The Mitigation Model: A Path Toward Resilience

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Executive Summary

The economic and human cost of disasters is rising unnecessarily. Building resilience to natural hazards risk is both possible and essential to community long term sustainability. Mitigation\(^1\), in its broadest sense, is the path to resilience.

The Federal Insurance and Mitigation Administration (FIMA) Incentives Initiative was initiated to increase the likelihood of community action. The Initiative undertook six incentive pilots and based on findings and outcomes of the pilots, the Mitigation Model (the model) was created. The model establishes mechanisms and incentives for local risk reduction action and consists of three focus areas: partnerships, recognition/rewards, and regulatory and economic alignment, described below.

- **Partnerships**: Establish collaborative programs and more extensive partnerships throughout the private and public sectors.
- **Recognition/Rewards**: Understand the value of recognition and rewards and develop the tools to motivate communities and other partner groups.
- **Regulatory/Economic Alignment**: Recognize the existing barriers to progress and develop ways to reduce those barriers. The community’s operating context play a vital role in which mitigation action will or will not be taken.

This document lays out recommendations for developing the overarching model, including:

- Establish a management structure that implements recommendations and moves effort forward
- Develop, implement and communicate an Action Plan to operationalize the model

The benefits of implementing the model include integration, collaboration, increased communication, local understanding of community needs and capabilities, community empowerment, and tangible benefits to FEMA (such as increased institutional knowledge and/or a means to achieve Whole Community principles and FIMA strategic goals). We can not only achieve these benefits, but we can also move one step closer to realizing our goal of national resilience.

\(^1\)As defined by FEMA, hazard mitigation is “sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects”. As discussed in Schwab, et al, *Hazard Mitigation: Integrating Best Practices into Planning*. PAS Report 560, APA, May 2010, mitigation must also include a loss prevention function characterized by planned, long-term alteration of the built environment.
Background

Natural disasters are becoming increasingly expensive\textsuperscript{2}, unnecessarily so. There are multiple and varied opportunities to support communities to reduce risk and increase resilience to natural hazards, primarily through mitigation. Resilience, as defined by the United Nations International Strategy for Disaster Reduction, is “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions”\textsuperscript{3}. During Congressional testimony, the Administrator of the Federal Emergency Management Agency (FEMA), Craig Fugate, stated that “FEMA has the lead role in helping communities increase resilience…through risk analysis, risk reduction, and insurance”\textsuperscript{4}, all Federal Insurance and Mitigation Administration (FIMA) functions.

Hazard mitigation, the lessening or limitation of the adverse impacts of hazards and related disasters\textsuperscript{5}, is therefore both an essential part of community resilience and critical to implementing FEMA’s mission. Reducing hazard risk becomes even more integral to resilience as demographic, economic, political, and climate variables shift and interact in new and increasingly unpredictable ways, escalating our separate and collective vulnerability to disasters.

Ultimately however, all risk reduction action is local, and despite the fact that evidence demonstrates the value of mitigation, there remain multiple challenges to local action, such as:

\textit{Mitigation can be difficult to accomplish.} There are many competing priorities at the local level as well as a multitude of state and federal programs, funding sources, and a confusing array of mitigation alternatives. Garnering political will, coordinating programs, and implementing actions to reduce risk is challenging.

\textit{Mitigation is not a widely established community value.} The idea of reducing multi-hazard disaster losses through prevention and long-term mitigation actions is not universally embraced. It is often a forgotten consideration in long-term sustainable development.

\textit{Limited public resources.} Given the state of the economic recovery, budget deficits, and other funding stressors, public funding of mitigation and other social programs will be limited; therefore, funds must be leveraged to the highest extent and means to engage non-profits and the private sector must be explored.

\textsuperscript{2}http://www.emdat.be/database
\textsuperscript{3}http://www.unisdr.org/we/inform/terminology
\textsuperscript{4}http://www.dhs.gov/ynews/testimony/20111025-fugate-emergency-management-reform-act.shtm
\textsuperscript{5}http://www.unisdr.org/we/inform/terminology
Increasing uncertainty. Population growth, shifting demographics, ongoing globalization, economic uncertainty, and climate variability directly and indirectly impact local decision-making and implementation ability.

Successful mitigation is invisible. When a natural disaster occurs, damaged areas receive significant attention. Effective mitigation strategies such as land use planning and building code adoption, are easily overlooked and their value insufficiently understood to be a catalyst for more action.

In an effort to begin addressing these challenges, FIMA launched the “Incentives Initiative”. The goal was to develop and pilot a select list of incentives to encourage community-initiated mitigation. A team of FEMA Headquarters, Regional, and private resources was created to develop ideas and prepare a business case to FIMA leadership on whether those incentives should be operationalized, and if so, how.

Three key findings arose as the team undertook the effort:

- Incentives for mitigation work, but the current approach is ad hoc and opportunistic when it should be a key part of an ongoing strategy for FIMA
- Support processes and mechanisms need to be developed and established in order to facilitate incentive establishment and evolution
- Risk reduction incentives must be characterized by the following principles: education and communication; innovation and continuous improvement; integration and collaboration.

As a result, the team concluded that individual incentives are valuable, a strategic and sustainable approach is necessary to most effectively address the identified challenges and encourage community-initiated mitigation. That approach is the “Mitigation Model” (the model). For reference and as examples of implementation of the model, the individual incentive pilots (Public-Private Partnerships, Resilient Communities Index, Innovation Campaign, Bond Ratings, Tax incentives, and Risk MAP Credits) are described in detail in the Appendices of this document.
The Mitigation Model

The goal of the model is to increase community resilience to natural hazards by establishing mechanisms and incentives to enable local risk reduction action. The model aims to facilitate collaboration and identify and build on existing organizational resources and strategies in new and creative ways to reduce risk and increase resilience. Where the regulatory and economic conditions are not conducive to communities reducing their exposure to hazards, long-term changes to support community action will be identified and implemented. These activities will be approached holistically and integrated into local contexts.

The Mitigation Model consists of three areas of focus:

**Partnerships for Action.**
FIMA will create a Partnership Strategy to assist with the development of collaborative, information sharing, and mentoring programs to support increased and effective risk reduction action.

By fostering more extensive partnerships, FIMA seeks to:
- Engage a broader audience, particularly specialists with expertise in physical and economic development, to realize the multiple benefits of mitigation
- Recognize opportunities for increasing local community resilience
- Support peer-to-peer learning and collaboration
- Create a network of local mitigation ‘champions’ and expedite diffusion of best practices
- Develop mechanisms and processes that enable public/private entities to leverage resources to increase risk reduction action.

The approach encompasses both private sector and local community engagement and within each, an effort to coordinate with other Federal agencies to identify synergies and additional opportunities.

**Private Sector Engagement**
Through engagement with the private sector, communities are able to leverage their limited resources in a variety of ways. Communities can receive monetary contributions that extend local budgets and improve services to citizens, technical support to address a specified challenge, or pro bono services that increase a community’s capacity and capabilities. There are also direct benefits to the private sector that range from reduced down time after a hazard event to increased competitive advantage that directly improves the bottom line.
The model seeks to maximize these opportunities by developing a ‘mitigation engagement strategy’ for FEMA’s Private Sector Division. The strategy will contain a two-pronged approach: one that focuses on establishing broader partnerships either at the National or Regional level and another that establishes the processes and tools that enable local communities to form risk reduction partnerships.

The Incentives Initiative demonstrated how partnerships can lead to successful outcomes. The pilot facilitated the transfer of publicly available Federal hazard and risk analysis data to on-line weather service provider Weather Underground to develop a free and publicly available national hazard mapping tool. Weather Underground incorporated FEMA and other Federal agency hazard data into layers of mapping showing the potential impacts of various hazards on geographic regions that can be used as a decision-making tool for local planning and investment.

**Community Engagement**

Behavior change takes time and all too often it takes an immediate threat to motivate action. In 2011, weather related disasters cost more than $11 billion; we must work better, sooner. As part of the Partnership Strategy FIMA, will work with the Natural Hazard Mitigation Association (NHMA) and other associations to establish or enhance mechanisms for issue-based problem solving and expedited diffusion of best practices.

The specific outcomes from those efforts are community networking systems that foster collaboration, enhanced peer-to-peer learning, and a broader acceptance of risk reduction for resilience. These systems will exist through a variety of different channels: in-person meetings such as conferences and workshops as well as virtual forums in order to most effectively reach and engage the broadest possible audience. The effort will seek to leverage the outcomes from

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Project Impact\(^8\), projects already initiated under the HUD Sustainability Partnership in 2011 as well as other Federal initiatives such as the Environmental Protection Agency’s (EPA) “Smart Growth” and the United State Army Corps of Engineers (USACE) “Silver Jackets”.

**Recognition and Rewards to Motivate Action.**

Recognition can take many forms, including financial and non-financial awards. Recognition for accomplishments is a strong driver and the model seeks to establish a strategy to recognize contributions to risk reduction and community resilience by academia, public, and private sectors.

The first component, currently underway, is to establish an internal FIMA system for measuring resilience. The system will quantify communities’ progress in mitigating their risk exposure to natural hazards and allow for a transparent and replicable index of communities that proactively seek to mitigate and avoid the impacts of natural hazard events. The index can then serve as a platform for recognizing and rewarding those communities through existing FIMA programs. The data elements used in the index can also be made available to the public and used as factors in other recognition systems, such as the Community and Regional Resilience Institute’s Community Resilience System\(^9\) or the STAR Community Index\(^10\).

Academia and the private sector also have a large role to play in community resilience. Research and development related to risk reduction activities are critical for mitigation practitioners. Innovation in design, application, and practice are essential ingredients to long-term sustainability, particularly in the context of increasing uncertainty. Fostering a culture of problem solving through peer recognition, either by other communities or by professional organizations, demonstrates what is possible and that risk reduction is desirable.

There are many examples of recognition and reward programs. The EPA has ENERGY STAR, which recognizes manufacturers for producing energy efficient appliances. The U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) has developed a data-driven, iterative recognition model that is nationally comparable and independently verified, and FEMA has its Community Rating System, recognizing communities for sound floodplain management and providing cost-savings on flood insurance.

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\(^8\) During the late 1990s, FEMA’s Project Impact started as an effort to bring communities, businesses, non-profit organizations, and government together in a collaborative manner to address mitigation issues at the local level, with FEMA being viewed as partner and facilitator as opposed to overseer of the program.

\(^9\) The Community Resilience System (CRS) is a web-based system that can help communities assess its capacity to withstand and recover from significant disturbances
http://www.resilientus.org/community_resilience_system_initiative.html

\(^10\) STAR is a strategic planning and performance management system that will offer local governments a road map for improving community sustainability.
http://www.icelion.org/index.php?id=1487&tx_ttnews%5Btt_news%5D=4560&tx_ttnews%5BbackPid%5D=983&cHash=35a9fe2578
Ensure an Action-Enabling Regulatory and Economic Context.
Resilience is the ability of a community to anticipate risk, limit impact, and bounce back rapidly through adaptation, evolution, and growth in the face of turbulent change. It is a long-term approach that requires an enabling environment in order to be sustainable. To ensure that mitigation is sustained over the long term, it is essential that the operating environment be aligned with and supportive of community and private mitigation efforts.

The two main drivers in the current operating environment are regulations and economics. To foster continuous progress toward resilience the existing context must be evaluated and modified to both reduce institutional barriers to and facilitate opportunities for local risk reduction action.

Examples of successful long-term strategies include EPA’s recent success in developing tax credits for energy efficiency. While this system took significant time, effort, and resources to achieve, it has successfully integrated key components of EPA’s environmental strategy (environmental sustainability and climate change) within the tax code to achieve its goals. Tax credits for individual risk reduction action are still a viable and powerful opportunity.

“Right pricing” the cost of money is another powerful opportunity. In other words, the cost of borrowing money should be commensurate with the real risk of repayment. A community would be evaluated on its long term vulnerability to a natural hazard and its ability to repay a loan. Bond ratings would be in line with the risk associated with repayment as indicated by a community’s resilience. Ultimately, the broader mitigation community must analyze and identify regulatory, economic and other opportunities for structural change that can be strategically implemented.
Benefits of the Initiative and the Mitigation Model
The Incentives Initiative was initiated in April of 2011 and FIMA has already derived a number of benefits in a few short months. These include:

*Integration across FIMA.* Enabled integration across FEMA programs and geographic areas (Headquarters and Regions), which resulted in an increased exchange of knowledge across the organization.

*Institutional learning.* Increased our understanding of community capabilities, needs, and existing resources as well as what organizations already exist to support them.

*Relationships with partners/stakeholders.* Built upon or created relationships with the FEMA Private Sector Division, NHMA, STAR/ICLEI, the Association of State Floodplain Managers (ASFPM), Weather Underground, Moody’s, and a number of universities. Our efforts to listen, engage, and incorporate their suggestions enhanced our credibility as a true partner. More concretely, the Initiative also assisted in the proof-of-concept for Risk MAP GIS Vision through the partnership with Weather Underground.

*Commitment to “Action”.* Demonstrated FIMAs commitment to “action” as both a principle and as a measure of progress toward resilience by searching for ways to reduce barriers or enhance opportunities for communities to reduce risk.

Implementation of the model can help to overcome the challenges to mitigation discussed earlier and lead to additional benefits as described below:

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**The Crawford County Highway Shop was acquired and removed from a hazard area of Wisconsin’s Kickapoo River, avoiding $3.9mm of losses and returning 592% on investment.**

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*Mitigation will be easier in the short and long term.* Through increased partnerships; additional, visible benefits to taking action; and increased alignment with the financial and economic operating context over time, the model will reduce the barriers to communities being able to mitigate.

*Empower communities and citizens.* By building on lessons learned from FEMA’s Project Impact, the model can also enhance community ownership of mitigation and resilience. The Project Impact model both inspired and empowered local ownership of not only disaster-related problems, but also of solutions.11 It also promoted a culture of collaboration and sharing at the local level.

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*Provide resources to initiate action (financial and non-financial).* The Initiative started as a way to develop and implement incentives for communities surmount the obstacles to mitigation. The incentives can continue to be developed while simultaneously implementing the model.

*Increase partner relationships.* Implementing the mitigation model is an opportunity to engage with local communities, associations, other Federal agencies as well as other Divisions within FEMA to build societal capacity in support of the Whole Community concept. The Initiative highlighted a real appetite on the part of each of these groups to grow mitigation; an inclination that ought to be fostered.

*Increased recognition of the real value of mitigation.* Enhancing partnerships by increasing opportunities for communication and collaboration will highlight how mitigation saves both lives and money.

*Implement broader FEMA initiatives.* The model is a mechanism to increase resilience through action and directly supports the principle themes and concepts of Presidential Policy Directive-8 (PPD-8) on “National Preparedness” and the concept of Whole Community as described by Administrator Fugate.

It is also aligned with the three goals of the FIMA Strategic Plan:

- **Value People and Relationships** through collaboration and integration.
- **Enhance Credibility** through partnerships with communities to deliver relevant and adaptable programs that meet the community’s specific needs.
- **Advance Disaster Resilient, Sustainable Communities** by increasing awareness of risk and risk reduction through mitigation.

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Sonoma County, California, elevated 196 structures between 2001-2008, leading to avoided losses of $13.5mm and a return on investment of 96%.
Implementing the Mitigation Model

There are as many ways for a community to be resilient as there are communities. The goal of the model is to support the full spectrum of those efforts in a structured and transparent way that has measurable outcomes. While the model as proposed will require dedicated resources, it is not intended to become a stand-alone department. Rather it is meant to be a coordination function that fosters broad based collaboration to achieve mitigation. There are two specific recommendations for implementing the Mitigation Model.

Recommendation 1: Establish a management structure

A governing body should be designed to oversee the implementation of the Mitigation Model, particularly in support of the Regulatory and Economic Alignment focus area.

- **Actions Committee**: Primary functions of this committee are to steer the progress of the model and to develop an on-going action plan for its continued development. Secondary functions include continuing the current Incentives Initiative pilots as well as the development of new incentives as others take root or come to completion. This committee should be an integrated team consisting of members from across FEMA, including FIMA members from Risk Analysis, Risk Reduction, and Risk Insurance, members from FEMA’s Private Sector Division, as well as other partners/stakeholders as deemed necessary.

- **Committee Chair**: The Committee Chair needs to be familiar with the work of the Incentives Initiative, ability to implement the model, and ideally be from the Risk Analysis Division.

- **Dedicated Staff**: We recommend that two dedicated staff members below the Committee Chair conduct the day-to-day business of implementing the model as well as managing the progress of the incentives. It is imagined that the team would be led by a GS-13 supported by a GS-12. A position description would include: independent self-starter, excellent managerial and communication skills, stakeholder engagement and relationship-building skills, knowledge of emergency management and mitigation.
Recommendation 2: Develop, implement and communicate the action plan

This recommendation addresses a number of outcomes and deliverables in order to bring the Mitigation Model to life.

- **Action Plan/Roadmap**: In order for the Actions Committee and Lead to map implementation, an Action Plan outlining vision, objectives, and more importantly, implementation steps and schedules will be required.

- **Outreach Strategy**: As the model comes to life, it should be communicated across multiple levels. To do so requires that we identify all stakeholders; develop proper messaging and appropriate channels for message delivery; and that our communication is coordinated with other non-profit and special interest groups.

- **Partner with NHMA**: NHMA has committed to establishing a national communication channel for FIMA, States, and local jurisdictions so they may share experiences and expertise that will stimulate and augment each other’s mitigation efforts.

- **Continue/Close out Incentive Pilots**: The Incentives Initiative working groups have already researched and developed plans for six specific incentive pilots. These are in varying stages of development and/or implementation, but they are worthy of further review for decision-making on continuation or close-out. It is recommended that the Actions Committee review these incentives and appropriately manage them. Descriptions and next steps for the six pilots can be found in the Appendices of this document.

- **Management Tools**: Throughout development of the incentives, a few specific management tools have been identified as being critically important.
  - **Resilient Communities Index**: As this incentive pilot is based on a rating system that incorporates current programs and scoring systems (such as the Community Rating System, CRS) as variables, a Resilient Communities Index tool is required to capture all of the data within each of the variables of the rating system. More information can be found in the Resilient Communities Index Appendix.
  - **Mitigation Action Tracker**: Although the Risk Analysis Mitigation Action Tracker was not borne of the Incentives Initiative, it is a critical tool and is intimately connected to the mitigation efforts associated with the model.
**Recommendations: Timeline (see Appendix G)**

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<th>Activity</th>
<th>Feb</th>
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<th>May</th>
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**Financial Analysis**

A high-level financial analysis for implementing the model is outlined in the tables below. Following the tables, there are more in-depth descriptions of what each line item in the left column entails.

The cost to implement the Mitigation Model and develop the incentives for Year 1 and Year 2+ are outlined in the following two tables.

- The first table line items estimate the “other than” direct labor costs of the recommendations outlined above. Where feasible, activity estimates have been calculated in terms of level-of-effort and average hourly rates. Other line items simply list flat rates or awards and further detailed analysis is required.
- The second table outlines direct labor costs associated with the recommendation of dedicating two full-time staff members to the project.

In reference to Table 1 below, The “Action Plan/Committee” line item assumes a few variables. First, in Year 1, it assumes contractor support for development of the Action Plan and any objective-setting or implementation road mapping support that is required. This is estimated at four months of work (640 hours) multiplied by the average contractor rate of $150/hour. Year 1 also assumes costs for conducting Action Committee meetings, including travel, time, and other
logistics costs. Starting in Year 2, the line item assumes no development costs associated with contractors and is solely based on on-going committee costs.

The “Pilots/Incentives” line item assumes non-grant costs related to continuing, implementing, or closing-out existing incentive pilots. Follow-on years could also include costs associated with development of new incentive ideas. While many of the forecasted activities are outlined in the Incentive Pilot Appendices under next steps, a sampling of activities could include:

1. Development of management tools: this line item describes the Year 1 development costs of the Resilient Communities Index. A flat amount of $200K has been estimated but this number requires further review.
2. Contractor support: this is outlined for select activities –
   a. Cost-benefit analyses for Tax Incentives and Risk MAP Credits – assumes level-of-effort multiplied by average contractor rate
   b. Economic analysis for Bond Ratings – assumes level-of-effort multiplied by special contractor rate
   c. Strategy development for Public-Private Partnerships – assumes level-of-effort multiplied by average contractor rate
3. Recognition/rewards funding: this assumes quarterly amounts of $10K to be distributed appropriately
4. New incentives development: this assumes level-of-effort multiplied by average contractor rate for assistance in developing new incentive ideas; contractor effort is assumed to be lessened by the fact that this is part of dedicated staff’s responsibility

The “Grants” line item assumes grant funding for three specific items in Year 1:

1. NHMA grant to run conference and become the major partner in the communication efforts of the MODEL and incentives (includes contribution to the Outreach Strategy)
2. Research grants for defining the vision from the Innovation Campaign
3. Funding a partner association’s education campaign for the Tax Incentives effort as well as providing contractor support to prepare for said partnership

In Year 2, the “Grants” line item assumes no continuing partnerships or pilot grants, but rather estimates a “Grants General Fund” to be used as required for continuing incentive relationships or grant programs.

The “Travel for Dedicated Staff” line item assumes travel budget for the two dedicated full-time MODEL employees to attend conferences, local events, regional planning sessions, etc. The line item assumes 12 trips for both staff members as well as conference fees.
### Table 1. Implementation Cost: Non-Labor

<table>
<thead>
<tr>
<th>Action Plan/Committee</th>
<th>Year 1</th>
<th>Year 2+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs associated with facilitating Actions Committee: meetings, travel for committee members, member time, etc.</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Contractor support for Action Plan development, other Committee needs: assume 1 contractor for 4 months (640 hours) x average contractor rate ($150/hour)</td>
<td>$96,000</td>
<td>$-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$146,000</td>
<td>$50,000</td>
</tr>
<tr>
<td><strong>Pilots/incentives</strong></td>
<td></td>
<td></td>
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<tr>
<td>Development of management tools (Resilient Communities Index)</td>
<td>$200,000</td>
<td>$-</td>
</tr>
<tr>
<td>Contractor support, cost-benefit analyses (Tax, Risk MAP Credits): assume 1 contractor for 1 month (160 hours total -- 2 weeks per analysis) x average contractor rate ($150/hour)</td>
<td>$24,000</td>
<td>$-</td>
</tr>
<tr>
<td>Contractor support, economic analysis (Bond Ratings): assume 1 contractor for 1.5 months (240 hours) x special contractor rate ($250/hour)</td>
<td>$60,000</td>
<td>$-</td>
</tr>
<tr>
<td>Contractor support, Public-Private Partnership strategy (PPP): assume 1 contractor for 1 month (160 hours) x average contractor rate ($150/hour)</td>
<td>$24,000</td>
<td>$-</td>
</tr>
<tr>
<td>Recognition/rewards funding: assume quarterly awards of $10K, divided appropriately for multiple awardees or recognition events</td>
<td>$20,000</td>
<td>$40,000</td>
</tr>
<tr>
<td><strong>New incentives development:</strong> assume [1.5 months new idea definition + .5 months business case development (320 hours)] x 3 ideas x .5 contractor support (average contractor rate of $150/hour) -- remainder of this effort covered by dedicated staff members</td>
<td>$-</td>
<td>$72,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$328,000</td>
<td>$112,000</td>
</tr>
<tr>
<td><strong>Grants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHMA Partnership/Outreach strategy (flat grant amount for FY12)</td>
<td>$125,000</td>
<td>$-</td>
</tr>
<tr>
<td>Innovation Campaign research grants: assume $60K x 3 universities participating for Phase 1 vision development in Year 1</td>
<td>$180,000</td>
<td>$-</td>
</tr>
<tr>
<td>Partner association's education campaign (Tax): assume partner association other than NHMA develops strategy and materials for influencing legislative action on tax incentives ($50K grant) + 1 contractor support x 2 weeks (80 hours) at average contractor rate ($150/hour) for strategy/partner outreach preparation</td>
<td>$62,000</td>
<td>$-</td>
</tr>
<tr>
<td>Grants General Fund: does not assume any particular partner relationships or continuation of pilot grants</td>
<td>$-</td>
<td>$250,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$367,000</td>
<td>$250,000</td>
</tr>
<tr>
<td><strong>Travel for Dedicated Staff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTE x2 travel, assuming attendance at meetings, conferences, etc.: assume [2 travelers x 12 trips x (air+hotel+per diem+car+parking=$1200)] + ($1000 conference fees x 2 conferences x 2 travelers=$4000)</td>
<td>$32,800</td>
<td>$35,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$32,800</td>
<td>$35,000</td>
</tr>
<tr>
<td><strong>Initiative Non-Staff Total</strong></td>
<td>$873,800</td>
<td>$447,000</td>
</tr>
</tbody>
</table>

*Assumption: Does not include contingency
In reference to Table 2 below, the “Salary” line item assumes the hiring or re-staffing of two full-time, dedicated staff members to execute and manage the day-to-day requirements to implement the model and the incentives pilots. This is the recommended GS-14 Lead and GS-11 or 12 support staff that works with the Actions Committee Chair. The dollar amount approximates the annual salary based on the 2011 General Schedule base rate adjusted for Washington, DC metro locality pay.

The “Overhead” line item assumes a 50% rate of overhead (benefits, leave, etc.) attached to the salaries of the two full-time employees described above.

**Table 2. Implementation Costs: Direct Labor**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2+</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salary</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 FTE, Lead, GS-14/1</td>
<td>$ 105,211</td>
<td>$ 108,717</td>
</tr>
<tr>
<td>1 FTE, Support, GS-12/1</td>
<td>$ 74,872</td>
<td>$ 77,368</td>
</tr>
<tr>
<td>Total</td>
<td>$ 180,083</td>
<td>$ 186,085</td>
</tr>
<tr>
<td><strong>Overhead</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GS-14/1, assume 50% of salary for benefits, leave, etc.</td>
<td>$ 52,606</td>
<td>$ 54,359</td>
</tr>
<tr>
<td>GS-12/1, assume 50% of salary for benefits, leave, etc.</td>
<td>$ 37,436</td>
<td>$ 38,684</td>
</tr>
<tr>
<td>Total</td>
<td>$ 90,042</td>
<td>$ 93,043</td>
</tr>
<tr>
<td><strong>Initiative Staff Total</strong></td>
<td>$ 270,125</td>
<td>$ 279,128</td>
</tr>
</tbody>
</table>

**Conclusion**

The Incentives Initiative was an important effort. It demonstrated that there are numerous opportunities for incentivizing risk reduction action at the local level. It also identified that there already exists a robust mitigation community as well as a hitherto untapped pool of mitigators. In the course of developing the pilots it also became clear that our mitigation community has been extremely successful at leveraging opportunities on an ad hoc basis but we lack a common platform so that we can build on our past success faster and more comprehensively.

Community resilience to natural hazards is part of a much bigger puzzle. The implementation of the Mitigation Model will engage a broader mitigation community in a strategic way, with measurable benefits, while ensuring that our efforts remain appropriate in a resolutely dynamic context.
## Appendix A: Summary of Incentives

<table>
<thead>
<tr>
<th>Pilot Name &amp; Description:</th>
<th>Value:</th>
<th>Next Steps:</th>
<th>Lessons Learned:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Private Partnership:</strong> Engage the private sector in the identification and implementation of community risk awareness and reduction activities.</td>
<td>• Improved long-term economic sustainability; • Increased resource-sharing, collaboration, and communication; • Increased integration within FEMA groups responsible for external partnering relationships</td>
<td>• Develop a strategy for marrying this initiative to FEMA’s Private Sector Division • Develop relationships and facilitation forums • Continue to develop current Weather Underground pilot to exemplify a public-private partnership success story for partnering and data dissemination</td>
<td>• FEMA’s Private Sector Division is tasked with efforts such as this and wishes to integrate with the initiative’s efforts • An overarching private sector engagement strategy is needed • There are private sector entities that are interested in partnering with FEMA</td>
</tr>
<tr>
<td><strong>Resilient Communities Index:</strong> Develop a multi-variable, comprehensive community rating system to recognize and reward communities for taking proactive mitigation action.</td>
<td>• Ability to recognize and/or reward community risk reduction action in a fair and transparent way • Encourages integration of existing FEMA programs</td>
<td>• Finalize the variables (criteria) for the Resilient Communities Index • Fully define not only the measure of success but also the method of recognition/reward to incent participation in the rating system</td>
<td>• There are many holistic rating systems, our opportunity lies in developing one for FIMA to integrate into more comprehensive systems. • The recognition/reward is as important as the rating system</td>
</tr>
<tr>
<td><strong>Innovation Campaign:</strong> Define the future of mitigation through the development of creative implementable strategies by engaging academia and the private sector in a competitive, multi-phase process.</td>
<td>• Close the gap between researcher and practitioner for viable mitigation solutions; • Generate innovative thinking about current issues in mitigation and sustainability; • Increase collaboration by engaging of academia and the private sector.</td>
<td>• Begin Phase 1, now that participants have been identified • Contact private sector to discuss possibility of Phase 2 • Validate recognition/reward</td>
<td>• Academia is willing and able to participate (three universities already engaged) • The private sector is interested in participating • There is broad interest in determining new ways of thinking about mitigation and resiliency.</td>
</tr>
<tr>
<td>Pilot Name &amp; Description:</td>
<td>Value:</td>
<td>Next Steps:</td>
<td>Lessons Learned:</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Tax Incentives:</strong>&lt;br&gt;Identify potential individual and/or business tax incentives that can be provided for making mitigation improvements</td>
<td>• Provide direct financial incentive to individuals and businesses to spur mitigation action&lt;br&gt;• Change financial context for decision making (tax code amendment) for mitigation investment</td>
<td>• Identify a champion association to execute an education campaign that rallies support for tax code amendment legislation&lt;br&gt;• Develop material for the education campaign&lt;br&gt;• Develop funding for champion association through grants&lt;br&gt;• Work closely with the champion association to target campaign&lt;br&gt;• Examine avenues for funding tax incentives (pooling of funds at the State level)</td>
<td>• At least one Congressional champion exists (Rep. Bilirakis, FL)&lt;br&gt;• EPA successfully undertook this effort with ENERGY STAR in the 1990s-2000s, but it took time, energy, and resources for Congress to enact legislation</td>
</tr>
<tr>
<td><strong>Bond Ratings:</strong>&lt;br&gt;Explore whether or not bond rating agencies would consider natural hazard risk within their algorithms for determining municipal bond ratings for individual municipalities</td>
<td>• Spur investment in mitigation action for the positive economic ripple effects of higher bond ratings;&lt;br&gt;• increase resilience through investment in mitigation;&lt;br&gt;• shed light on the potential adverse impacts of disaster relief policy;&lt;br&gt;• provide a more complete perspective on a community’s resilience</td>
<td>• Conduct more in-depth analysis to substantiate initial findings (disaster relief policy may adversely impact municipal financial ownership)&lt;br&gt;• If substantiated, then forward to internal FEMA leadership for a policy discussion about the level of disaster aid and the thresholds for declaration&lt;br&gt;• Contact rating agencies and Federal regulators to discuss findings</td>
<td>• Bond rating agencies don’t consider “hazard risk” per se, but it may be encapsulated in “geography risk”&lt;br&gt;• Economic analysis of disaster relief aid could show adverse impact on municipal financial ownership</td>
</tr>
<tr>
<td><strong>Risk MAP Credits:</strong>&lt;br&gt;Recognize and reward participation in the Risk MAP process by issuing bankable credits (or “coupons”) that could be redeemed to offset costs associated with FEMA mitigation grants.</td>
<td>• Community members become more aware of their true flood risk and are more inclined to take action&lt;br&gt;• The cost of mitigation is reduced</td>
<td>• Revisit the concept when other funding (or alternative) comes available that could be applied toward the credit and banking concept</td>
<td>• This incentive was the most popular with a broad base of stakeholders.&lt;br&gt;• The idea was not feasible as considered but it resonated broadly and should be revisited, perhaps in a different form, in the future.</td>
</tr>
</tbody>
</table>
Appendix B: Public-Private Partnerships

The community of Watertown has experienced several flooding disasters in the past. These disasters have impacted both the public and private industry. FEMA is currently working across the watershed on several Risk MAP Projects that are delivering both regulatory and non-regulatory products in several flood-prone areas. One of the products provided to Watertown is the Areas of Mitigation Interest which identifies several key factors that may lead to higher flooding. The community wants to address the issues but find itself short of revenue to fully address the flood contributing factors. Put simply, the community needs additional resources.

Situation

A community is comprised of local government, citizens, businesses, associations, and non-profit organizations. It is an eco-system that is dependent on all its parts to thrive. Both natural and man-made disasters can have devastating impacts on the balance of the eco-system. As an example, FEMA has found that 40% of businesses do not reopen after a disaster and another 25% fail within one year. Taking the appropriate actions to reduce the community’s vulnerability to disaster is important to everyone in the community. The private sector is interested in supporting local mitigation actions. In 2007, FEMA established the Private Sector Division within the Office of External Affairs. The division’s overarching goals include “improving information sharing and coordination between FEMA and the private sector during disaster planning, response and recovery efforts.” A major gap that exists is the lack of focus of engagement of the private sector in mitigation.

Complication

Given the current economic climate, communities need to maximize their resources to find ways to bring in additional capabilities to address their limitations. In times of shrinking budgets and competing priorities, it is clear that communities cannot “go it alone” when it comes to the sustainability of the community.

Part of the challenge that communities face regarding mitigation is that, at many times, it is invisible. The community reacts when a disaster takes place and damages are evident. Where mitigation has been successfully implemented, there is nothing to see, there is no damage. In addition, building can take a significant amount of political capital and effort.

In order to build the partnership, both the private sector and the public sector must see benefits to the association and efforts. Businesses must understand what is at risk to them and be able to identify opportunities to their operations. For example, Wild Times Brewery requires high water quality to develop its product, a local river association is interested in keeping the river environmentally safe and limiting pollutants for recreation and other activities, and the community is interested in managing the flooding to protect its tax base and providing excellent environmental stewardship. These are the ingredients for a great partnership, one where each party benefit while at the same time increasing overall community resilience.

Finally, businesses are concerned about the potential impacts of additional regulations that may result from risk reduction activities. Businesses are willing to participate in community activities but do not want to be told what to do when it comes to specific mitigation actions. They prefer
to have voluntary initiatives that can be pushed through with the help of incentives or other methods instead of regulation.

**Resolution**

The rationale for entering into a partnership is that the sum of the parts is greater than the whole and that each party stands to gain from the relationship. The desired objective is for communities to develop partnerships that result in increased local ownership and ultimately reduce their risks to natural hazards. As learned through Project Impact, local businesses generally have strong involvement in their communities. They are interested in being partners and are also likely to be heavily involved in community issues, especially in smaller communities.

The Incentives Initiatives first focused on engaging with the private sector in the identification and implementation of community risk awareness and reduction activities. The primary outcomes of the initiative are:

1. Raise local risk awareness through data dissemination
2. Encourage private underwriting of projects
3. Identify, promote, and facilitate land use best practices

The working group was able to establish a partnership with a private sector organization called Weather Underground, an online weather provider. The partnership involved developing a pilot focused on data sharing capabilities. Weather Underground was provided with publicly available hazard and risk analysis data that included fault lines, landslide, tsunami, fire, and flood data. The pilot will be making this data available to the public as part of Weather Underground’s weather maps. Weather Underground hopes to benefit from the partnership through increased demand for their service and gaining a competitive advantage. FEMA’s benefits include free data dissemination which should result in increased risk awareness of the public and the provision of tools that improve the public’s decision-making process. The pilot is expected to go live in the 1st quarter of 2012.

A more consistent and structured strategy is necessary to establish public-private partnerships that are focused on mitigation. The strategy is an important element to maximize the opportunities of engagement between the private and public sector. The strategy should be developed in conjunction with FEMA’s Private Sector Division and be implemented by the Private Sector Division, thereby addressing a gap that currently exists. One focus area of the strategy should be on developing broader partnerships at the National or Regional level. These partnerships can be focused on data sharing or increasing risk awareness as well building collaborative mechanisms that focus on disseminating best practices across communities. The second focus area for the strategy should be on establishing processes and methods that enable local communities to establish partnerships with the private sector. These processes and methods should focus on encouraging local ownership and enable the communities with the capabilities to develop and executive plans that include all parts of the community (government, citizens, businesses, associations, and non-profit organizations).
Social Analysis and Benefits to FEMA
The benefit of this incentive is that it develops a working relationship at the lowest levels to the impacted communities. Private industry can provide resources that communities may not be able to completely fill while simultaneously building their community, fulfilling corporate social responsibility goals, increasing brand image and awareness, and even doing right by themselves financially. Communities gain the benefit of having partners be another avenue for resource allocation into projects or awareness opportunities. Communities will benefit as well by having more active local business, which could lead to increased economic output.

Benefits to FEMA include:
- Stronger local ownership of the problem by the community and the private sector
- An increased likelihood that communities are taking mitigation action, progressing toward risk reduction
- Ability to forge relationships with communities, developing a resource-sharing model (local ownership)
- Grassroots outreach and widespread engagement (“stone soup” model)

This incentive provides further benefit to FEMA by fulfilling the FIMA Strategic Goals, specifically:
- Advancing Objective 1.3 – strengthened community relationships by enhancing collaboration and dialogue
- Advancing Objective 2.2 – creating connected programs through integrating the Whole Community concept
- Advancing Objective 3.3 – strengthened grassroots support for disaster resilient communities by recognizing partnerships and the private sector’s role in community sustainability

Financial Analysis
Initial investment in the Public-Private Partnerships Incentive requires contractor support for the development of the PPP Strategy for FEMA’s Private Sector Division. This effort assumes one contractor for one month level-of-effort (160 hours) multiplied by the average contractor rate ($150/hour), for a total of $24K.

Current costs to FEMA for the Weather Underground pilot are t zero (other than minor costs for data collection and/or transfer time). However, as new pilots are developed involving Public-Private partnerships, estimates can be expected to rise.

Next Steps
1. Partner with the Private Sector Division and engage private sector stakeholder to develop the Public-Private Partnership Mitigation Focused Strategy
2. Continue Weather Underground Pilot

Incentive’s Connection to the Mitigation Model
This incentive is most closely connected to the “Partnerships” focus area of the Mitigation Model. By understanding the importance of working together to build a resiliency team, the likelihood of achieving mitigation action rises. FEMA understands, through its Whole Community Principles, that to truly be successful requires understanding the needs and the capabilities of communities and that all areas of the community are involved.
Appendix C: Resilient Communities Index

Old Mill Town is an established community with plans for moderate growth over the next 20 years. The Town has a diverse economy, ranging from manufacturing to agriculture and services to internet start-ups. They are not a County seat so they do not have a large proportion of government jobs. Old Mill Town is not dissimilar to many of the surrounding communities in its make-up and composition and like most communities in the surrounding area is also subject to regular flooding and other hazards.

Distinct from the surrounding communities however is that the people of Old Mill Town and their leadership wanted to ensure long term prosperity for the Town by considering the impact of natural hazards in their decision making. In this way, they have been proactive in their approach to building resilience to natural hazards. They have considered flooding and other potential hazards in their development plans, promoting development in safe areas and rezoning the remaining space to a variety of uses i.e. recreation, aquifer recharge, water detention etc. They have adopted all of the latest building and residential codes, are active in CRS to lower flood insurance premiums paid by individuals, and have actively reduced the existing risk through mitigation projects.

All of these efforts paid off when a major storm event that caused terrible loss and the damage in many of the neighboring communities but not Old Mill Town.

Situation
Post disaster, attention and resources are focused on those areas most heavily impacted, diminishing the sense of urgency for undertaking risk reduction activities and long term planning for resilience. Communities are rarely recognized or rewarded for the tough choices they make to protect themselves from natural hazard events, in fact it almost appears to be the opposite; communities that make extremely poor land use choices and are at high risk have access to tremendous resources post-disaster. The intent of the resilient community index is to counteract the perception of rewarding ‘bad behavior’ and identify meaningful ways to recognize and reward communities for their efforts in a systematic, transparent and replicable way.

Complication
Although a number of FEMA and other programs exist for ranking certain activities related to hazard mitigation, an integrated rating system is not currently in place. The existing programs use disparate methods of recognition and reward and there is no analysis of how those methods interplay. Results from existing FIMA programs must be evaluated to better understand and recognize those communities that are considering natural hazards for long term sustainability. An integrated approach would create the basis for rewarding those communities who are taking steps to reduce their reliance on the Disaster Relief Fund.

Resolution
To identify, recognize and reward communities that are increasing their resilience, FIMA will develop a Resilient Community Index. The Index provides the anchor to an incentive that fosters a culture of hazard mitigation by recognizing and rewarding those communities that proactively seek to mitigate and avoid the impacts of natural hazard events to their community, economy and environment.
To establish this incentive a process is needed to identify the criteria to recognize a community that is progressing towards increased resilience. Following development of the criteria, a method by which FIMA can gather the information necessary to develop the index, incorporate into existing processes and eventually recognize and reward those communities that undertake risk reduction and risk awareness activities for increased resilience and sustainability.

**Social Analysis and Benefits to FEMA**
The benefit of this incentive is that it develops a transparent and tangible community scoring system that enables the recognition or reward of proactive communities. Something as simple as recognition could boost community pride and make communities more “marketable” as places to live, work, and invest. Tangible rewards such as grants, technical assistance, etc. are obvious benefits to the communities as they can be directly applied to mitigation efforts.

Benefits to FEMA include:
- Communities taking mitigation action, progressing toward risk reduction
- Ability to forge relationships with communities, recognizing success stories
- A comprehensive scoring system that baselines existing community efforts and provides data to support management decision making.

This incentive provides further benefit to FEMA by fulfilling the FIMA Strategic Goals, specifically:
- Advancing Objective 1.3 – strengthened community relationships by celebrating community successes
- Advancing Objective 2.2 – creating connected programs by promoting holistic program delivery
- Advancing Objective 3.3 – strengthened grassroots support for disaster resilient communities by recognizing resiliency and advancing strong engagement

**Financial Analysis**
In order to continue this incentive’s work, investment in the data analysis, purchase and system will be required. It is expected that a lot of the data and analysis has already been completed by other partners and so the data modeling is not expected to be extensive. The cost to design and develop such a system is estimated at $125,000 depending on the designer’s existing understanding of the programs, data and desired outcomes. Some of the data is provided by external parties and will come with a subscription cost over time.

**Next Steps**
The immediate next steps are to procure the data, analyze the data for overlaps and build the system. Not all programs will be included in the index at first but those that meet the following requirements:
1. are already established
2. have current and consistent data
3. either reduce risk or raise awareness about risk
The following table notes the programs, as well as the ‘resilience ranking’ of each one, that meet the criteria and should be included in the system.

<table>
<thead>
<tr>
<th>Category</th>
<th>Resilience Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>Mitigation Plan</td>
<td>current</td>
</tr>
<tr>
<td>HMA Grants</td>
<td>participating</td>
</tr>
<tr>
<td>CRS</td>
<td>8-10</td>
</tr>
<tr>
<td>BCEGS</td>
<td>8-10</td>
</tr>
<tr>
<td>Community Identified Program</td>
<td>education</td>
</tr>
<tr>
<td>Levees</td>
<td>non accredited levee w/ no mitigation</td>
</tr>
<tr>
<td>Maps</td>
<td>current</td>
</tr>
<tr>
<td>Disaster Declarations</td>
<td>3 or more</td>
</tr>
<tr>
<td>SRL Properties</td>
<td># increasing</td>
</tr>
</tbody>
</table>

**Incentive’s Connection to the Mitigation Model**

This incentive is most closely connected to the “Rewards/Recognition” and the “Regulatory and Economic Alignment” focus areas of the Mitigation Model. By developing a more comprehensive rating system for assessing community resilience, FEMA hopes to not only recognize good deeds but also foster community awareness of risk and mitigation opportunities. By integrating a number of existing programs and rating variables, FEMA further hopes to change the way in which the rating systems work to develop a more holistic picture of a community’s preparedness.
Appendix D: Innovation Campaign

Professor Yoon Kim was leading a team of graduate students in a discussion about the earthquake recovery efforts in Christchurch, New Zealand. She referenced the minimal damage to residential areas and the significant amounts of damage to community centers and the central business district. Students began questioning why there was such a disparity between the various areas impacted; why some buildings seemed more resilient than others. They wanted to know more about how (or if) the recovery efforts would take into account any relationships between how the underlying historic public policy and construction practices resulted in different damages. They asked, “Is there a more effective way to prioritize recovery and mitigation projects to make a community more resilient?” Students applied this question to disasters in the United States and wondered how FEMA took into account such complex relationships prior to, and immediately following, an event. Many questions were asked about how FEMA advised state and local officials about ways to incentivize mitigation or whether or not they considered “future resilience” as a primary goal to pursue in the midst of an ongoing response and recovery effort.

Situation

Key scientific and societal changing events begin by drawing the best minds to the table to tackle the most challenging questions. Whether it is the X Prize, an organization whose mission is “to bring about radical breakthroughs for the benefit of humanity, thereby inspiring the formation of new industries and the revitalization of markets that are currently stuck due to existing failures or a commonly held belief that a solution is not possible”, or Kennedy’s challenge to put a man on the moon, there are problems that, at least initially, begin without an existing solution. Perhaps the technology does not yet exist. Maybe it does, but there is insufficient critical mass necessary to push beyond research into mass production or broad implementation. Money is a factor over the long term, but in these larger endeavors, if the challenge is embraced, the resources emerge.

The Innovation Campaign began with a goal similar to that of the X Prize Foundation; it was intended to articulate a problem statement in need of a solution that may be perceived as impossible: true self-sustaining whole community resilience – communities impervious to disaster. The cycle of preparedness, response, recovery, and mitigation continues annually while damages continue to occur and the costs to repair or even respond to the event continue to rise (at an unsustainable rate). In spite of our best efforts, we have not been able to create and fund programs capable of accomplishing widespread community mitigation; we have not articulated a challenge that draws the best minds or demanded that insurmountable problems be solved in the name of whole community resilience. Disconnected pockets of success occur in various industries, but at the current rate of expansion, it is debatable if programs like EPA’s “Smart Growth” or LEEDs and others will ever coalesce into something revolutionary. Some other catalyst is still needed to unite these progressive efforts and bring resilience into the front of people’s imagination and expectation that resilience is not a privilege, but an inalienable right.

FEMA cannot mandate nor fund the solution(s), but perhaps we can help frame the challenge. Looking at our example of Christchurch, what if the conversation was not about immediate recovery, but adaptation and resilience? What if the devastation to the city and community was viewed through the eyes of the X Prize Foundation such that the single focus of recovery was premised on the goal of inventing impossible solutions and using the opportunities to stimulate markets and conversations about what radical breakthrough could have prevented the damage or,
perhaps, could have better enabled the community to undergo the event change without ever having suffered for it. Perhaps this event was the opportunity to restructure and re-create a civilization that is in harmony with the prevailing natural (and technological) hazards. What if the ensuing conversation between students and their professor was not about “is there a more effective way recover…” but “why didn’t this catastrophic earthquake disrupt their community?” What if the conversations in Christchurch were about how and why it was so resilient that no disastrous event could occur that would disrupt their economy, cultural identity, or community fabric?

Driving to such a Shangri La is not currently possible. To say nothing about the human cultural complexities, money, and political realities, we do not have the science, community concurrence, etc. necessary to achieve such absolute whole community resilience. But what if we did? Innovation is in part a product of focus, inspiration, opportunity, and experimentation. What if FEMA could create the necessary environment where innovation (and its associated products) could flourish? The Innovation Campaign described in this Appendix is not intended to yield a specific solution; rather, it is to stimulate the conversation and raise our attention to aspirations that may seem impossible to solve, but are none the less the right things to pursue (in the name of genuine whole community resilience).

Complication
FEMA, and other key partners, may share a common definition of “resilience,” but they do not pursue a common strategy to achieve it. Similarly, none of our programs are deliberately measuring how their efforts (as measured by funding or resource allocation) are directly enhancing whole community (or whole community resilience). We accept that there is no single strategy that will work in all instances, but question why there is no consistent methodology that would allow a community, program, or individual the ability to quickly evaluate how various mitigation, preparedness, response, and recovery actions/alternatives/decisions could be evaluated to determine direct and indirect consequences that shape future resilience. At the most basic level, why does EPA promote and implement the concepts of Smart Growth independent from how FEMA promotes Hazard Mitigation Planning or the National Disaster Recovery and Mitigation Frameworks?

These disconnects only further substantiate the need for a Mitigation Model.

Currently we rely on disparate programs designed to produce a specific result as defined by regulation or policy; we rely on historic performance and antiquated concepts that project the future as a linear relationship to trends from recent history to define formulaic ways to talk about hazards and risk. We have not adequately begun to leverage emerging technologies that take into account the dynamic relationships between “change” and: climate, human development, public policy, disasters, and “livability” (whole community resilience). We have not defined a national conversation that challenges academics, elected officials, industry or the public to formulate sophisticated resilience strategies that build upon local perceptions of identity and relate existing capitals to service needs. We have not yet leveraged the technology and modeling techniques needed to evaluate interdependences or create complex statistical models that produce timely results that can be understood by the whole community.

This is precisely why we felt the need to prioritize finding a way to facilitate innovation.
Resolution
Considering there is no perspective-based plan or paradigm in place, the need for engagement with academia and the private sector can assist in the development of innovative tools that will ensure the future of mitigation is based on community specific resiliency needs. The Innovation Campaign Incentive’s goal is to define the future of mitigation through the development of creative implementable strategies. The approach consists of three phases to create a “Recipe for Resilience.” The concept is analogous to President John F. Kennedy’s goal of reaching the moon.

Phase One works with universities to help articulate a problem or challenge of such complexity that there is no current known way to attain a definitive result. In essence, if we continue with the analogy that the “moon” represents “resilience”, then phase one of this project is to assemble some of the leading academic and private sector minds and declare our ambition to achieve a seemingly impossible reality: achieve permanent whole community resilience. More specifically, by framing the challenge, we hope to create an atmosphere and a framework where competition and ideas can be explored and tested; in short we will provide the necessary space for innovation to flourish and progress made towards attaining resilience.

Phase Two of this approach, if funded, would further define the existing complexities of reaching our destination. The focus will be on creating a concept design for a system (and tool) that would allow us to begin evaluating various ways and means needed to adequately map out a strategy to “reach the moon.” The conceptual tool further strengthens our nexus to regional universities and would potentially include a more robust presence of private sector involvement. During this phase, graduate and undergraduate students will begin testing and investigating some of the key assumptions we are struggling with to validate or invalidate ideas. Besides strengthening our partnerships with key institutions, the examination of whole community resilience will begin permeating the future workforce; the questions and challenges will become subjects for additional research and thesis work. The essential formulation of an Agency Whole Community Resilience research agenda brings new minds to a complex question; it reinforces the importance of the effort and pushes us further towards exploration of our potential.

Phase Three of this approach will be a test fire of the tool and conceptual framework. Beyond pure research and theory, we will have solutions to the most immediate gaps in data and modeling. We will have created a new vernacular, adjusted existing curriculum, socialized the project potential, brought in mechanical, civil, electrical engineering, architecture, sociological, environmental-focused industry into the dialog. We will have addressed information flow, etc and we will be helping to plan and implement a high-visibility pilot location to begin testing how the new tools and strategies. This phase will include significant involvement from private sector partnerships. Communities may be involved in this phase as a test bed for implementation.

Each phase would include heavy academic (professor/student involvement) and provided grant money to fund their research efforts. Findings will be presented at a national conferences and showcased in Washington DC among influential senior leadership.

Social Analysis and Benefits to FEMA
The benefit of this incentive is that it spurs innovative thinking about current issues in mitigation and sustainability. On the lowest level, increasing interest and awareness of these issues and spurring innovative thinking should encourage broader study in this area into the future. On a
higher plain, through this thinking and testing, as well as through collaboration, the general population is one step closer to solutions to problems surrounding hazard risk.

Benefits to FEMA include:

a. The inclusion of new ideas and innovation into mitigation, technology, and sustainability fields
b. Solutions that can be implemented by communities
c. Enhanced partnering capabilities with universities and private sector organizations
d. Achievement of strategic goals
e. Potential recruiting source (university students)

This incentive provides further benefit to FEMA by fulfilling FIMA Strategic Goal #1 and #3, specifically:

a. Advancing Goal #1, Objective 1.3 – expanding and intensifying the level of engagement with communities through collaboration
b. Advancing the entirety of Goal #3 – advancing disaster-resilient, sustainable communities through promoting emerging technologies and state-of-the-art tools, promoting green building design, addressing future growth and changing conditions, and advancing education and grassroots engagement

Financial Analysis
In order to continue this incentive working group’s progress, investment in a pilot includes grants to support graduate students at three local universities (University of Washington, University of Oregon, Western Washington University) of approximately $180K.

Costs of a university participating in the “Recipe for Resilience Project” include $50K-$60K per university for a Research Assistant as well as an additional $10K for administrative and travel fees. In the future, as more universities desire to participate, the project will become more competitive with a cap of ten to twelve schools participating, totaling approximately $700K.

Next Steps
1. Consolidate perspective-based ideas into a comprehensive document.
2. Create a baseline model of the perspective-based tool with a thesis type report.

Incentive’s Connection to the Mitigation Model
This incentive is most closely connected to the “Rewards/Recognition” and the “Partnerships” focus areas of the Mitigation Model. By developing a set of rewards (research grants for early phases/production grants for later phases) and recognition opportunities (presentation of findings at conferences/media “spots”), this could incent both academia and private sector partners to become involved in the campaign. These partnerships lend themselves to the other model connection in that this is an opportunity to engage non-governmental partners to assist with mitigation innovation and development of technology and solutions.
Appendix E: Bond Ratings

Mike Smith, the Chief Controller and Finance Officer for Floodville, was reviewing Moody’s latest bond rating for the city. Having followed every rating release for the past few years, and knowing the broad array of infrastructure projects that the City Council and the Mayor’s office planned to undertake this coming fiscal year, he began to wonder about the types of actions that the city could take in order to improve its credit rating with the rating agencies. An improved rating sure would help with the financing aspect of the projects…

Situation
Government bonds have been rated since the early 1900s. The concept of taking action to positively impact bond ratings in order to have more positive financial results is not new. The Bond Ratings Incentive’s goal is to have bond rating agencies consider natural hazard risk within their algorithms for determining municipal bond ratings for individual municipalities. By doing so, the desired outcome and primary purpose of this incentive is for communities to achieve higher bond ratings, and thus lower bond interest rates, by taking specific measurable actions against their hazard risk. If achieved, this incentive should encourage communities to take action: from their perspective not only to reduce risk but also to achieve the economic “ripple effect” of higher ratings and lower interest rates, allowing for projects to positively impact the community on a broader and on-going scale. In FEMA’s perspective, the action will achieve Risk MAP’s broader vision of reducing risk to lives and property.

Complication
The ratings agencies themselves are a major stakeholder in this working group’s efforts. If they are not adequately convinced of the value of hazard risk in the rating algorithms, then this incentive might not succeed. In speaking with Moody’s Municipal Division, it became clear that hazard risk per se is not considered, though it may be swallowed by geography risk. Moody’s did indicate, however, that if we were to be able to show that hazard risk was a factor, then they would be forced to consider it as a factor in their determinations.

In the interest of providing more research, the working group discovered (through limited analysis of annual financial reports of comparable communities) that disaster relief may be adversely impacting communities’ financial ownership of disaster recovery and thus creating a “Federal backstop” against hazard risk – communities “look fine” financially on paper.

Resolution
Although the initial intent of the working group was to influence the rating agencies to act on certain information, the complication has led the group to alter its vision. Rather than focus solely on providing data to rating agencies to encourage community action, the working group has developed a plan to further research the financial implications of natural disasters in the United States. By undertaking a more rigorous financial analysis using economic consultants, the working group hopes to achieve two goals:

1. Inform the rating agencies of the findings, either to the point of influencing the algorithms (original intent) or merely as a courtesy response to the original meeting
2. If the findings are substantiated, that is if it appears that municipal financial ownership is adversely impacted, then forward that information to FEMA leadership for an internal policy discussion as to the appropriate level of disaster aid.
Social Analysis and Benefits to FEMA
The benefit of this incentive is that it spurs investment in mitigation action within communities for the impact of the positive economic ripple effect of higher bond ratings/lower interest rates. Communities are safer because mitigation action has been taken. Community economics are impacted by the positive investment opportunities that arise from lower interest returns that are required of the bond issuances. By saving this money, communities can reinvest elsewhere or receive higher levels of investment interest from outside sources (be they private investment or other public investment).

In the event that an analysis of communities shows adverse impacts of disaster relief, then society will gain through a review and better understanding of disaster relief policy.

Benefits to FEMA include:
   a. Communities taking mitigation action, progressing toward risk reduction
   b. Enhanced partnership with bond ratings agencies, allowing access to FEMA datasets
   c. Broader insight into the appropriate level of disaster aid (policymaking discussion)

This incentive provides further benefit to FEMA by fulfilling FIMA Strategic Goal #3, specifically:
   a. Advancing Objective 3.1 – creating a shared picture of risk and
   b. Advancing Objective 3.2 – addressing future growth and changing conditions

Financial Analysis
In order to continue this incentive’s progress, an investment of $50K-$60K will be required to hire a firm that specializes in economic consulting. This investment will engage the services of a consultant for approximately 1.5 months to conduct a rigorous analysis of the financial reports of multiple communities under certain variables – disaster-declared, non disaster-declared, etc.

Next Steps
1. Conduct more in-depth analysis to substantiate initial findings.
2. If findings are substantiated, then forward information to internal FEMA leadership for a policy discussion about the level of disaster aid and the thresholds for disaster declaration.
3. Contact rating agencies and Federal regulators to discuss findings.

Incentive’s Connection to the Mitigation Model
This incentive is most closely connected to the “Regulatory and Economic Alignment” focus area of the Mitigation Model. By understanding the economic impacts of the incentive and how those can affect the economic environment in which communities operate, mitigation action could become as much a necessity as other services provided to citizens. The importance of mitigation to overall community preparedness, citizen safety, and economic security can ultimately change community operating behavior.
Appendix F: Tax Incentives

Dr. Benjamin McMurray, Chief Executive at the Floodville Economic Development Center (and a retired economist), was reading a newspaper article about the Environmental Protection Agency’s successful efforts to develop tax credits for certain environmentally-conscious behaviors such as replacing windows or purchasing energy-efficient appliances. Having been a resident of Floodville for many years and knowing its tendency to flood on an annual basis, he started to wonder if Floodville could learn from the EPA and develop tax credits for encouraging mitigation behavior. This might just get the right mix of action to lower the entire community’s risk. It could also take some of the burden off of the local government…

Situation
Tax incentives are designed to provide relief from tax liabilities in order to encourage certain types of behavior or certain actions deemed worthy of that release of liability. The Tax Incentive’s goal is to identify potential individual or business tax incentives that can be provided for making mitigation improvements to residences or local business facilities. The objective is to provide resources for individuals and businesses to overcome barriers in order to contribute to local mitigation.

Complication
Following interviews with EPA employees to determine best practices for creating tax incentives (ENERGY STAR and others), it became clear that developing tax incentives requires legislation be passed to amend the tax code. Achieving this requires champions in government as well as support for the champions (both broad public support as well as support from Congressional colleagues). Developing champions requires educating them about the problem and desired outcome, which takes time and resources.

Resolution
In consideration of Federal regulations regarding lobbying, it will be imperative to develop a relationship with a national association (i.e. ASFPM, APA) to create an educational campaign. By providing the association with grant money and helping it develop the content, FEMA can be clear as to its goals for the incentive. In order to follow-up, FEMA can work closely with the association to monitor progress of gaining support for a tax code amendment.

Social Analysis and Benefits to FEMA
The benefit of this incentive is that it spurs individual or local business action against hazard risk. It places the onus on the individual or on local businesses to be self-reliant and not wait for the community to act.

Benefits to FEMA include:
   a. Direct mitigation action on individual or business properties
   b. Potential minimizing of overall insurance risk due to more individual action
   c. Increased partnership with national hazard associations
   d. Potential increase in national and Congressional awareness of the importance of hazard mitigation

This incentive provides further benefit to FEMA by fulfilling FIMA Strategic Goals, specifically:

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a. Advancing Objective 1.3 – expanding and intensifying the level of engagement with communities’ individuals or businesses
b. Advancing Objective 2.3 – demonstrating the value and results of mitigation and insurance
c. Advancing Objective 3.1 – promoting disaster-resilient construction techniques on personal or business property

Financial Analysis
Developing an initial educational campaign could require nominal amounts to be doled out as grant funding to partner associations ($50K). Considering the potential length of time required to develop champions, build relationships, and maintain continued Congressional support, this effort could become costly.

Next Steps
1. Choosing a champion association to execute the education campaign
2. Developing material for the campaign
3. Developing funding for champion through grants
4. Working closely with the champion to target the campaign
6. Examine avenues for funding tax incentives (pooling of funds at the State level)

Incentive’s Connection to the Mitigation Model
This incentive is most closely connected to the “Regulatory and Financial Alignment” focus area of the Mitigation Model. By understanding the individual or business economic impacts of providing tax incentives, this incentive can change the operating environment by encouraging action through direct financial means.
Appendix F: Risk MAP Credits

John Smithson, emergency management lead for the City of Floodville, has been to a few community meetings in which representatives from FEMA have discussed Risk MAP. Floodville, knowing its propensity to flood, has committed to a fair number of actions to mitigate against its risk in the past, but knows it could probably do more with extra resources. If there was only a way to get “extra credit” for extra effort…

Situation
One way to drive hazard mitigation action in communities is by encouraging participation and use of Risk MAP processes, tools, and data. Risk MAP projects lead communities through stages of flood hazard identification, risk assessment, and focused mitigation strategies. Active community participation and commitment to mitigate their risk as a result of Risk MAP should be recognized and rewarded. Communities must also be encouraged by FEMA to act upon their mitigation strategies in a timely manner while Risk MAP messages and knowledge remains high.

Complication
Advancing mitigation at the local level requires commitment of community resources. Given current economic conditions and competing priorities, mitigation initiatives are often set aside. Without proper incentive, communities may fail to advance their mitigation commitments as identified through Risk MAP processes.

Resolution
This incentive would provide bankable credits (or “coupons”) to communities or watersheds that participate in the Risk MAP process. The credits would be valued upon the degree or extent of participation and could be “redeemed” to help offset costs (in-kind or otherwise) associated with Hazard Mitigation Assistance (HMA) grants and/or applied to CRS points, etc.

Challenge: Every avenue researched by the working group has led to the same conclusion – developing a FEMA-financed credit system to offset HMA project costs effectively results in matching Federal dollars to Federal dollars. The result is not allowable due to Code of Federal Regulation requirements. Incorporating other Federal or non-Federal matching dollars from sources such as USACE Feasibility Studies or HUD funding also creates challenges due to varied requirements tied to each source. Ultimately, no simple mechanism to provide bankable credits was identified.

Social Analysis and Benefits to FEMA
The benefit of this incentive is that it encourages positive behavior by communities to become active participants in the Risk MAP process. By becoming active, the benefits of Risk MAP would presumably flow throughout those communities, thereby enticing further advancement of actions to reduce their hazard risk.

Benefits to FEMA include:
   a. Communities taking mitigation action, progressing toward risk reduction
   b. Increased knowledge of avenues for offering communities credit for participation

This incentive provides further benefit to FEMA by fulfilling the FIMA Strategic Goals, specifically:
a. Advancing Objective 1.3 – strengthening community and stakeholder relationships by intensifying and recognizing engagement

Financial Analysis
1. According to the Congressional Budget Office, mitigation typically returns 3-to-1 (CBO, “Potential Cost Savings from the Pre-Disaster Mitigation Program.” 09/2007). Any additional dollars (Federal or otherwise) applied toward successful mitigation should be expected to return as much.
2. The financial benefit of Risk MAP credits cannot be quantified at this time, however the qualitative or psychological benefits of coupons or discounts is commercially well understood, yet untested for the Risk MAP Credits concept.
3. Changing a CFR to accommodate additional Federal to Federal matching would be costly and time-consuming. Estimates of labor could span over many years.

Next Steps
1. Continued monitoring of other Federal or state grant programs that could realistically be applied to this credit and banking concept within current Code of Federal Regulations.
2. Continued monitoring of how Risk MAP influences communities to take action without this incentive (e.g. Mitigation Action Tracker is in place to accomplish this).
3. Under consideration: Conduct cost-benefit analysis of undertaking an effort to change the CFR and potentially pursue regulatory change. However, as changing a CFR can be costly and time-consuming, it is the recommendation of the Incentive Initiative’s Executive Steering Committee to not pursue this option at this time.

Incentive’s Connection to the Mitigation Model
This incentive is most closely connected to the “Recognition/Rewards” focus area of the Mitigation Model. It attempts to reward the efforts of communities in taking action through participation in Risk MAP by providing credits to be used at a future date to offset costs. Despite its regulatory hurdles, if this effort was successfully implemented, it could provide a major incentive for communities to not only participate in the Risk MAP program but also to increase their level of participation.
Appendix G: Model Implementation Next Steps

Establish a Management Structure

1. Committee Chair
   a. Assign Chair from within Risk Analysis Division

2. Actions Committee
   a. Committee Chair meets with FEMA/FIMA leadership to assign members to integrated Committee team
   b. Communicate with outside partners for participants (as needed)
   c. Develop charter, scope statement, governance plan
   d. Develop meeting timeline, logistics, expectations
   e. Conduct monthly meetings to advance current incentive pilots and/or test new ideas

3. Dedicated staff
   a. Create role description and responsibilities
   b. Assign two full-time staff members
   c. Make staff accountable to Committee Chair and responsible for managing the implementation of the Mitigation Model and incentives implementation

Develop the Model – Implement & Communicate the Action Plan

1. Create an Action Plan/Roadmap
   a. Develop Action Plan/Roadmap
   b. Validate plan with Actions Committee – incorporate feedback into plan

2. Develop an Outreach Strategy
   a. Determine the goals and vision for the strategy
   b. Contact NHMA for support in finalizing the strategy and developing outreach action plan

3. Develop NHMA Partnership
   a. Develop Statement of Work to outline first year of partnership
   b. Coordinate strategy and planning sessions to develop partnership and Outreach Strategy
   c. Discuss plans for quarterly meetings, annual conference, and communication tools (technology platforms, social media, other possibilities)
   d. Communicate nature of partnership to Actions Committee

4. Continue/Close-out Incentive Pilots
   a. All pilots
      i. Communicate status to Actions Committee at monthly meetings
   b. PPP strategy
      i. Finalize the Public-Private Partnership strategy
      ii. Coordinate with FEMA Private Sector Division to discuss and finalize strategy
      iii. Attend Region IX PSD meeting with potential local private sector partners as a test run for strategy
   c. Other pilots
      i. Continue to provide Weather Underground with data as needed for Public-Private Partnership pilot
ii. Conduct brief Cost-benefit Analyses for Tax Incentives and Risk MAP Credits pilots

iii. Initiate Phase 1 of the Innovation Campaign (contact/fund academia for vision definition)

iv. Conduct economic analysis of community mitigation funding and disaster recovery for the Bond Ratings pilot

v. Develop preparatory materials for developing partner association education campaign for Tax Incentives pilot

vi. Seek out a partner association (e.g. ASFPM, APA, etc) to carry out the education campaign for Tax incentives and develop relationship for strategy and planning

**Develop Management Tools**

1. Resilient Communities Index
   a. Finalize variables/programs for inclusion in the Index “formula” for rating
   b. Purchase required data from formula variables
   c. Develop the tool that will maintain the formula inputs
   d. Communicate tool’s existence (internally and externally)
   e. Train tool users and deploy use

2. Mitigation Action Tracker
   a. Collaborate with RAD Program Area F to understand the connection of the Mitigation Action Tracker (Area F responsibility) to continued resiliency/incentives implementation (Actions Committee)
   b. Communicate integration points/target areas for strategic decision-making by Actions Committee