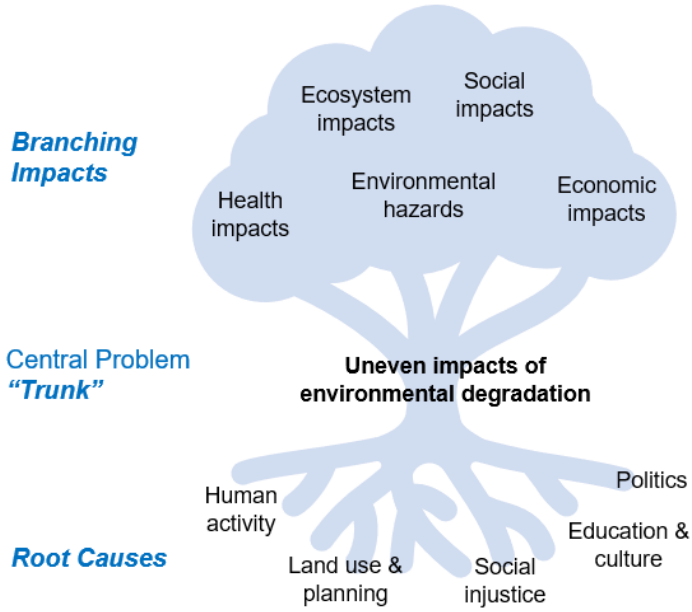
THIS IS A DRAFT. PLEASE DO NOT SHARE WITH OTHERS.

"Problem Tree" Learning Object

Link to online version: https://fl-rda.org/problem-tree-learning-object/

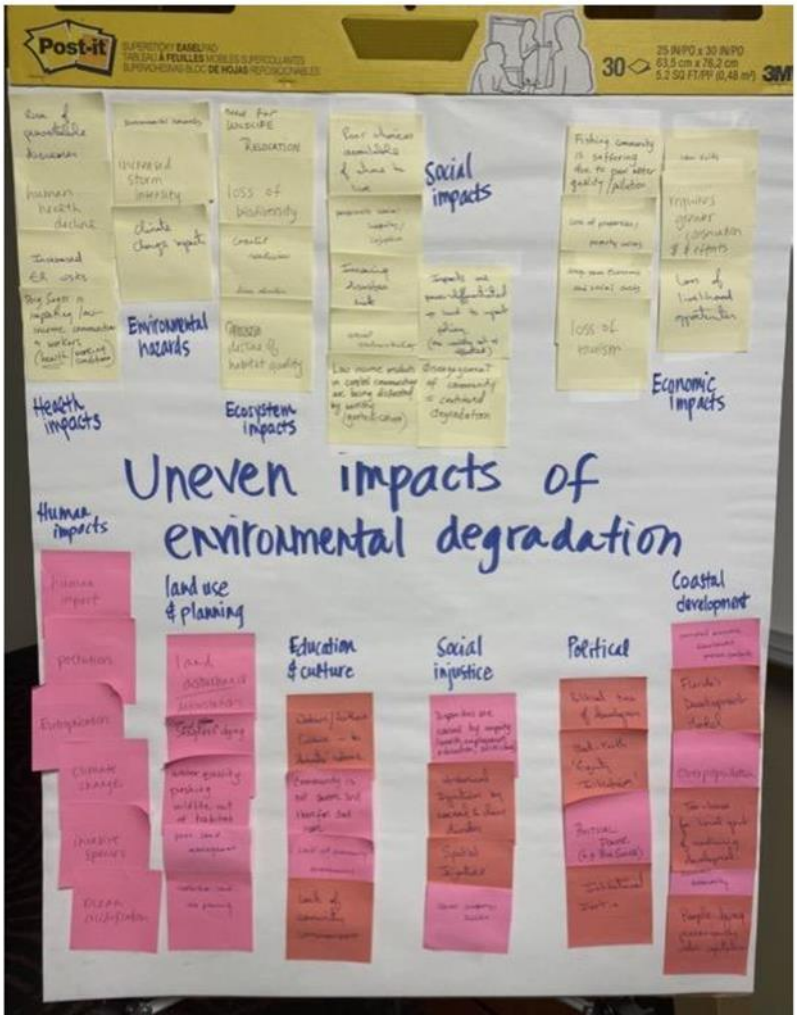
Title	Problem Tree
1-sentence summary	A brainstorming activity to depict a problem space and identify causes and impacts.
Time to implement	30-60 minutes
Purpose of tool	• Map a core problem in terms of its causes and effects • Capture diverse perspectives on a problem • Elucidate opportunities for collaborative solutions to the problem
How it works	Decide on whether you will be working in a virtual or in-person setting for this activity. • **Virtual**: Consider using a digital white board tool such as Google's Jamboard, Microsoft's Whiteboard, Mural.co, or another tool. Make sure that whatever you use can be retained after the meeting so the product of the activity is not lost. • **In person**: You will likely need a physical whiteboard, large poster board, or a large-scale sticky note that ideas can be added to. Small sticky notes are the most useful to add ideas to the problem tree when done in person because the notes can be moved around and organized at a later stage in this activity. If you write the ideas using markers on a board or paper, you will not be able to move them. Make sure to photograph the final product at the conclusion of the meeting so it can be referred to in the future. The activity proceeds as follows: 1. **Introduce the activity** as a way for members of a collaboration to identify the core problem or phenomenon they will be investigating, and then characterize the problem/phenomenon in terms of its causes and impacts. A tree is used as a conceptual point of reference with a trunk, roots, and branches used to reference the core problem, causes, and impacts, respectively. *(See the below visual for a stylized version of a problem tree.)*



Note: *The above causes and impacts are at the summary level of themes. This problem tree activity should produce ideas at a more specific level that can be grouped and labeled by overarching themes at a later stage in the activity. The higher-level themes are depicted here for simplicity.*

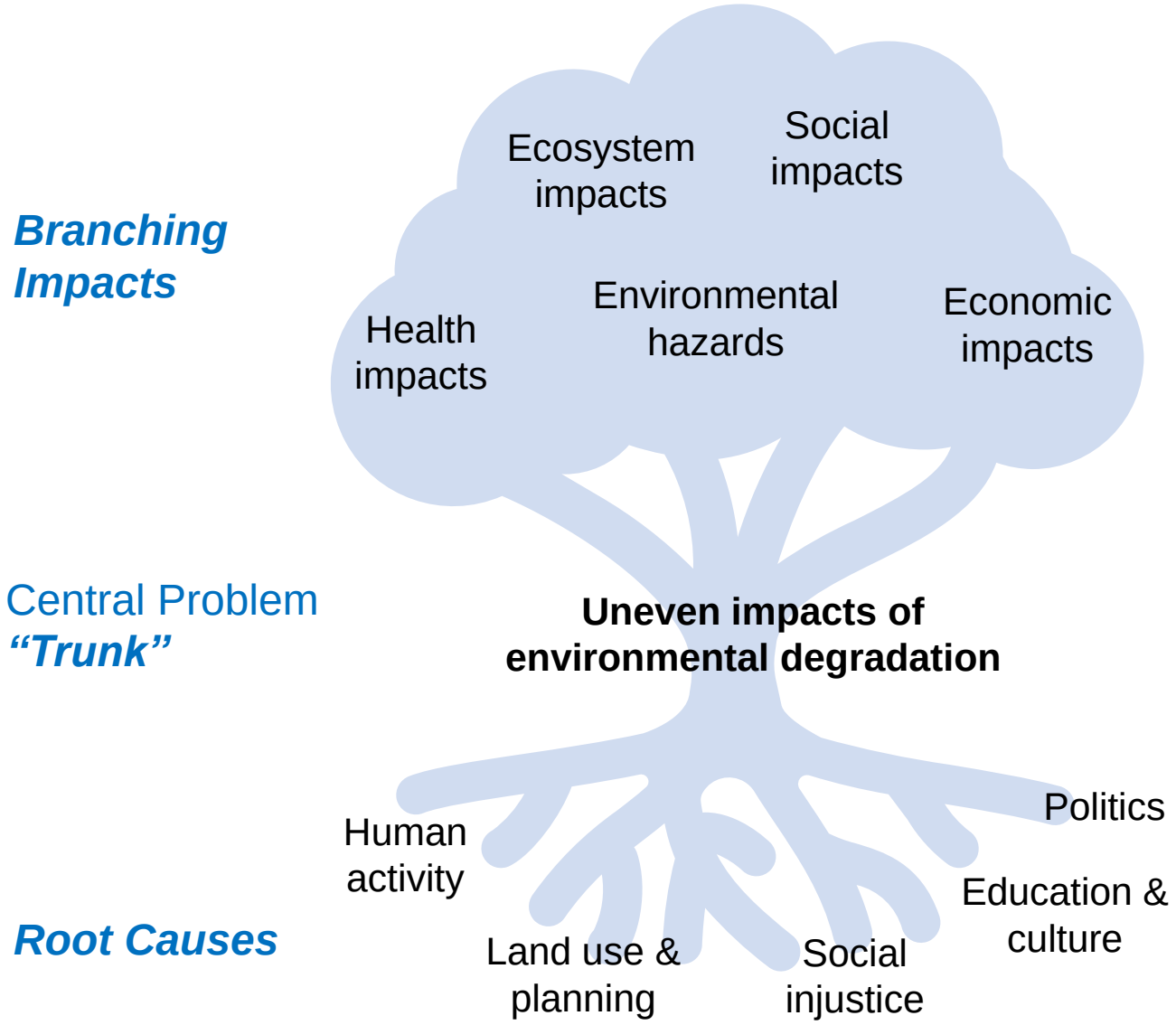
2. **Agree on the central problem to label the "trunk" of the tree (5-10 minutes).** The first step in creating a problem tree is for members of the group to agree on a word or phrase that captures the central problem or phenomenon the team is interested in addressing. Ensure the word/phrase is not too broad as to encompass an entire field or discipline, but also not too narrow so as to exclude multiple (disciplinary) perspectives from contributing. Once the word/phrase is agreed upon, write it in the center of the virtual or physical board space.
3. **Collaboratively identify "root" causes (5-10 minutes).** After the central problem is identified, all members may start contributing causes to the tree along the bottom of the board space by adding one idea to each sticky note; these are the roots. It can be helpful to use one color of sticky notes or font for the causes, and a different color for the impacts, so they can be distinguished.
4. **Collaboratively identify the "branching" impacts (5-10 minutes).** After the group has stopped generating new causes, move to using the same process of writing one idea per sticky note for the impacts, the consequences of the problem. Place these along the top of the tree; these are the branches. As noted above, use a different color of sticky note or font for the impacts than the causes.
5. **Group the causes and impacts by theme (15-20 minutes).** Once ideas for causes and impacts have been

	exhausted, move next to grouping each by theme. Themes will help you understand the major issues underlying and resulting from the core problem. **Some key guidance:** • Make sure everyone is contributing to the discussion of the core problem as well as adding sticky notes for the causes and impacts. This early work in the team of identifying a problem to pursue will set the stage for later activities. If a member's perspective and expertise is not included in the discussion and idea generation, they may be left out and not feel part of the team moving forward. • At both the stages of generating the core problem statement (Step #3) and grouping the causes and impacts by theme (Step #6), discussion and debate are encouraged to develop and refine ideas. In contrast, the steps involving brainstorming of causes and impacts (#4-5) should be as generative and inclusive as possible. Questions and discussion can be part of the causes and impacts brainstorming steps, but members should lean toward asking questions to clarify their own understanding of other members' contributions instead of challenging others' ideas.
The outcome	A **situational analysis and visual model** that characterizes a central problem or phenomenon along with its underlying causes and resulting impacts. A **unifying understanding and conceptual framework** that was generated together by all members and can serve as a reference for future discussion on opportunities for collaborative efforts.
Something visual	Example problem tree drafted by an interdisciplinary team of researchers who engaged in this activity around the topic of environmental degradation:

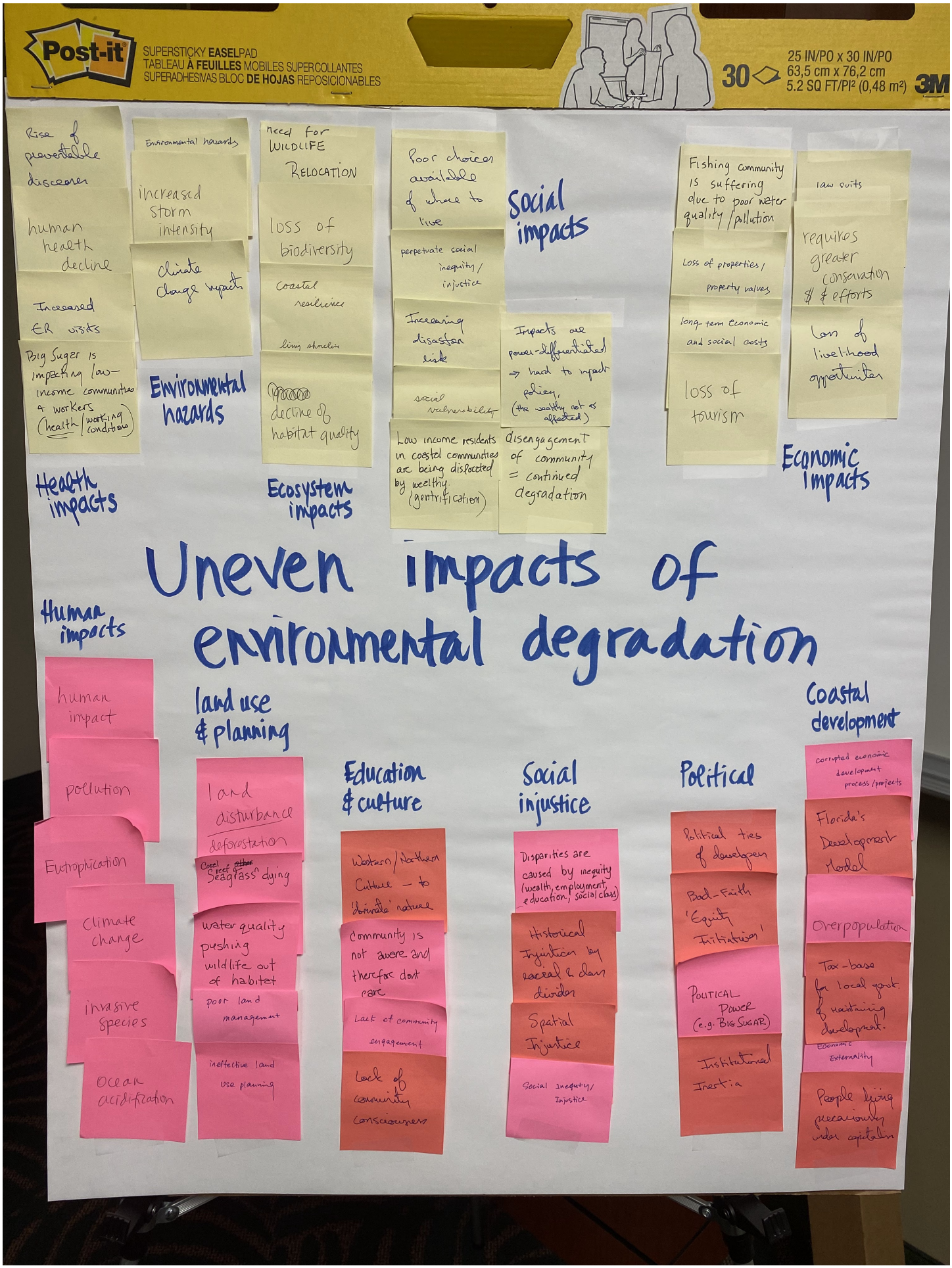
	
Example use cases	Creation of a problem tree is beneficial for a team aimed at dealing with complex problems (the first use case described below). This activity can also be used to get all members of a team on the same page about the issue at hand (the second use case described below). **Tackling Complex Problems** This brainstorming activity is great for characterizing complex problems that have many underlying causes and resulting impacts. The generation of many diverse ideas and perspectives is encouraged to fully describe the problem space. Once the visual "problem tree" is created, it can be discussed at future team meetings, with a part of the tree delineated as the area in which the team will focus. Or, several parts of the tree may be encircled to indicate the foci of subgroups or individual team members, which contribute to the larger goals of the collaborative. In examining the tree, the team may identify an area of interest that

	they lack the full expertise to pursue. This identified gap on the team is an opportunity to add additional members or consultants, or upskill current members. **Seeking a Shared Mental Model** For new teams or those embarking on new projects, this activity can help the group develop a “shared mental model.” A shared mental model is a conceptual representation of an issue that gets everyone on the same page. Since everyone is contributing ideas, and working together to group ideas by theme, the output is one generated and understood by the group. If members of the group do not understand parts of the model, they have an opportunity to ask questions and learn more, either during the exercise or at future group meetings where it can be discussed.
Q&A:	
- When should this be applied?	This learning object can be applied when a new team is formed or when a new project is taking off. This is an opportunity for a team to develop a shared mental model (see the relevant use case explained above) and decide on topics and areas of the problem to pursue.
- When *not* to use this?	If the problem is already well-defined and commonly understood within a team (e.g., within a unidisciplinary team that has worked together before) this tool may not be as helpful. However, if the problem or objectives of the group need reevaluation to determine a path forward, this activity can be a helpful intervention.
- What should I do next?	With this visual model in hand, the team can discuss future directions for their collaboration and exploring the problem that unites their interests. As the discussion and project evolves, the problem tree can be revisited and updated with new ideas. Once data are collected, especially in a multi-faceted and interdisciplinary project, it may be helpful to summarize the collected data or findings by adding text to the problem tree. The visual representation with the data/findings labels may provide the group new insights into where more data or information is needed.
- What evidence or sources is this based on?	This exercise draws heavily from a **problem tree activity** published in the *Integrated Research Toolkit*. Some modifications in the language used to describe the problem tree and additions such as the use cases and contexts in which to implement and extend the activity are new contributions. https://integrated.landcareresearch.co.nz/resources/problem-tree.html
- What if I want to learn more? What	The *Integrated Research Toolkit's* "What is integrated research?" post is especially helpful for understanding the variety of ways

are other complementary tools?	disciplines can come together and conduct research. https://integrated.landcareresearch.co.nz/guides/what-is-integrated-research.html So also is the book Disciplining Interdisciplinarity by Gabriele Bammer. https://press.anu.edu.au/publications/disciplining-interdisciplinarity An alternative activity is the “idea tree” described at the below link. Additional resources are also included at this link for collaborative brainstorming. https://i2insights.org/2019/03/12/idea-tree-brainstorming-tool/



Note: *The above causes and impacts are at the summary level of themes. This problem tree activity should produce ideas at a more specific level that can be grouped and labeled by overarching themes at a later stage in the activity. The higher-level themes are depicted here for simplicity.*


Post-it
SUPERSTICKY EASELPAD
TABLEAU À FEUILLES MOBILES SUPERCOLLANTES
SUPERADHESIVAS BLOC DE HOJAS REPOSICIONABLES
30
25 IN/PO x 30 IN/PO
63,5 cm x 76,2 cm
5.2 SQ FT/PI² (0,48 m²)
3M
Rise of preventable diseases
human health decline
Increased ER visits
Big Sugar is impacting low-income communities & workers (health / working conditions)
Health impacts
Environmental hazards
increased storm intensity
climate change impacts
Environmental hazards
Need for WILDLIFE RELOCATION
loss of biodiversity
Coastal resilience
decline of habitat quality
Ecosystem impacts
Poor choices available of where to live
perpetuate social inequity / injustice
Increasing disaster risk
social vulnerability
Low income residents in coastal communities are being displaced by wealthy (gentrification)
Social impacts
Impacts are power-differentiated ⇒ hard to inspire policy, (the wealthy not as affected)
Disengagement of community = continued degradation
Fishing community is suffering due to poor water quality / pollution
Loss of properties / property values
long-term economic and social costs
loss of tourism
law suits
requires greater conservation $ & efforts
loss of livelihood opportunities
Economic impacts
Uneven impacts of environmental degradation
Human impacts
human impact
pollution
Eutrophication
climate change
invasive species
Ocean acidification
land use & planning
land disturbance
deforestation
Coral reef Seagrass dying
water quality pushing wildlife out of habitat
poor land management
ineffective land use planning
Education & culture
Western / Northern Culture – to 'dominate' nature
Community is not aware and therefor don't care
Lack of community engagement
Lack of community consciousness
Social injustice
Disparities are caused by inequity (wealth, employment, education, social class)
Historical injustices by racial & class divides
Spatial Injustice
Social Inequity / Injustice
Political
Political ties of developers
Bad-Faith 'Equity Initiatives'
POLITICAL POWER (e.g. BIG SUGAR)
Institutional Inertia
Coastal development
corrupted economic development process / projects
Florida's Development Model
Overpopulation
Tax-base for local govt. & maintaining development.
Economic Externality
People living precariously under capitalism