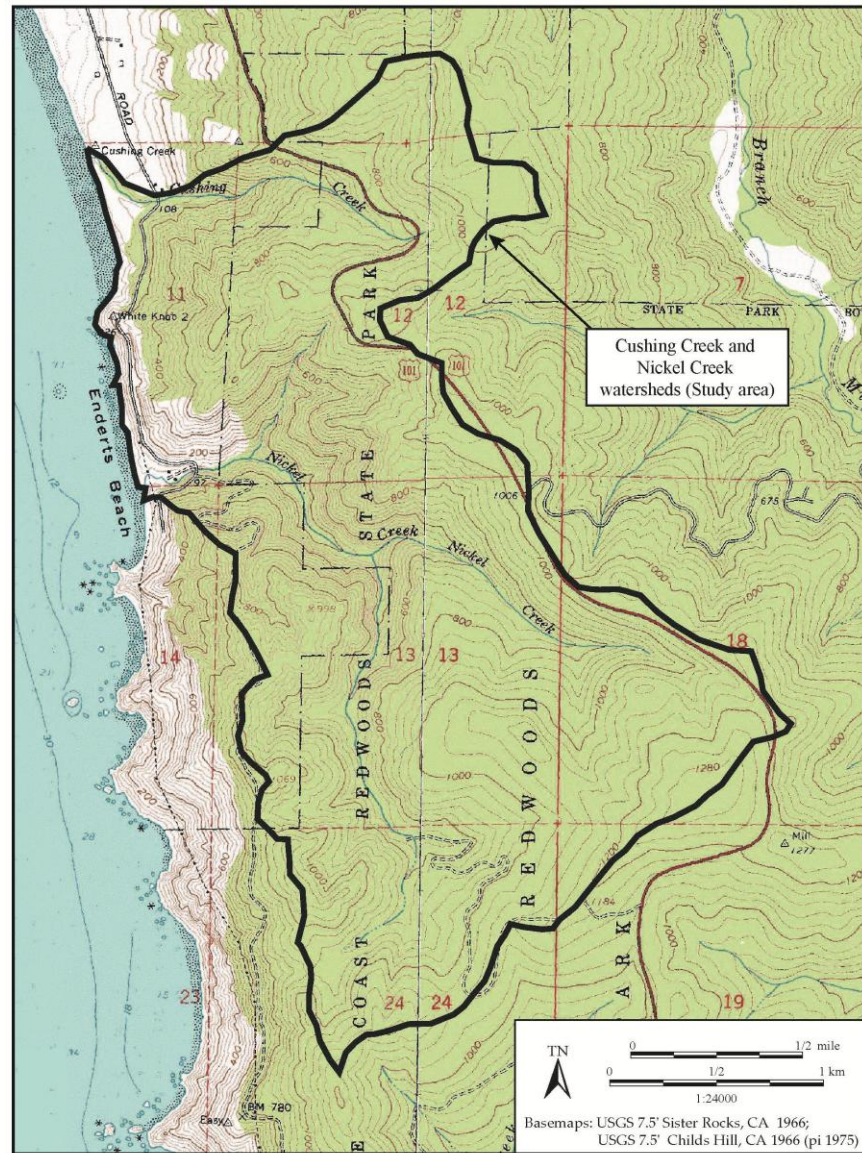


Figure 2. Study area

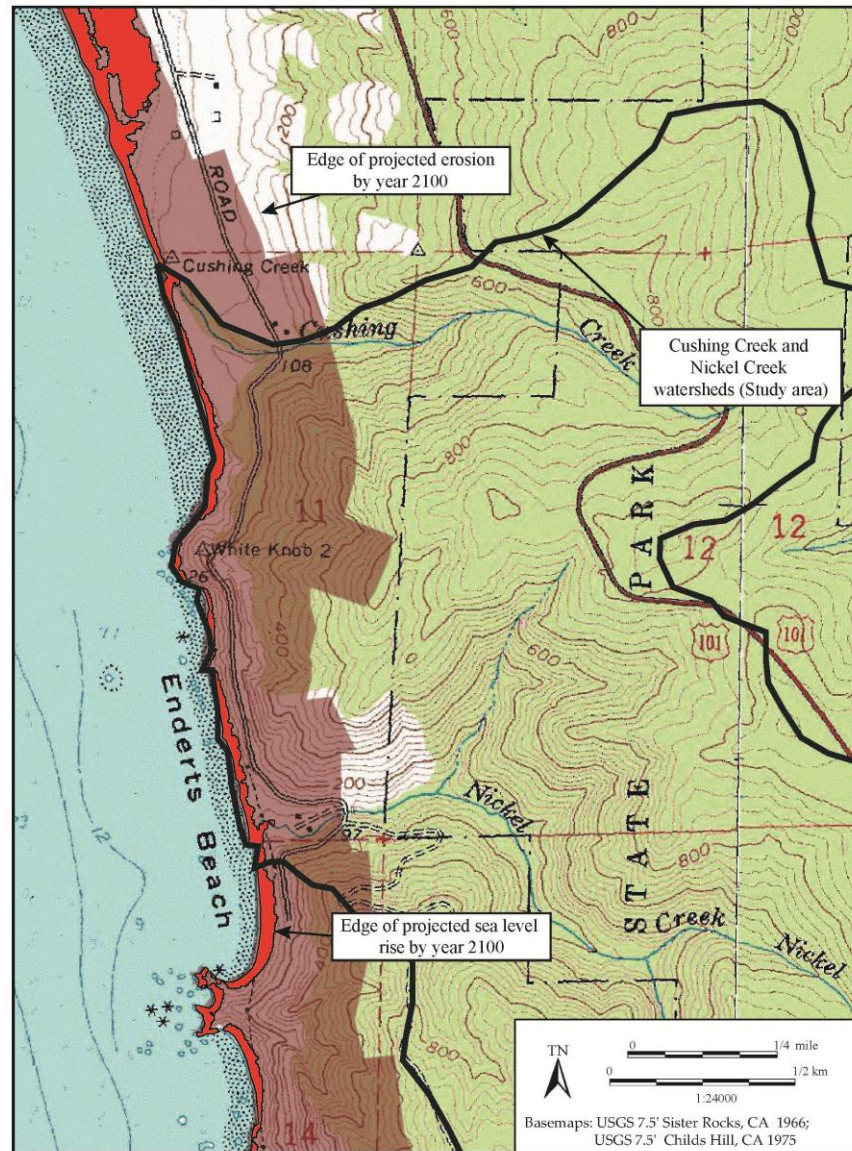


Figure 15. Coastal strip of project area with maximum anticipated coastal erosion and sea level rise (roughly 5 ft. with storm surge) as projected by Heberger et al (2009).







Management Recommendations

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- 2) If tribal councils decide this is the will of the Creator, what are their views towards NPS preserving or letting go sites within the sea level rise/coastal erosion footprint?
- 3) If tribal councils decide this is an act of man, are their views different than above?

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- 1) Tolowa tribal councils should decide whether or not climate change is the will of the Creator or an act of man, and decide appropriate course of action
- 2) If tribal councils decide this is the will of the Creator, what are their views towards NPS preserving or letting go sites within the sea level rise/coastal erosion footprint?
- 3) If tribal councils decide this is an act of man, how does this change their views?
- 4) What are NPS's legal responsibilities under Section 110 in relation to climate change vs. the wishes of tribal council?

Management Recommendations

- 1) Tolowa tribal councils will need to decide whether or not climate change is the will of the Creator or an act of man, and decide appropriate course of action
- 2) If tribal councils decide this is the will of the Creator, what are their views towards NPS preserving or letting go sites within the sea level rise/coastal erosion footprint?
- 3) If tribal councils decide this is an act of man, are their views different than above?
- 4) What are NPS's legal responsibilities under Section 110 in relation to climate change vs. the wishes of tribal council?
- 5) What kind of precedent does NPS and Tolowa wish to set for future agency-tribal government agreements regarding climate change and preservation of tribal cultural heritage?

Impacts

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- 3) Which species are these resources dependent on, and what conditions do they need for survival?
- 4) How will climate change impact these resources?
- 5) What can be done to minimize these impacts?

Critical Flora Species for Tolowa Clothes and Adornment Traditions

Common Name	Taxon	Historically Used	Modern Use	Comments	Reference
Oregon maple	<i>Acer macrophyllum</i>	X		Fibers of bark used for making woman's skirts; wood used for acorn mush paddle	Baker 1981:85, 113
Northern maidenhair fern	<i>Adiantum pedatum</i>	X		Used as dye for dress basket caps	Baker 1981:110
Oregon alder	<i>Alnus oregana</i>	X		Used as dye for dress basket caps	Baker 1981:110
Pacific madrone	<i>Arbutus menziesii</i>	X		Inner bark sewed together to make every-day dress, berries used to make beads	Baker 1981:15
Wood	N/A	X		Used for nosepins	Baker 1981:111
Common juniper	<i>Juniperus communis</i> var. <i>saxatilis</i>	X		Dried berries used to decorate dresses and beads for necklaces	Baker 1981:34

Shared Goals

1. Increase Salmon Habitat

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 - Consult with elders about productive smaller streams in the past
 - Review archaeological data of sites with evidence of salmon
 - Conduct shell isotope analysis to check past water temperatures at the mouths of creeks
 - Look at the health and age of the salmon at the time of catch in the archaeological record
 - Identify changes in salmon health during past climate change events

Shared Goals

2. Better Managed Elk Population

Shared Goals

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- Identify areas where elk was butchered— better assessment of pre-contact range
- Health and age of animals when hunted
- Seasonality of animals when hunted
- Consider reintroduction of elk hunting by tribal members

Shared Goals

3. Increase Smelt Habitat and Population

Shared Goals

3. Increase Smelt Habitat and Population
 - Identify changes in ocean conditions through shell isotopes
 - Identify changes in genetic stock of smelt
 - Identify changes in smelt populations in response to past climate change events

Shared Goals

4. Better Manage Pinned Populations

Shared Goals

4. Better Manage Pinniped Populations
 - Consider reintroducing hunting sea lion
 - Identify age and health of sea lion in the archaeological record
 - Identify hunting and butchering techniques and tools
 - Identify responses in sea lion populations to past climate events

Shared Goals

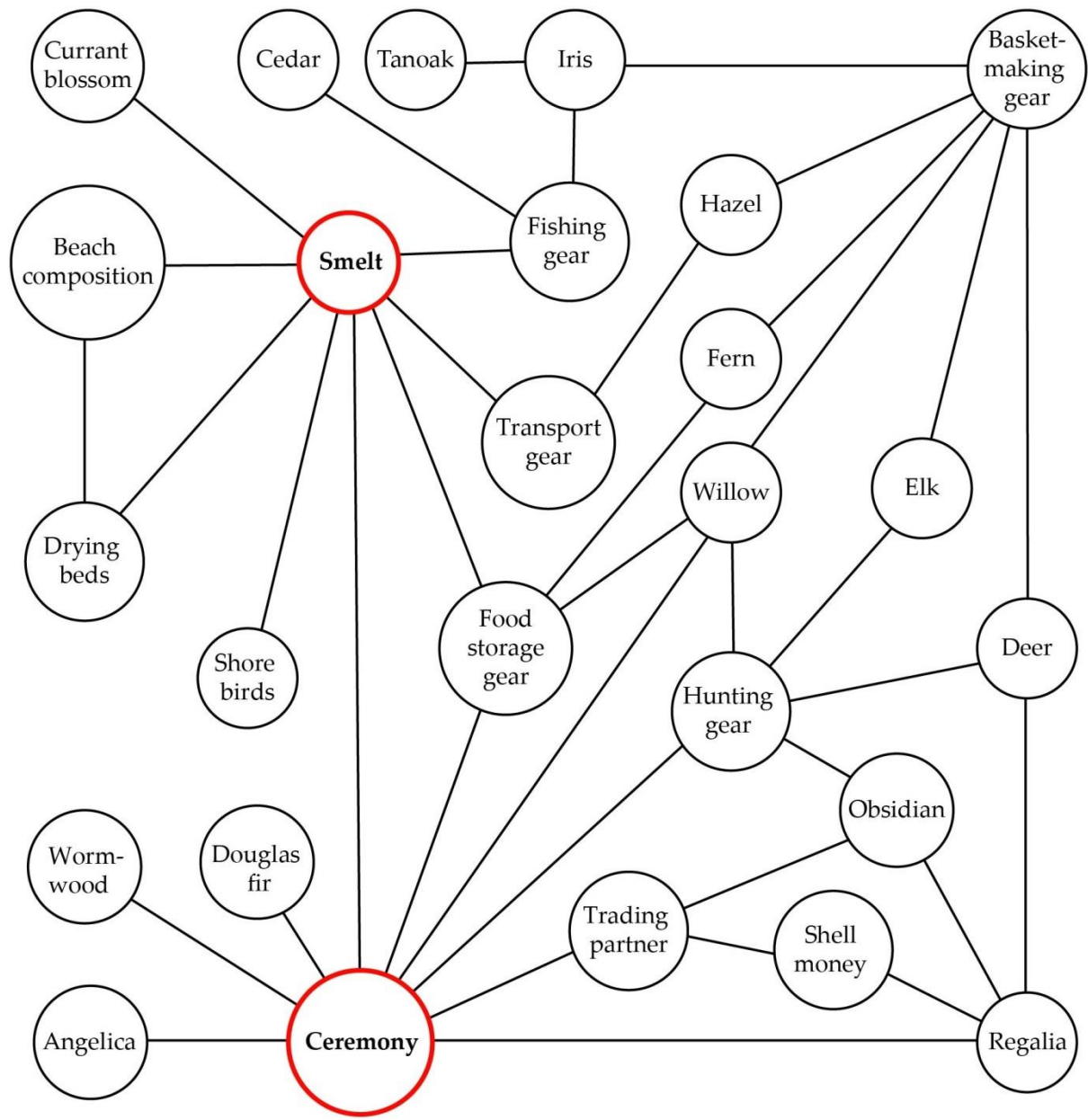
5. Improve Water Quality

Shared Goals

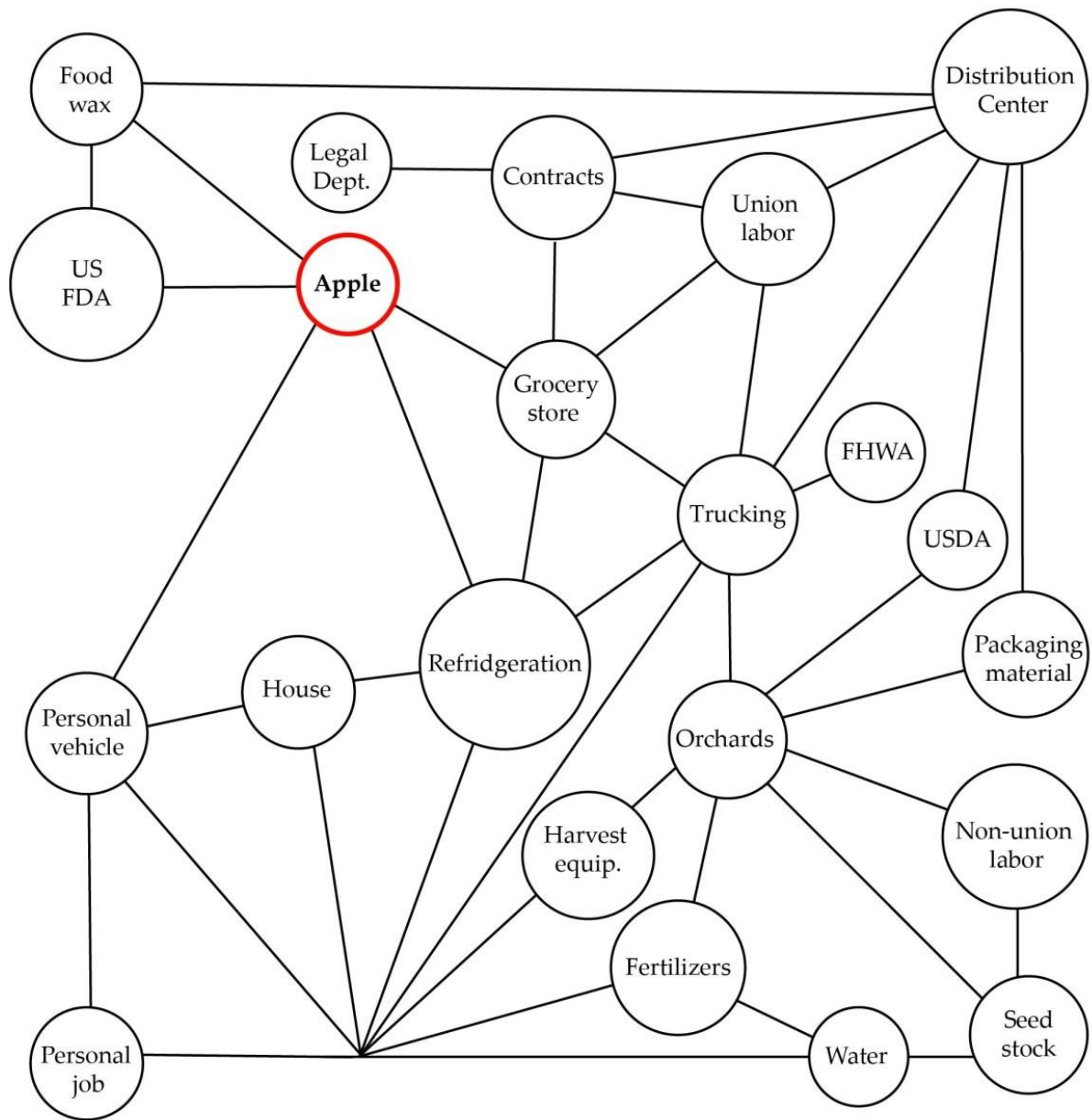
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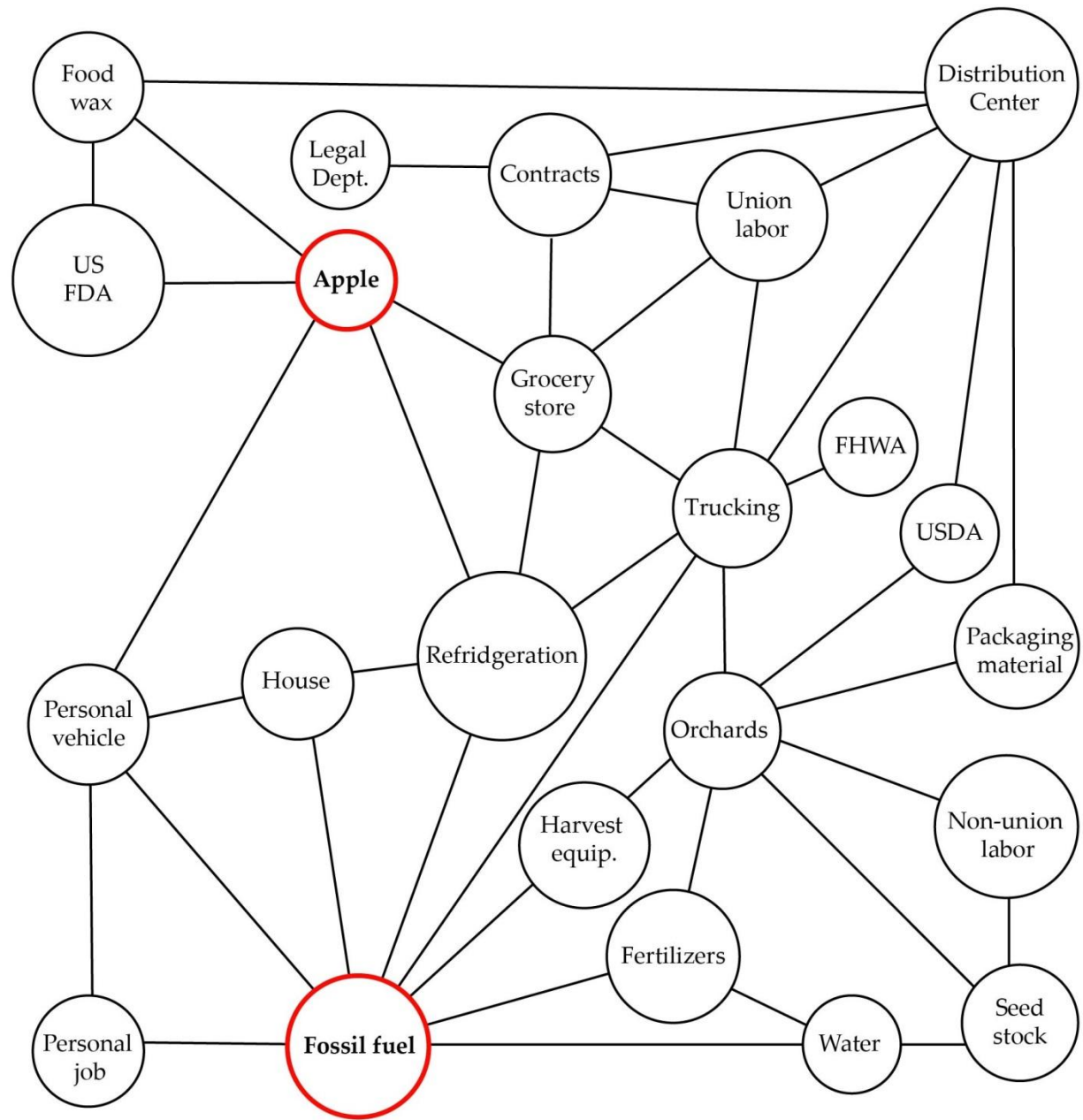
- Recover seed and pollen data from natural and archaeological deposits
- Identify responses in plant communities to past climate events
- Use shell isotope information to identify water temperature and salinity changes in bays and estuaries

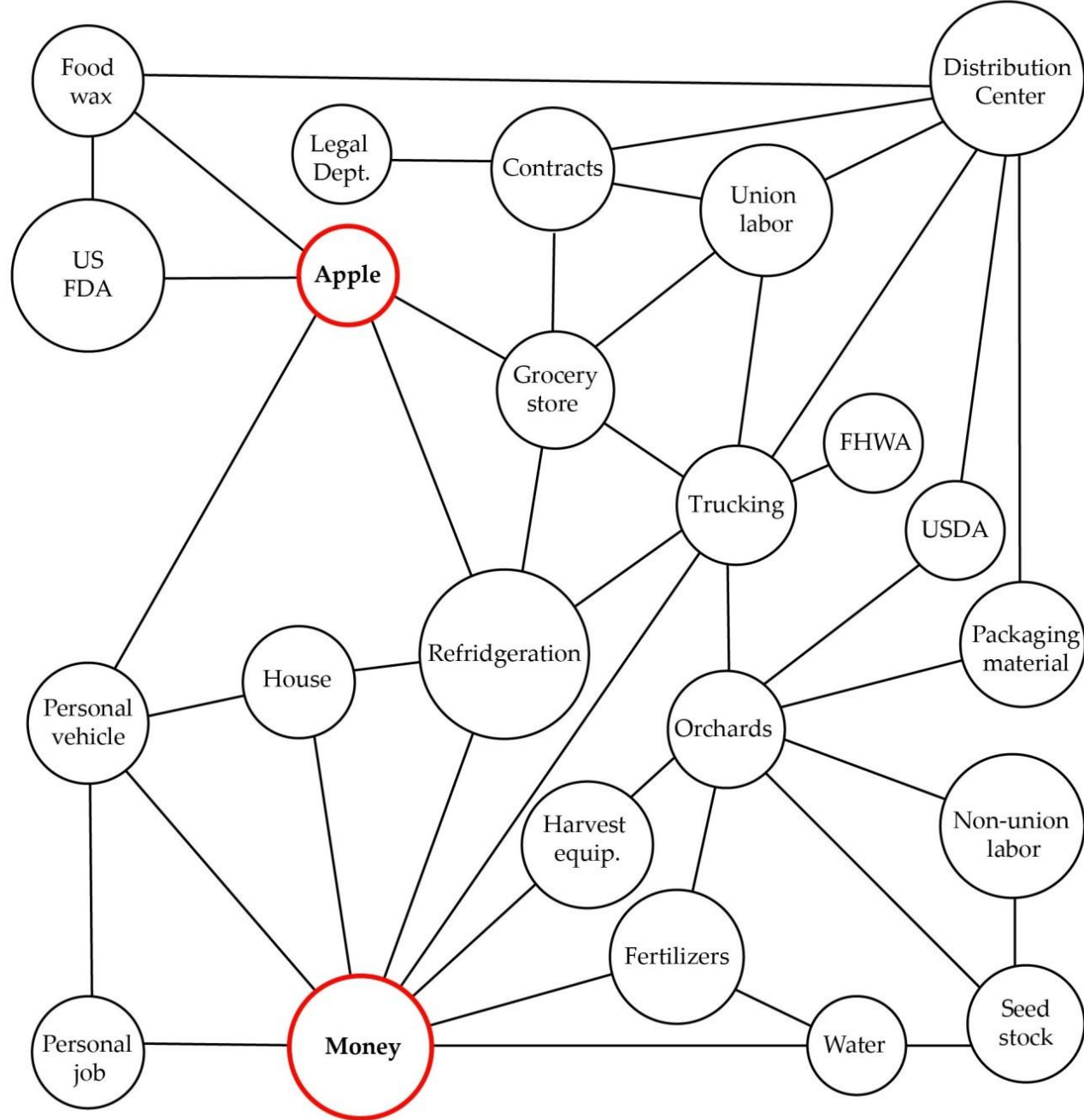
Smelt











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OKLAHOMA SECRETARY OF STATE

STATE OF OKLAHOMA



EXECUTIVE DEPARTMENT

Proclamation

Whereas, Oklahoma is blessed with an abundance of oil and natural gas, allowing the state to be a prosperous producer of these valuable resources; and

Whereas, Christians acknowledge such natural resources are created by God; and

Whereas, the oil and gas industry continues to produce countless opportunities for wealth generation for Oklahoma families; and

Whereas, Oklahoma recognizes the incredible economic, community and faith-based impacts demonstrated across the state by oil and natural gas companies; and

Whereas, Christians are invited to thank God for the blessings created by the oil and natural gas industry and to seek His wisdom and ask for protection;

Now, Therefore, I, Mary Fallin, Governor, do hereby proclaim October 13, 2016, as

"Oilfield Prayer Day"

in the state of Oklahoma.

In Witness Whereof, I have herunto set my hand and caused the Great Seal of the State of Oklahoma to be affixed.



ATTEST

Acting Assistant Secretary of State

Mary Fallin
GOVERNOR

Done at the Capitol, in the City of Oklahoma City, this 8th day of September, in the Year of Our Lord two thousand and sixteen, and of the State of Oklahoma in the one hundred and eighth year.

40070



BUSINESS INSIDER

MARKETS

The governor of Oklahoma created 'Oilfield Prayer Day' in hopes of saving the state's oil and gas industry

Claire Lampen

Oct 13, 2016, 10:29 PM 2,090 1



Energy and Environment

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A poll this week showed that only 34% of America's white evangelical Protestants accepted there is solid evidence that global warming is real and that it is attributable to humans



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Congressman says God will save us from climate change

A Republican congressman who believes that global warming is not a threat because God has promised not to destroy the Earth has put himself forward as chairman of a powerful committee that deals with energy policy and its effect on the environment.

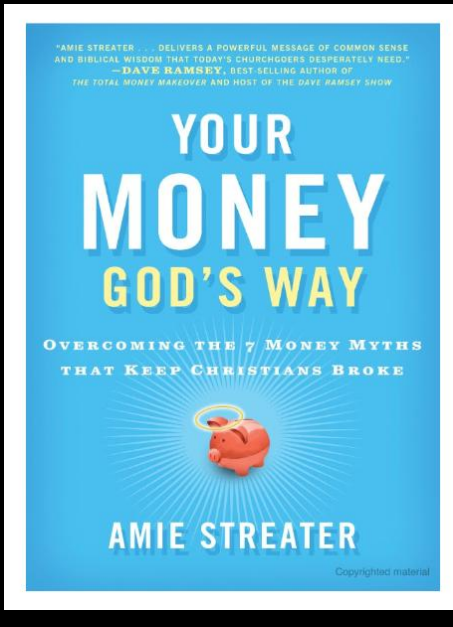
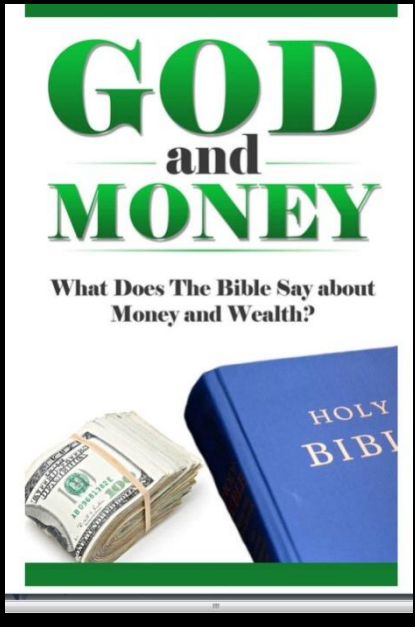
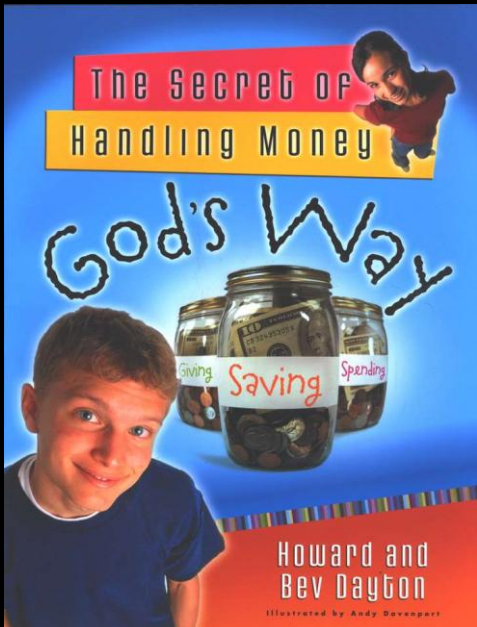
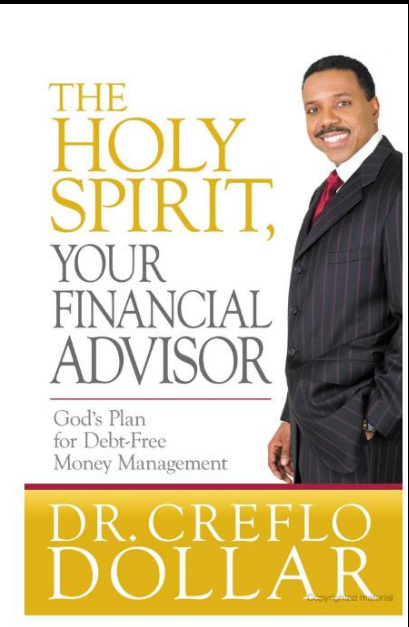
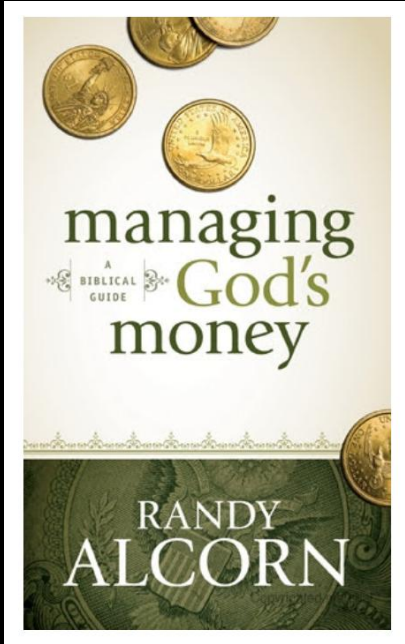
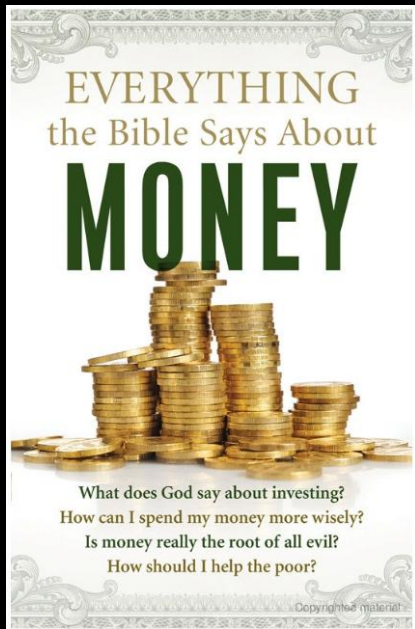
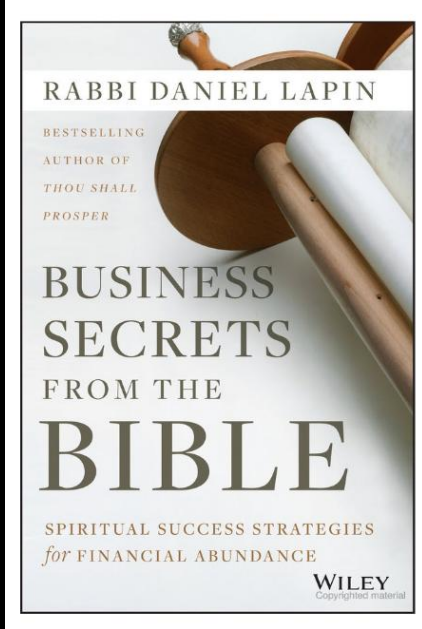
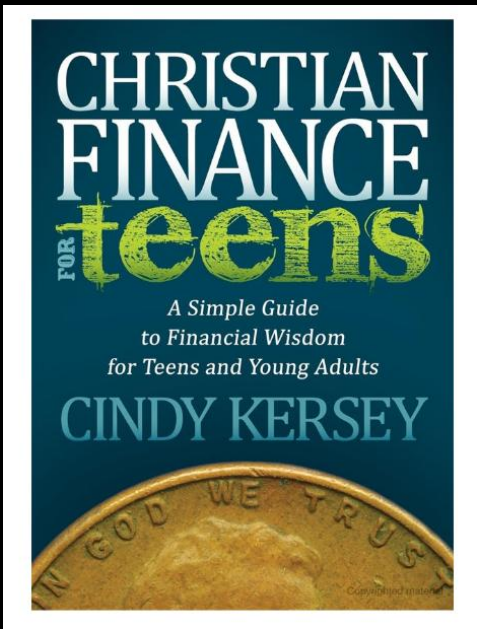
UNITED STATES OF AMERICA

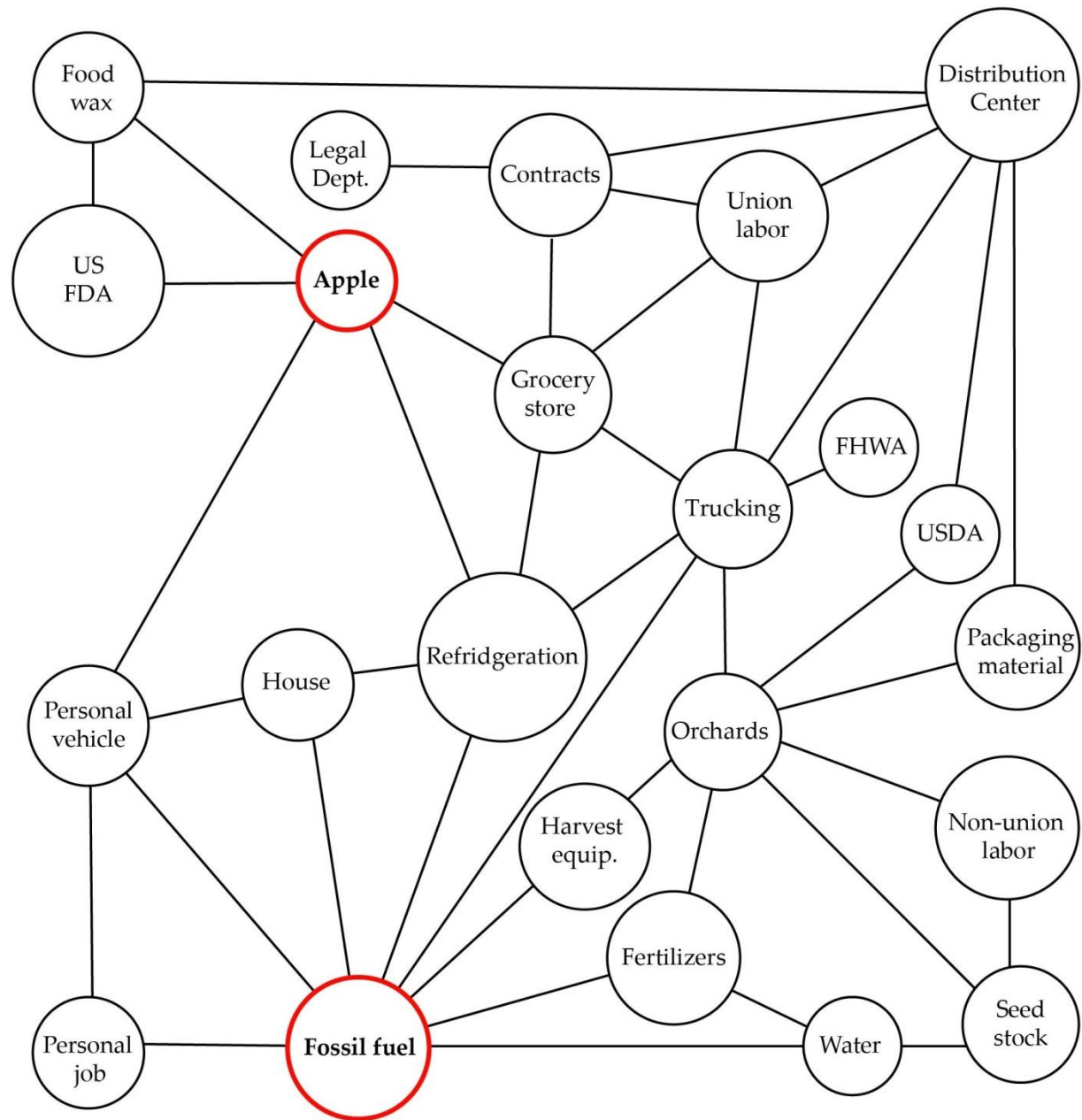
IN GOD WE TRUST

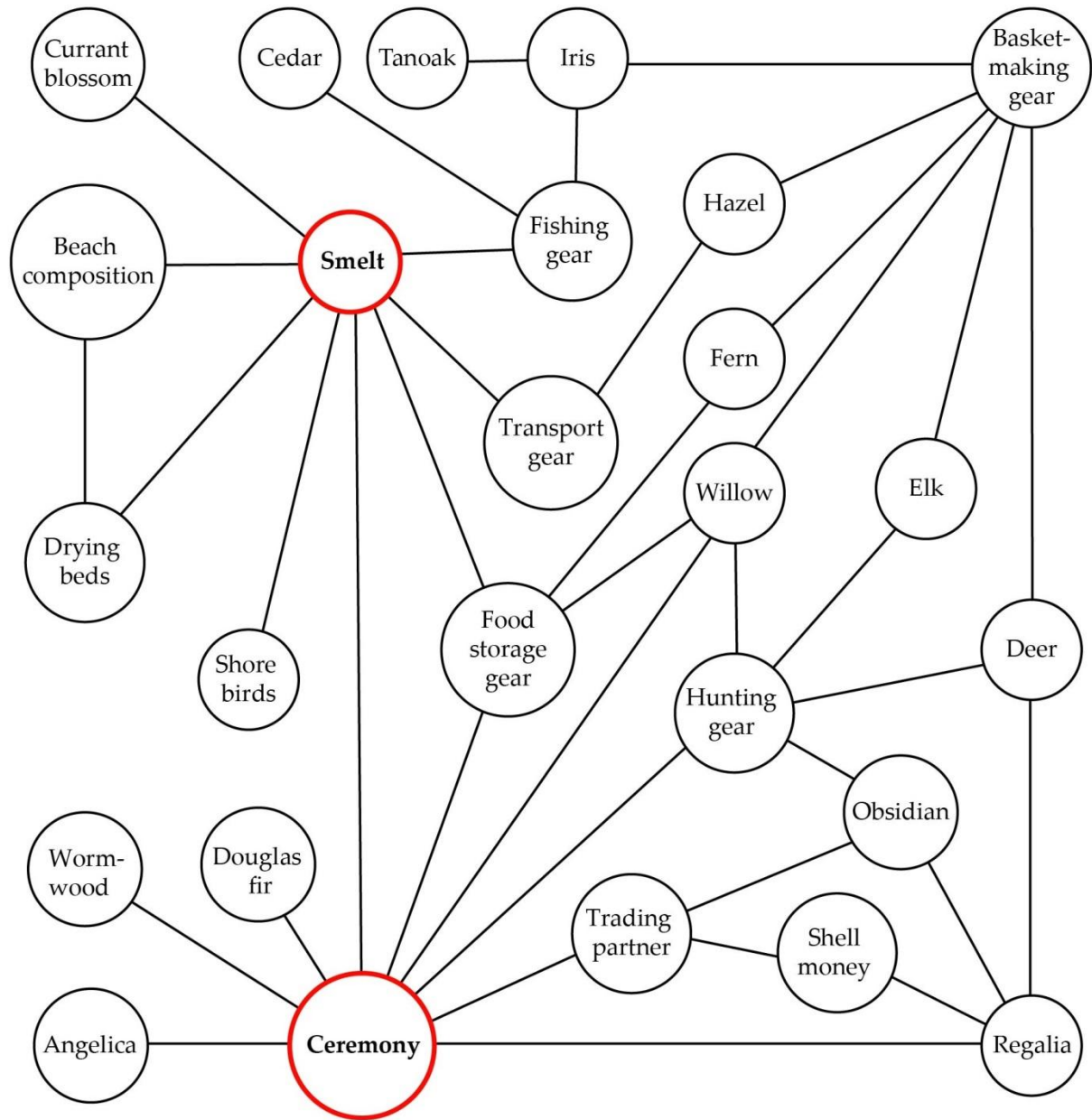


THE WHITE HOUSE

TWENTY DOLLARS









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-Suntayea Steinruck
-Karin Levy

Elk Valley Rancheria
-Crista Stewart
-Kevin Mealue