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Clark County Pre-Disaster Mitigation Project: Suggestions for Project Initiation

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Jim: official project title?

Summary

Attention to several organizational issues will facilitate the efforts of the Clark County regional Pre-Disaster Mitigation project. Key considerations include defining terms efficiently, establishing and maintaining a clear timeline, determining rules for acceptability of new information, determining the nature and boundaries of concerns to be addressed, evaluating a full range of mitigation options, considering how to manage uncertainty, and ensuring stakeholder buy-in and participation. The NOAA seven-step process should serve as an operational template. Project participants should anticipate substantial uncertainty, and consider probabilistic methods (e.g. Monte Carlo analysis) for coping with uncertainty within a GIS framework.

Introduction

States, regions and municipalities have been conducting broad-based risk comparisons for nearly two decades. This experience, coupled to information from FEMA and NOAA, should provide guidance for the exercise, but also create a challenge. Typically, these exercises require several years, and in few cases have they been completed in the originally projected time frame. The Clark County regional PDM, however, has an externally determined schedule, and should use this as incentive to proceed efficiently. Finally, the NOAA seven-step process appears to be a useful template, but should be tailored to the needs of Clark County.

Key Components for Successful Project Initiation

Defining terms.

One chronic problem when dealing with risk, vulnerability, hazards, and related issues is not so much which terms to use, but ensuring that all involved in discussions agree to key terms. Inconsistent use of terminology regularly leads to unnecessary friction. While discussing terms is a necessary exercise, it should be neither time consuming nor contentious. An appropriate starting point is the definition of vulnerability provided by FEMA. As the project progresses, PDM project participants should keep in

mind that apparent disagreements may be simple miscommunication.

In selecting a definition of vulnerability, members should keep in mind the difference between “marginal” and “overall” risks. Public and private institutions already have in place procedures and equipment (including prevention plans and insurance) for managing vulnerability; marginal risk is that portion that has not yet been adequately addressed.

Establishing and maintaining a clear timeline.

Completing an exercise of this sort regularly takes longer than expected. A timeline for the PDM should be clearly specified and diligently followed.

Determining the nature and boundaries of concerns to be addressed.

To some extent the vulnerabilities assessed will be driven by FEMA directive. However, it is likely that project participants will be interested in issues beyond that scope. Project planning should include discussion about what sorts of hazards are appropriate for consideration, and establish criteria (effect, jurisdiction, etc) for consideration.

In addition, the PDM project should determine up front whether it will evaluate *effects* or *causes* as a focal point.

Evaluating a full range of mitigation options.

When mitigating potential hazards, a broad range of mitigation options should be considered. These include¹

1. Modify the natural or human environment. For example, to avoid casino fires, stay out of casinos.
2. Avoid or modify exposure process. For example, prohibit smoking in sensitive areas of casinos.
3. Avoid or modify effects process. For example, install automatic sprinkler systems in casinos.
4. Compensate effects. For example, pay for property loss and injury resulting from a casino fire.

It can often be much more cost effective to achieve the same reductions in losses in one of these categories than in another. Note, however, that choosing different categories can also redistribute responsibility and expense, and can be socially or financially contentious. Disagreements about appropriate mitigation based on distributive grounds should not be confused with disagreements about technical information. Also along these lines, it is important to differentiate economic-based decision making from human health-based decision making.

Considering how to manage uncertainty.

All of the issues that will be considered in this project are characterized by low probability of occurrence and high consequence. This type of risk is particularly difficult to estimate and to manage. The project may want to consider evaluating each potential hazard in a variety of terms including expected range of effects (along a number of dimensions including total cost, loss of life, extent of injuries, distribution of effects) and plausible worst-case scenarios. Experience suggests that point estimates of highly uncertain risks should be avoided, and both qualitative and quantitative information about

uncertainty should be propagated. Project participants should keep in mind that uncertainty is inherent and often irreducible. As such, decisions made based on point estimates of any single dimensions, while appealing, often have little or no reliability. Opportunities to incorporate probabilistic methods for dealing with uncertainty (e.g. Monte Carlo Analysis) into the GIS framework could be a useful exercise.

Ensuring stakeholder buy-in and participation.

The PDM project has the advantage that the major jurisdictions have already decided to participate. However, participants should keep in mind that “retrofitting” participation is generally difficult and ineffective. Added participants need to be brought up to speed – a time consuming exercise – and may not agree with decisions made by existing members. The committee may therefore wish to consider the extent that expertise and expenditures may come from parties not currently at the table. In addition, to the extent that public trust and credibility may be necessary for effecting mitigation measures, attention to public acceptance and participation should be considered. Since GIS will serve as the primary coordination tool, all efforts should be made to ensure transparency and clarity.

Determining rules for acceptability of new information.

A frequent stumbling block for this sort of process is the acceptability of information sources. When uncertainties or unknowns arise, project members should discuss which sources of information they will access prior to evaluating the information provided by those sources. Experience show that issues are not effectively resolved when each of several parties to a disagreement brings in its own experts. In contrast, when parties in disagreement mutually select expertise, resolution is likely.

Comments on the NOAA seven-step process.

The seven-step process proposed by NOAA appears to be a viable and efficient approach to the Clark County regional PDM project. Some comments:

1. Hazard Identification. This should be a brief but exhaustive brainstorming exercise. Participants should generate independent lists, in consultation with diverse parties and interests throughout the area. All plausible hazards, broadly defined, should be included at this point. Participants should avoid mixing causes and effects on a single list.
2. Hazard Analysis. This step should involve scoping out the possible severity of different hazards, along a number of dimensions. In evaluating the possible extent of different hazards, analysts should accept that there will be substantial and possibly irreducible uncertainty. Generating a matrix (such as that presented below in table 1) might be advisable.
- 3 – 6. Critical Facilities, Societal, Economic and Environmental Analyses. These should be centrally coordinated, but can be done contemporaneously. Finding appropriate and available individuals to perform this type of analysis is often a serious challenge.

7. Mitigation Opportunities Analysis

As discussed above, it will be useful to consider a wide range of mitigation measures. Project participants may wish to simultaneously consider a range of issues including cost-effectiveness, expected and plausible cases, and so on. A broader range of participants may be needed at this stage, based on who will bear the costs of assorted mitigation measures. Again, a matrix such as that in table 2 might be advisable.

Table 1. Hypothetical matrix for hazard analysis. Hazard: collapse of spaghetti bowl.

Extent of hazard	Causes	Event Likelihood	Loss of life	Property damage	Uninsured losses	Emergency response expenses
Partial collapse	Airplane accident	(undefined)	10 to 210	(undefined)		
Partial collapse	Earthquake	(undefined)	0 to 10	Etc		
Complete collapse	Airplane accident	(undefined)	210 to 500			
Complete collapse	Earthquake	(undefined)	10 to 200			

Table 2. Hypothetical matrix for mitigation opportunities analysis. Hazard: collapse of spaghetti bowl.

Type of mitigation	Measure	Viability	Relevant actor
Modify the Natural or human environment	Close or dismantle the Spaghetti Bowl	Implausible	State / County / City of LV
“	Reinforce Spaghetti Bowl	Expensive	Engineers
Avoid or modify exposure process	Minimize rush hour congestion	Plausible	Regional Transportation Commission
Avoid or modify effects processes	Enforce seatbelt and car safety standards	Plausible	NHP, DMV, car owners
Mitigate or compensate for effects	Require private insurers to cover	Plausible to expensive	Insurance Companies, car owners
“	Purchase County/State insurance	Plausible to expensive	Government

1. After Morgan, G. and ...