

Extreme Event Agenda Setting and Decision Making

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Abstract

Extreme events are “potential” focusing events that can cause severe damage and potential harms to many people in a very short period of time. A focusing event may create a “window of opportunity” that policy makers can use to advance an issue on the national agenda. However, once disaster issues reach the agenda, the resulting extreme event policy often focuses on response and relief rather than mitigation and preparedness. Much of the previous literature on this topic discusses these problems in terms of discrete “events” that have some degree of influence on agenda setting and the policy process. This paper develops a continuous perspective on the problem by using a system dynamics approach to explore how changing relationships between various stakeholders in the system influence extreme event agenda setting and policy making. This paper will also discuss the utility of such a decision aid for public administrators who wish to have a better understanding of the policy process.

Organization of this paper

This paper has two main sections. The first section is an introduction to the problem. Background information is provided on the problem focus. There is also a discussion of the problem context, intended audiences for this paper, model purpose, model boundaries and reference modes. Section one concludes with a brief discussion on the initial policy options likely to be explored by policy makers.

In section two, the model is explained with series of causal loop diagrams. As the loops are revealed, important stocks and flows are discussed, along with some mention of the pertinent sectors in the model. In addition, there is some preliminary insights on conditions that may “activate” certain loops and cause them to “dominate” the system.

This paper concludes with a brief discussion about the contributions this work will have in the fields of system dynamics, political science and public administration. In addition, there is some discussion of selected policy tests for the model. Finally, some basic insights are presented based on preliminary runs of the mode, along with an outline for next steps of this research.

I. Introduction to the Problem

Problem focus

Extreme events are “potential” focusing events that can cause severe damage and potential harms to many people in a very short period of time. A focusing event may create a “window of opportunity” that policy makers can use to advance an issue on the national agenda (Kingdon 1995). There is some debate as to how a “potential” focusing event becomes an actual focusing event. However, once disaster issues reach the agenda, the resulting extreme event

policy often focuses on response and relief rather than mitigation and preparedness. As a result, we enter endless cycles where administrators are cleaning up existing damage rather than using resources to gain more knowledge on the problems to mitigate future damage. In fact, it would be reasonable to suggest that “mitigation” policies created without proper knowledge of the event may actually produce more damage than it prevents. One might intuitively recognize this pattern of behavior as a product of “fixes that fail” structure. One purpose of this model is to find points of leverage in the system, where policy efforts can be more effective, preventing future damage rather than just clearing current damage.

Context

There are many examples of extreme events. Disasters are products of nature (e.g., hurricanes and earthquakes), human error (e.g., oil spills and nuclear reactor leaks), or even deliberate acts of violence (e.g. the shootings at Columbine and the September 11th attacks). Any one of these extreme events has the potential to be considered a focusing event, an event that focuses our attention a specific problem underlying the cause of the damage associated with the event. In reality, many of these disasters never illuminate the problem to the point where it stays on the national agenda very long.

The problem becomes more complicated when one considers the fact that the agenda setting process and policy making process appear to be very disconnected at times. For example, there have been many issues that reached the top of the national agenda, where policies were developed to resolve the issue, and yet the final policy selected did not directly address the issue. Very seldom do public sector problems have clear-cut solutions, even when the problem has been recognized by all stakeholders. Usually there are one or more interest groups that perceive adverse affects by any change to current policy. These folks often prefer policies that maintain the “status quo.”

Measures of administrative accountability and performance in the implementation phase add another layer of complexity for extreme event policy problems. For example, a top level administrator at the Federal Emergency Management Association (FEMA) is responsible for coordinating response and relief efforts between the national government and the state and local districts who have been “damaged” by an extreme event. Policy solutions will be ineffective if the agency does not have enough capacity or knowledge on the underlying problems to deal with the event.

Audience

This paper should be interesting for four different groups of people:

1. *System Dynamicists*
2. *Political Scientists*
3. *Public Administrators*
4. *Natural Scientists*

There can be some valuable discussion among system dynamicists who observe these “continuous vs. “event driven” debates regarding how a status quo belief is challenged by a competing “policy”. Some aspects of this model were inspired by the system dynamics work done by John Sterman on Kuhn’s (1970) theory of scientific revolutions. In fact, as will be pointed out shortly, it is the unresolved “damage” in this model, which builds a public perception that “status quo” policies are simply not working and it is *time for change*. A corollary to this

debate might be the debate between “punctuated equilibrium” and “evolutionary” explanations of rivalry, which I think are also germane to theories on coalition building and agenda setting for this paper.

Political scientists have running debates on the relative impact of different focusing events and the prior conditions which must exist for a *potential focusing event* to become an actual focusing event. In fact, an impetus for this research came to me by reading *After Disaster* by Thomas Birkland (1997). This book operationalizes the term “focusing event” by observing changes in Congressional testimony hearings and legislation for the periods before and after several disasters over the last 30 years. The author identifies several “potential” focusing events that became actual focusing events because of pre-existing conditions, including “coalition strength” which accumulated over time. Although Birkland was specifically testing the effects of extreme “events” on the political system, he often used a “continuous” perspective of the conditions in the system to help explain these effects. My research picks up from this point. I suggest that we begin with the continuous interactions between several key stakeholders in this system to help us understand why certain groups gain and/or lose power over time after unexpected “shocks” to the system. One goal for this research is to have a continuous perspective help explain *why* certain extreme events “focus” our attention to policy issues on the national agenda and other potential focusing events of equal magnitude have a relatively small impact.

Public Administrators are often unable to explore the most “effective” policies for several reasons. One such reason is because these options are not politically feasible. There is a gap between public administration and political science with respect to their focus on different phases of the policy process for policy analysis. The literature discusses problem identification, estimation, selection and implementation as four different phases in the policy process (Brewer and DeLeon 1983). There appears to be some disconnect between how problems are identified (i.e., the agenda setting process), how alternative solutions are developed and selected (i.e., the policy making process) and how the policies are executed (i.e., the implementation process). This research should resonate with policy analysts in public administration audience who desires some understanding of how their actions influences the agenda setting and policy making processes, and in turn will affect the implementation of policies in the future.

Finally, this paper should be of interest for natural scientists with some interest in public policy. There is a basic assumption in this paper about how the level of “uncertainty” and our relevant “knowledge” on an extreme event will affect the administration of such policies. There are some disasters where knowledge in the natural scientists is sought to develop better policies. The level of Congressional “commitment” may be signaled by which Congressional Subcommittee maintains control over the policy issue. For example, earthquake policies rely on science “experts” and these policies are located in a science and technology subcommittee. On the other hand, hurricane policy resides in a public works subcommittee and use far less scientific evidence to support current policy.¹

¹ This observation is based on Congressional Hearing data collected between 1980 and 1999.

Model Purpose

There are three research goals:

1. *To represent and test the theories on agenda setting and the policy-making processes.*
2. *To conduct research that bridges the gap between “continuous” and discrete “event” perspectives by using a system dynamics approach.*
3. *To develop a decision tool for policy analysts and public administrators who wish to understand how implementation decisions fits in with a much larger system of processes.*

Model Boundaries

Temporal : The time horizon for this model is 20 years. It has been argued that extreme event issues have agenda cycles, which peak when there is a perception that there is a problem whose solution is within our reach. Intuitively, these cycles make sense if one considers national election cycles.² Presidents are restricted to a maximum of two and power in Congress (and thus subcommittee control) changes with a similar period. One could make an argument that such changes in power would result in changes to the agenda. A formal model can test how much influence the President and/or Congress exerts on the national agenda.

Conceptual: *What is included in this model:* There are three main sectors in this model:

1. *The Agenda Sector:* This includes all stakeholders (including policy entrepreneurs) and activities who influence the *Initiation* phase of the policy process. That is, all people who have the power to raise or lower an issue’s national agenda ranking.
2. *The Policy Making Sector:* This sector includes all relevant “decision makers” and activities dealing with the *Estimation* and *Selection* phase of the policy process. In theory, an issue must have a high ranking on the “Decisions Agenda” before any policy may be passed. However, a high agenda ranking does not determine what *type* of policy will result (whether it favors the status quo groups or advocates for change groups)
3. *The Administrative Sector:* This sector includes all of the knowledge acquired and decisions made by public administrators who face implementation challenges for any given disaster policy.

Causal:

Endogenous: All policy and decision-making activity relative to a disaster policy.

Exogenous: All of the activity in other policy domains.³

Reference Modes – *graphs of hypothesized data based on the literature*

The graph over time below represents a reference mode based on my readings of the agenda setting literature by the following prominent academic scholars:

1. John Kingdon
2. Cobb and Elder

² For the purpose of this discussion, “national” agenda will refer to the U.S. The literature does not suggest there is reason to believe all political systems would respond to “shocks” in the same way.

³ This may change as the model develops, but it has been a very clear boundary item for me thus far.

3. Baumgartner and Jones
4. Thomas Birkland
5. Deborah Stone
6. E.E. Shattschneider
7. Paul Sabatier

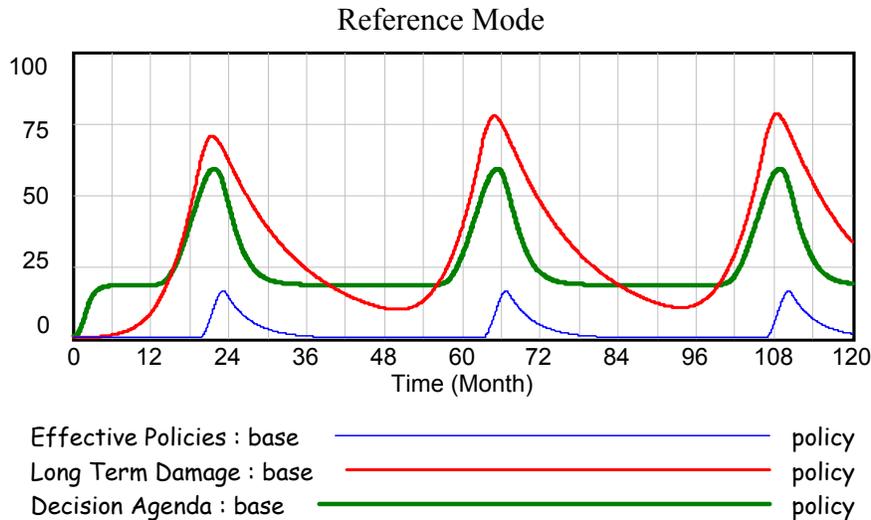
The reference modes illustrate the behavior for three important stocks in the system. It is important to be clear on these definitions.

Effective Policies: For the purpose of this discussion, effective policies are ‘policies designed to mitigate damage.’ As we increase the number of effective policies, administrators will be able to prevent damage and thus fewer people will be harmed in the future. The effectiveness of any disaster policy certainly depends on the level of knowledge administrators possess at the time of a disaster.

Long Term Damage: This is damage caused by extreme events. This is not necessarily a measure of the event’s size. Rather it is an accumulation of damage over time. For example, disasters that strike often but carry relatively minor damage may be just as problematic as large “shocks” to the system. Thus Long Term Damage should be thought of as accumulated damage.

Decision Agenda: The decision agenda is where new legislation on disaster issues is actively considered. This is the end result of a long battle between coalitions for and against policy change, with the status quo trying to prevent issues from rising to the decision agenda⁴. I prefer to think of the decision agenda as “decision agenda ranking.” The ranking can rise or fall depending on several factors. These factors will be explored in the next section of the paper.

⁴ In fact, a more accurate statement would be that issues move from the systemic agenda to the institutional agenda and then final to the decision agenda. Status quo coalitions try to block issues from reaching the decision agenda.



There has been competing theories to explain how and why agendas behave the way they do. “Punctuated equilibrium” suggests that policies remain at a standstill for long periods of time and then suddenly gain attention and undergo rapid change, finally returning to some equilibrium level (Baumgartner and Jones 1993). Another purpose of this model will be to test the punctuated equilibrium explanation.

The reference mode above tells a particular story. As damage accumulates, decision makers *eventually* perceive the problem and the issue rises on the agenda. The scale of 0 to 100 could be thought of as a percent of decision makers talking about the problem. The policies which develop in response to extreme events do not show a long term commitment to mitigation and research.⁵ Without a sustained commitment to a mitigation policy the cycle never appears to end. We will always be clearing prior damage rather than preventing future damage. One final comment on the reference mode. Notice how damage is never completely cleared away. This represents the notion that our commitment to disaster relief and recovery is not perfectly effective even when there is strong commitment. For example, the Federal Emergency Management Agency (FEMA) website lists several disasters that still require relief funding. Some of the disasters have remained on the list for nearly 10 years. This suggests that damage caused by these events can leave residual problems that we must deal with even years after the initial impact of event is long gone. This becomes another reason why good mitigation “prevention” policies would be preferred over relief and recovery “fire fighting” policies.

Initial Policy Options

Earlier, I stated that one purpose of this model is to develop a tool that administrators and policy analysts can use to understand the sources of opposition to different policy solutions. Currently, I am considering the following policy options. These policy options are consistent with the way administrators discuss the issues when they testify before Congressional.

⁵ Claire Rubin’s disaster timeline connects disasters with resulting policies. She concludes that American disaster policies have been historically more “reactive” than “proactive” (before September 11th).

Mitigation: These are long term policies implemented well before the next event and they are designed to prevent future damages. There are three types of mitigation policy:

1. Structural
2. Non-structural
3. Insurance

Preparedness: These are policies implemented right before the damage hits. These policies are most effect for disasters that give administrators some before they strike (i.e., for hurricanes but not for earthquakes).

Response: These policies are probably the most well-known and often, they are the most important. These policies are in effect the day of the event and when they are effective, they can prevent substantial damage to infrastructures. There is also a key information piece to this policy. Administrators are often forced to rely heavily on judgments based on the information at hand. These judgments are made from multiple fallible indicators (cues) about disasters (environments), which are rare and thus difficult to predict (even if information was perfect).

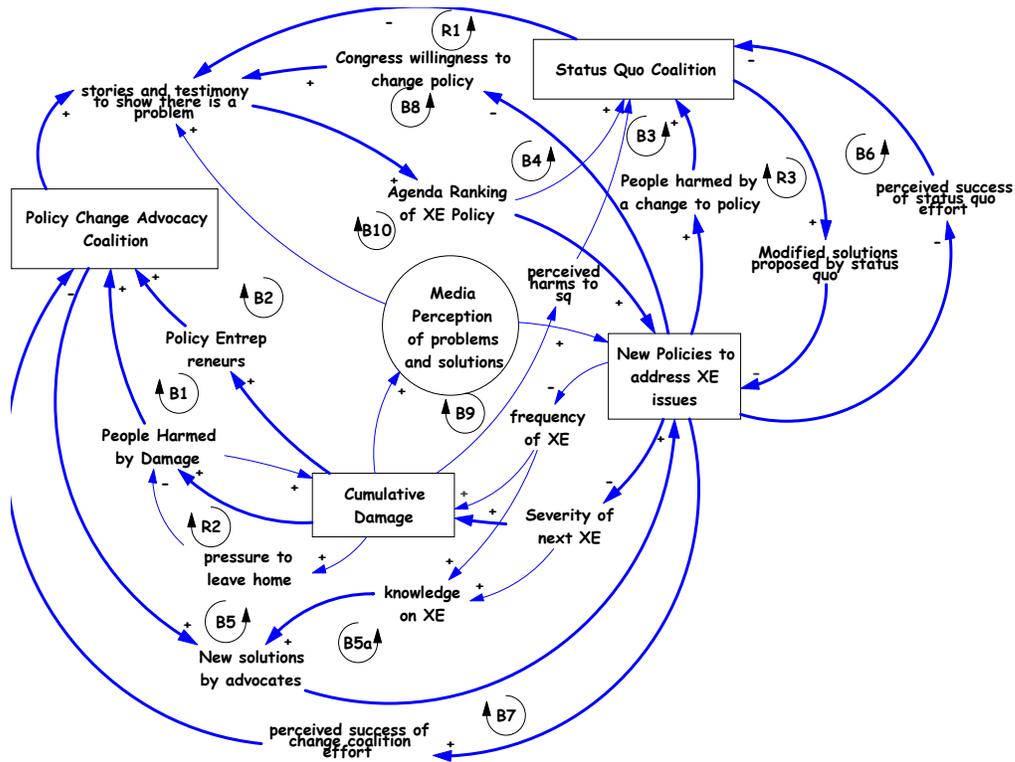
Relief & Recovery: This is the policy that comes into effect to clean up the damage after all other options have been exhausted. Policies which change directly after a major event often have a disproportionate level of relief and recovery policies. This behavior, while politically attractive, creates problems for administrators.

II: Model Presentation

Causal Loop Diagrams

This section presents the model through series of causal loop diagrams that illustrate key “stories” in the literature. Throughout this presentation, key stocks in the system are defined, along with some discussion of how these variables relate to the sectors in the model.

A quick look at the entire model....



A first look at the mental model, represented by this causal loop diagram, shows ten main balancing loops and three reinforcing loops. These loops will be discussed in more detail in a moment. Also, there are four important stocks identify in this diagram, which represent the main accumulations in the system. This section continues with a brief description of each loop, followed by an explanation of “new” variables introduced in each loop. Balancing loops are identified with the letter “B” followed by a number. Reinforcing loops are identified with the letter “R” followed by a number. Extreme Events are referred to as “XE” in the decision and policy sciences literature.

The Media Influence

Much of the literature dealing with agenda setting and the policy process discusses the importance of media perception and “causal stories” in forcing issues on the agenda (Stone 1997). Media coverage” is not defined as an accumulation in the system. Rather, as the literature suggests, the coverage responds to events in a way that influences public perception of disaster “problems.” In *After Disaster*, the author discussed specific qualities of different events, which made some of them inherently more attractive news stories than others (Birkland 1997). The classic example in the book compares news coverage of a nuclear reactor leak with news coverage of an oil spill. Suppose you are the managing editor of the New York Times and you have to decide which is the more interesting story, an oil spill or reactor leak. The oil spill is

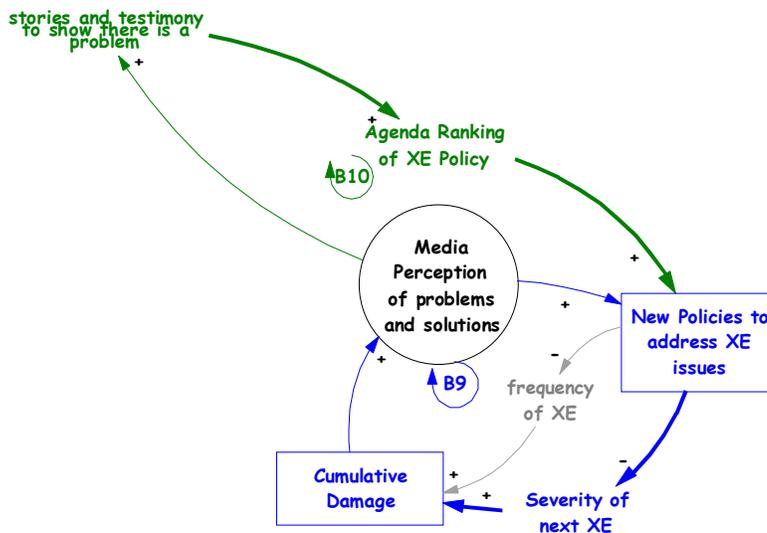
potentially a more “attractive” story because of the visual power of the event, even though the reactor leak is potentially more harmful to a wider scope of the population. The decision is likely to be based on the strength of an event’s “story” relative to other stories available to you. There are not many pictures one can take of a nuclear power plant building before the story gets old and slides off the front page. Oil spills, on the other hand, are easily photographed and carry a large “symbolic value.”⁶

B10: “Is there a problem?”

- *Starting with Damage:* As Damage caused by the disaster event increases, the media develops a perception that there could be a problem here. As media perception increases, there will be more stories suggesting there is a problem needing our attention. As the number stories suggesting there is a problem increases and public perception grows (not explicitly drawn here) the issue will climb up the agenda. This will result in action by Congress, resulting in new policies to address the issue. Ultimately, more policies to address the issue will reduce the future damage. This creates a balancing loop.
- So then my task becomes to find out, ‘exactly what type of damage will keep an issue alive?’

B9: ”Which solution is ‘perceived to be’ the best?”

- On the other end, there is competition for media attention on the solutions proposed by different coalition groups. The media perception of the solution can influence policy. Again, this creates a balancing loop.

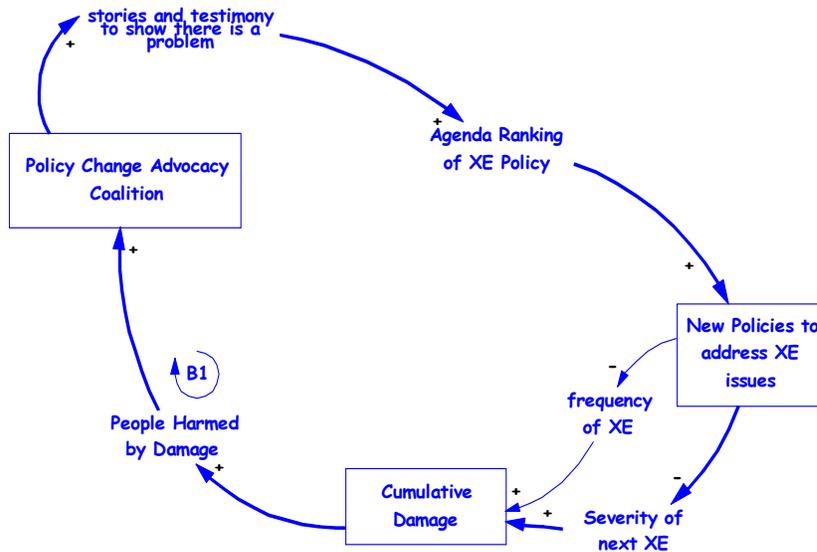


While the media perception deals with the short run dynamics in the system, I think the more interesting explanations deal with how coalitions develop over time and how they influence the agenda.

⁶ In the case of the Exxon Valdez, there were camera crews taking photographs of birds covered in oil. These images became symbols the media used to keep stories alive, creating a public perception that a problem existed.

B1: “Balancing the Damage”

Starting again from Damage: As damage increases, there will be more people harmed. Some fraction of these people will form a coalition to change the existing policy. These folks will create “causal stories” suggesting that there is a problem. If the public (and the media) agrees with their version of the story, the issue will reach the agenda (Schattschneider 1975). Again, completing the main balancing loop as more new policies are created to reduce future damage caused by the next event.



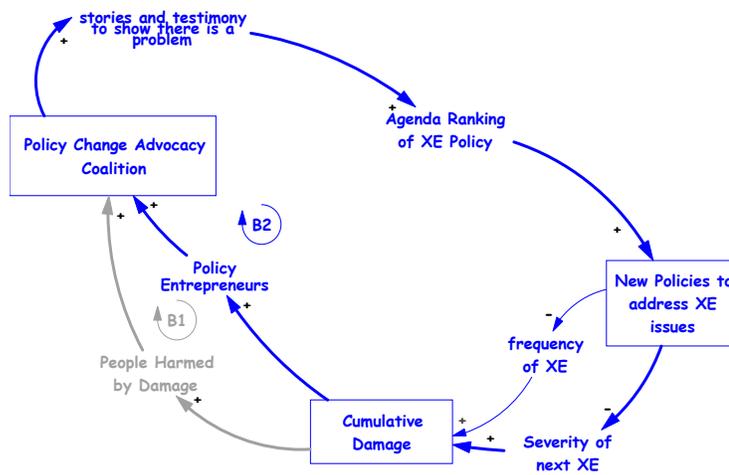
New Stocks to discuss

Cumulative Damage – this is the same as the Long Term Damage mentioned earlier. I am suggesting here that there are two components of damage: severity and frequency. If we can not prevent the frequency of the events perhaps we can reduce the severity of the damage.

Policy Change Advocacy Coalition- I think the best way to think about a coalition as a stock is to think about their strength. We could see that it does help to have a lot of people in your coalition. But what makes it strong? This question is addressed in the next diagram.

B2: “Get by with a little help from my friends”

Starting from Damage: As damage increases there will be a group of people called Policy Entrepreneurs⁷ who observe the damage and will eventually become “inspired” to join the cause. These players build strength in your coalition. As the strength builds you will be able to now not only push stories to the public but you will have more direct testimony in front of Congress. As these two things build, your issue will rise to the top of the agenda. The result (potentially) will be better policies and less future harm – completing the balancing loop.



New Stocks to Discuss

Policy Entrepreneurs: To keep the diagram coherent, I decided not to box this stock. In part, because I am learning that some of these folks do not stay with the cause for very long.

Agenda Ranking: Again it is not boxed. In the current model there are two agendas (Institutional and Decision as discussed in the literature) that are very important. I represent those stocks as one concept here. We could think of this agenda as a scale from 0 to 100 for example. If the issue ranking was high enough on the agenda (over a threshold of 50 for example) then there would be a guarantee that some new policy would result.

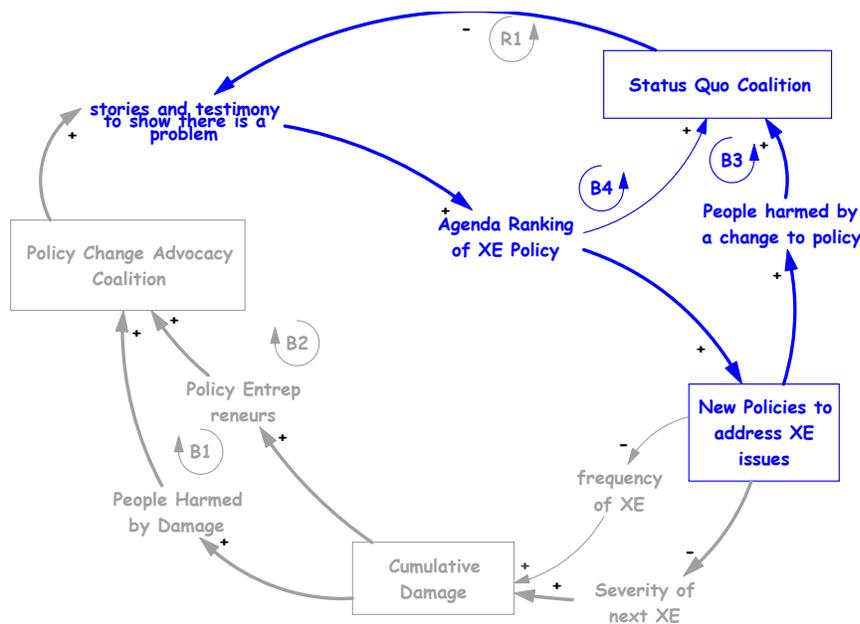
⁷ These are folks who know something about the issue and understand the political process very well. You will need these people if you wish to advance your issue on the agenda.

B3: “Building a stifling status quo”

Starting from New Policies: There will always be some group of people who fear a change to status quo (from Prospect Theory). In fact, other groups of people might be directly harmed by a new policy. These people form a dominant status quo coalition (Sabatier 1988). The status quo attempts to keep items off the agenda (Cobb and Elder 1983). The literature suggests that they probably have some desired “goal” they seek for the issue’s agenda ranking.

B4: “The dominating agenda of the status quo”

Starting from Agenda Ranking: In the same way we can talk about policy entrepreneurs there, there will be a group of folks who can work the system on behalf of the status quo. Thus, as the issue rises on the agenda, the status quo will mobilize. The status quo can attempt to divert the issue on the agenda by creating alternate “causal stories” to suggest that the issue is not a problem at all. Also, these folks are conflicted by whether or not to “address” the issue with Congressional testimony. If they decide to do nothing then only one version of the story is out there. If they speak up then the issue’s agenda ranking will rise.

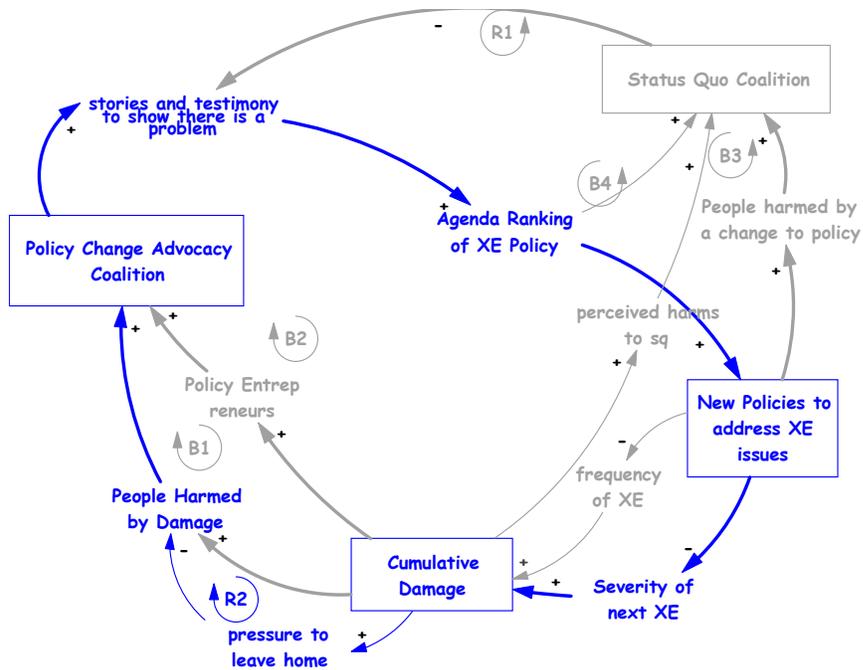


New stock to discuss

Status quo Coalition: The strength of the status quo probably rests more in its numbers. In some ways we could be lethargic at times. However, the sheer size will control much of the agenda once it perceives a threat to its position.

R2: “The damaging death spiral”

Starting from Damage: How much damage can you bear? As the damage increases, the pressure to leave home will increase. As they leave, there will be fewer harmed, resulting in a smaller coalition for change. Basically, this creates a “death spiral” for the change coalition, as the coalition won’t be strong enough to keep the agenda or the policy alive. The result will be more and more damage until the population either moves out or in the worst case scenario, it literally dies off if the damage is too severe

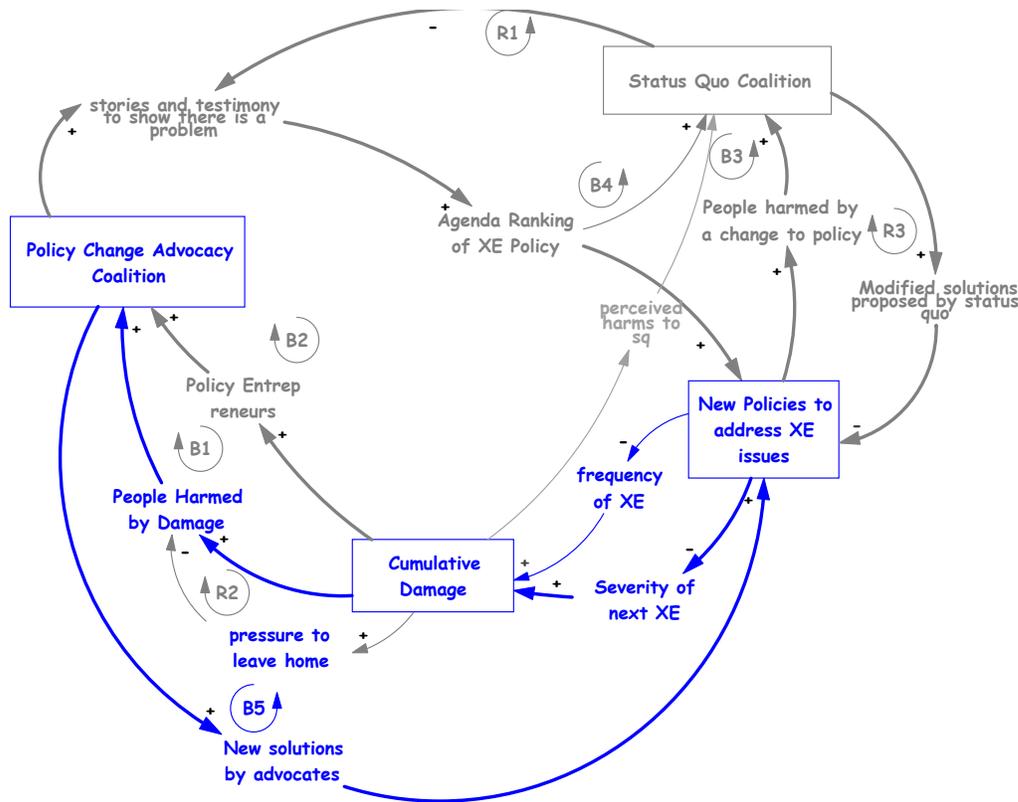


New Variable

Pressure to leave home: This is pretty straight-forward. If you have to keep rebuilding your home because you live in a hazardous area then perhaps one day you decide it is better to just leave. Another way to think of it is that maybe either market forces or the government steps in and pressures you to move (e.g., with high mandatory insurance rates) .

B5: “New policies that may work”

- *Starting from Damage:* Increasing cumulative damage mobilizes the advocacy coalition. The advocates for policy change come up with their own solutions to the problem. Some fraction of the proposed policy solutions will be accepted to help alleviate the damage caused by these events. But how effective will these policies really be?

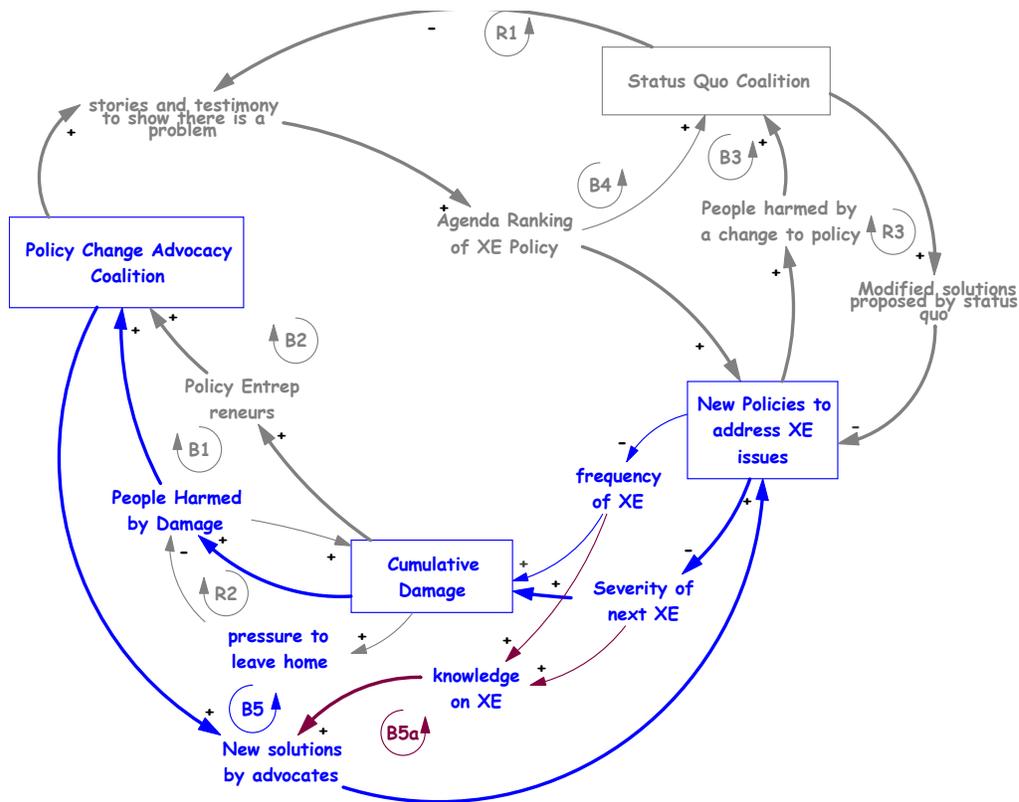


New stock to discuss

New solutions by advocates: These are solutions proposed by people who want to eliminate the damage. This is a bit of a tricky concept and perhaps the wording I use here does not explain the variable as precisely as I need to discuss. We are not really talking about number of solutions or number of policies but we are trying to get a measure of “effective policies.” You may then ask, “How can we have effective policies in a model that doesn’t show how we learn about problems?” This loop could be renamed “we have to do something, anything!” My intuition is that when we send up solutions not grounded in anything learned about the problem we will seek “Relief” policies rather “Mitigation” policies.

B5a: “Knowledge is Power”

- *Starting from New Policies:* Perhaps one of the driving leverage points in the model will rest here in this loop. How much can we learn about the problem? If the current policies are ineffective and the frequency and/or severity of the of the damage continues. There will be an increase in growth of relevant knowledge. (This leads to better judgments - Lens Model). This helps us create better policies to address the real problems we are trying to mitigate. Thus, as better solutions are proposed, less damage will accumulate, which is basically the goal for these folks. This avoids a trap where we are merely “putting out fires” with relief instead of preventing them with mitigation.



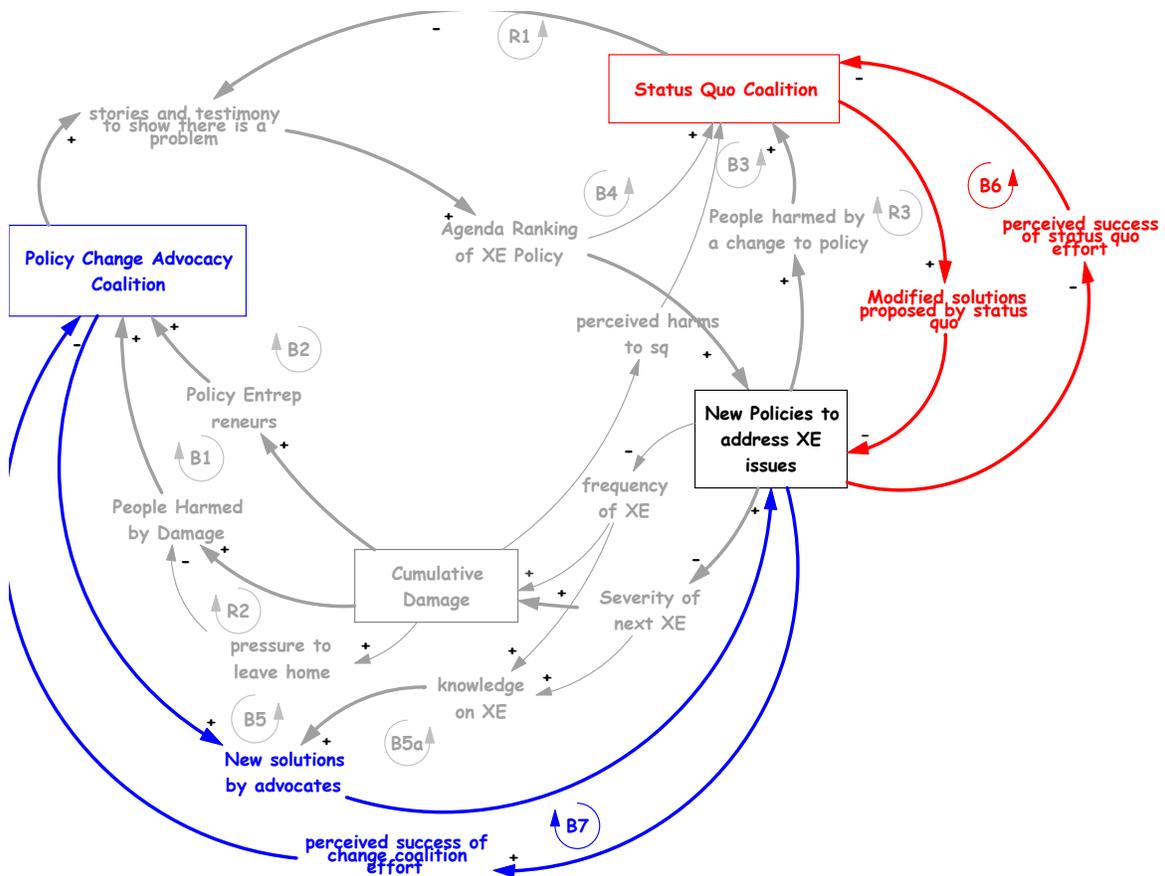
New Stock to discuss

Knowledge on XE: This is an important stock in the model.⁸ As knowledge accumulates (and maybe I should say relevant knowledge since literature from every discipline suggests that these are tough problems to solve. However, just because problems are difficult does not mean they are not worth studying. I would suggest just the opposite should be true. The severity of damage can always be mitigated with creative analysis.

⁸This variable should be boxed as a stock.

B6&B7: “Competing versions of the truth”

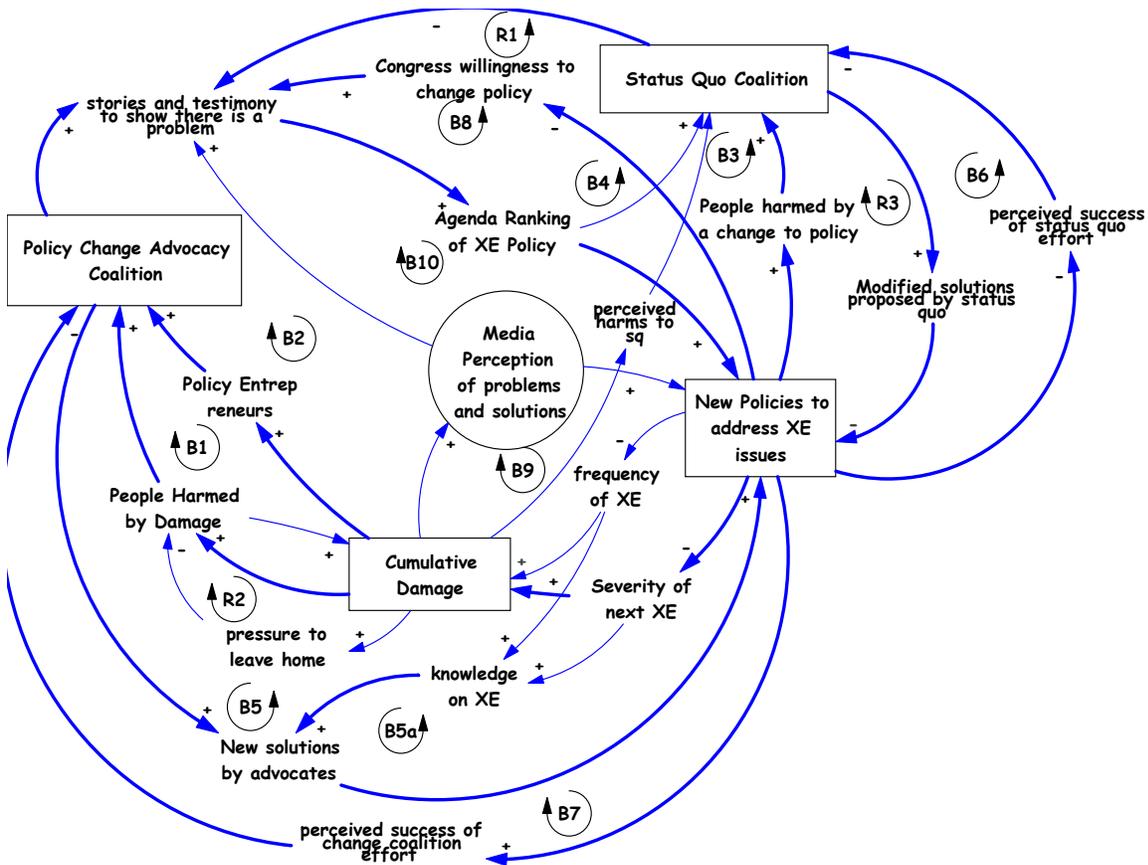
- *Start from New Policies:* There are two groups who have competing versions of how something should be resolved. They have two very different goals for the strength of “new policies to address XE” - Status quo would like that strength to be close to (if not) zero. That is, the status quo would prefer no additional “new” policies. The Change Coalition seeks new policies that are strong enough to mitigate the damage they are perceiving at the moment. In the end these are two balancing loops seeking different goals
- Policy solutions need to be sold just as “causal stories”.
- The solution perceived to be the best will win.
- The other group will feel pressure to come up with better solutions.
- Or.... If 1 group dominates this arena - the other’s power will be diminished



New Variable

Perceived success: Both groups have essentially the same variable with different goals to influence these perceptions on “success.” Therefore, we can measure success in relative terms to some goal they have for the policy.

Putting All of the Pieces Together....



Preliminary Insights from the Causal Loop Diagrams⁹

The three reinforcing loops make things problematic for any coalition desiring change to the current policy. As I stated earlier, I think loop B5a will be an important loop in this model. How can administrative agencies learn more about the problem, gain knowledge, develop more effective policies, and convince Congress that these policies are worth pursuing – all in the face of a status quo (for which the agency helped create) - who wants to keep new policies off the agenda? The challenge for administrators comes as they try to create a wealth of “knowledge” on the particular event in times when the status quo still dominates the agenda. At what point do administrators sacrifice resources, which can be used for short term policy “relief,” in order to further their knowledge and develop better long term “mitigation” policies. What policy mix will work best in the long run? Can we afford to lower today’s “capacity” for preventing damage if it may (potentially) guarantee long term benefits. This appears to be a major problem with disaster policies. In fact, any policy where there is great uncertainty about the benefits faces a natural tendency for the status quo.¹⁰

⁹ The model is currently a work in progress and will be available upon request.

¹⁰ If we agree with the insights from Kahneman and Tversky's Prospect Theory.

Discussion for further research

First, in the causal loop presentation, I illustrated several unintended consequences and a few key points of leverage. I plan to test these ideas and develop policy recommendations for several types of disasters, showing how and/or if the model would have a behavioral change when a large event “shocks” the system. My intuition tells me that we will not see a behavior change unless we are in the most extreme cases. Second, the literature suggests that “potential” focusing events need just the right set of conditions in order to become actual focusing events. The model will test “shocks” to the system under all possible conditions to determine how large and at precisely what time extreme events are most likely to becoming focusing events. Finally, I would like to test the previous theories on agenda setting and policy making by including an administrative agenda that would be acceptable to policy analysts and the political scientists in terms of efficiency and political viability respectively.

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