Hazard Mitigation Planning Tasks for University Students

The following list includes research, mapping, and writing tasks that may be appropriate for undergraduate or graduate students to help counties complete their hazard mitigation plans. While this list may not encompass every hazard mitigation planning task that interns could potentially assist with, it outlines the various components of hazard mitigation plans, associated tasks, and estimated levels of effort to assist counties and intern managers with developing a work plan for interns. In addition to these tasks, students that participate in the Hazard Mitigation Planning Internship Program may also be able to assist with other mid-cycle hazard mitigation planning activities, including:

- Pre- and post-disaster recovery planning
- GIS data clean-up, (structures, critical facilities, utilities, and roads)
- Community Rating System (CRS) requirements
- Implementation mitigation actions, such as
    - Developing educational materials
    - Assisting with grant applications
    - Completing activities to participate in StormReady or CRS
    - Revising other planning documents to incorporate hazard mitigation planning principles

The list of hazard mitigation planning tasks is organized into the three portions of mitigation planning that students may have the skills to assist a county with: profiling the community, assessing risk and vulnerability, and assessing current county capabilities. This list corresponds to a university matrix, which estimates the ability of students in each identified university's relevant programs to complete each of the tasks; not all students will have the background to complete these tasks.

Each item is categorized as a "planning" task, which requires research, analysis, and writing, or a "GIS" task, which requires the use of geographic information system (GIS) software, including ArcGIS or Hazus, as specified.

Each of the items below includes limited descriptive information about what is required to successfully complete the task, as well as an estimate of how much time it would take a student-- with proper training--to complete the work. The following assumptions were made in determining the tasks and estimating the time it will take to complete the work:

- The county hazard mitigation planners will work with the stakeholders to identify the hazards to profile. This will not be the responsibility of the student planners.
- Students who are completing GIS analysis and mapping tasks will have a background and knowledge in using ArcGIS. Additionally, students completing GIS analysis and mapping will receive the following:
    - Training--from the county, PEMA, or FEMA--on the GIS analysis methods used to complete these tasks.
    - Access to local, county, state, and federal datasets to complete the analysis.

Please note, the county hazard mitigation planning lead should review these tasks to include relevant specific information, and should review the tasks with students who will complete the work so that they have the training and knowledge to successfully perform each task.

1. Community Profile

Purpose: The community profile provides information about the base or existing conditions of the county and the jurisdictions in the county or the community completing the hazard mitigation plan. This information helps provide context to the rest of the plan by defining the built and natural environment, and the population characteristics in the county or community which are vulnerable to the hazards identified in the plan, and which will be considered when completing the mitigation strategy.

1.1 Describe Geography and the Environment

a. Prepare base and watershed maps of the county or community to illustrate the geographic features of the area where the land and water environmental characteristics are in the community. The county, the US Geological Survey, and the Department of Environmental Protection are potential sources for this information.
    - 3 hours

b. Research and write a narrative of the geographical location and features of the county or community, including the land area, topography, and water features, to provide context of what exists in the community that may affect where and how communities are built. Use the information compiled in task 1.1a, as well as internet research and potential interviews with county personnel to inform this section.
    - 5 hours

1.2 Describe Community

a. Research and write a narrative about the character of the county or community, including the area's history, information about landmarks and other places of interest in the area, the major industries, and any other information about the county and its jurisdictions to provide context about how the community was developed. Include what has historically been important to the community. This information may be gathered through interviews with county personnel or stakeholders, and/or online research.
    - 8 hours

1.3 Summarize Demographics

a. Prepare tables or charts illustrating demographics of the county and the jurisdictions (or the community), including population, population density, racial composition, age breakdown, income, and housing to present qualitative information about the population characteristics in the community. The U.S. Census Bureau is the best source for this information.
    - 6 hours

b. Summarize in narrative form the demographics of county and the jurisdictions (or the community), including population, population density, racial composition, age breakdown, income, and housing to provide a written analysis to the data presented in the tables to give context about the population in the county or community. Use the information compiled in task and 1.3b to inform this analysis.
    - 6 hours

1.4 Growth Trends and Land Use

a. Prepare a land use map to illustrate how the community has developed and where different land uses are positioned near each other, the population, and the environmental characteristics of the area. The county planning or zoning department is the best source for this information.
    - 3 hours
b. Prepare a table or chart that demonstrates the current population growth experienced for at least the last decade in the county and jurisdictions in the county or the community to provide a qualitative reference for how the community, or surrounding areas, are growing or declining in order to give context for how the community is developing. The U.S. Census Bureau is the best source for this information.
    - 4 hours
c. Research and prepare a narrative description of the existing land use and the developed area of the county or community, the current population growth rate of the county or community, and the population and land use growth trends the county or community has identified or has cultivated in order to provide a context for how the community has developed and grown. Use the information compiled in tasks 1.4a and 1.4b to inform this analysis.
    - 7 hours

2. Risk Assessment

Purpose: The risk assessment identifies hazards that have the potential to occur in the community or county and provides an analysis of what may happen if the hazard event occurs. The risk assessment must include a description of the hazard and where it may occur in the community, an evaluation of the strength or magnitude of the hazard, an identification of the past occurrences of the hazard, an evaluation of the probability of future occurrence, and a description of the impact each hazard will have on the community. The risk assessment includes a full vulnerability analysis, which forms the basis for the creation of a mitigation strategy to address those vulnerabilities.

Please note, data sources for this information vary by hazard. A potential list of sources is included in the *Pennsylvania All-Hazard Mitigation Planning Standard Operating Guide*, but the county emergency management agency, department of the environment, or planning department may have more up-to-date and localized information. For flooding profiles, use the most up-to-date digital flood insurance rate maps (DFIRMs) available from FEMA to indicate designated floodplains.

2.1 Identify the Geographic Location

a. Prepare maps to illustrate the geographic location of the areas that are subject to the hazard (community and/or county-wide, regional, or state-wide as appropriate) to show which areas may be vulnerable to the impact of the hazard. See the note at the beginning of the risk assessment section about data sources for this information.
    - 6 hours/Hazard
b. Research and provide a narrative of the geographic area, including the geographic boundaries, that is subject to the impact of the hazard to provide an analysis of the areas most and least vulnerable to the hazard. Use the information gathered in task 2.1a to complete this analysis.
    - 5 hours/Hazard

2.2 Define the Extent

a. Research and provide information about the extent-- the strength or magnitude-- of impacts that each area in the county or community can experience from the hazard. Indicate the possible worst case scenario of this hazard occurring to provide an analysis of its potential impact on the community. See the note at the beginning of the risk assessment section about data sources for this information. If a data is available for a map, use the data used in task 2.2c to inform this narrative analysis.
   - 5 hours/Hazard

b. Research and identify the environmental impacts of the hazard (potential and historical) in order to provide further analytical context to its potential impacts on the community. See the note at the beginning of the risk assessment section about data sources for this information.
   - 4 hours/Hazard

c. As appropriate, prepare maps illustrating the extent of the hazard's impact on the county or community to provide an illustration of the analysis of vulnerable areas in the community. See the note at the beginning of the risk assessment section about data sources for this information.
   - 6 hours/Hazard

2.3 Identify Past Hazard Occurrences

a. Prepare a table of past presidential disaster declarations, using data from FEMA disaster declaration records online. This information will help to provide information about the types of disasters which have had a great impact on the community or county.
   - 2 hours

b. Research the past occurrences of each hazard being profiled, including the dates of occurrences, recorded magnitude and/or severity of the event, duration of the event, and information on the damage it caused (including casualties and property damage).
   Use this information to complete a narrative of the impact the past occurrences of the hazard had on the community in order to provide a historical illustration of the current risk the community faces from the hazard.
   Prepare tables of past events, as appropriate, to present an illustration of the number and impact of the events.
   See the note at the beginning of the risk assessment section about data sources for this information. If data is available for a map, use the data used in task 2.3c to inform this narrative analysis. In addition to records of past events, meetings with stakeholders and community members will provide information about where hazards have occurred and the impact of those hazards.
   - 12 hours/Hazard

c. As appropriate, prepare maps depicting the past locations of the occurrences of hazards to provide an illustration of the areas where the hazard impacted the community in the past. See the note at the beginning of the risk assessment section about data sources for this information.
   - 6 hours/Hazard

d. For flood hazards, summarize the Repetitive Loss Properties in the county or community (if the students will have access to the information, and personal information is removed) to provide

information about where flooding has caused property loss in the past. This information will be available from the state emergency management agency.

- 5 hours

2.4 Establish Probability of Future Occurrences

a. Research and provide a narrative summary of the quantitative and qualitative measures or indicators of how often the hazard will impact the county or community, including if climate change has the possibility of increasing this probability. This will provide an analysis of the potential of this hazard impacting the community in the future. See the note at the beginning of the risk assessment section about data sources for this information.
   - 6 hours/Hazard

2.5 Assess Vulnerability

a. Prepare data for GIS analysis by inventorying, and providing a tabular summary of, the assets in the county or community, including the population, the buildings, the infrastructure, and the critical facilities (the county or community will define the types of facilities that are critical facilities.). This information will inform an analysis of the impacts of hazards on the existing structures and population in the community. The county GIS, planning, or tax assessment departments are the best source of the data regarding buildings, infrastructure, and critical facilities. The U.S. Census Bureau is the best source for information regarding the population, unless the county or state has more up-to-date data sets.
   - 15 hours
b. Prepare data for GIS analysis by gathering information on building construction characteristics (year built, building materials, freeboard, and foundation type) and the use of the building (as defined by land use, i.e., commercial, residential). This data will inform a Hazus analysis of economic loss due to building damage. The county planning, GIS, or tax assessment departments will have this information, if it exists.
   - 15 hours
c. As appropriate, determine which buildings, critical facilities, and population are within the extent of the hazard; this is only applicable for hazards that have a defined extent identified in the hazard analysis. This data will provide the basis for the quantitative analysis in determining buildings, facilities, and population, which are vulnerable to the hazard.
   See the note at the beginning of the risk assessment section about data sources for information about the hazard extent. The hazard data should be the same used in task 2.2c and the building, critical facility, and population data should be the same compiled in tasks 2.5a and 2.5b.
   - 6 hours/Hazard
d. Prepare a table showing the percentage of buildings, population, and critical facilities within the extended area of the hazard to inform the quantitative analysis of the structures and population that are vulnerable to each hazard. Use the data compiled and used in Task 2.5c to populate this table.
   - 4 hours/Hazard
e. Prepare a narrative of the vulnerability of the county and the jurisdictions (or community) to the hazard to provide an analysis of the structures and population across the area that are

vulnerable to the hazard. Use the data compiled and presented in tasks 2.5c and 2.5d to inform this analysis.

- 6 hours/Hazard

f. As appropriate, prepare a map showing buildings, population, and critical facilities within the extended area of the hazard to provide an illustration of the structures and population most vulnerable to the hazard. Use the outcome of the analysis performed in task 2.5c to prepare this map.
   - 5 hours/Hazard

g. Prepare community level maps of the Special Flood Hazard Area and the buildings, and critical facilities within these areas, to provide a detailed illustration of the structures vulnerable to flooding. See the note at the beginning of the risk assessment section about data sources for this information.
   - 10 hours (if using community driven mapping tool in ArcGIS)

h. Prepare map of the critical facilities in the area to illustrate the distribution of facilities throughout the county or community. Use the data compiled and analyzed in task 2.5a to prepare this map.
   - 4 hours

i. Prepare a table of the critical facilities in the area, and their vulnerability to the identified hazards, to provide a reference for the community to use in determining the critical facilities most vulnerable to the profiled hazards. Use the data compiled in task 2.5c to prepare this table.
   - 7 hours

j. Research and provide an analytical summary of the predicted future population growth in the jurisdictions in the county or the community; identify if the areas of vulnerability to the identified hazards coincide with the areas of predicted growth. This information will help demonstrate future vulnerability to the identified hazards.
   This information may already exist from a state environmental or development and planning department. If this information does not exist, a planning graduate student may use a standard, population growth model to complete this analysis using past development figures from the U.S. Census Bureau.
   - 8 hours

2.6 Estimate Losses

a. Complete a Hazus analysis, including the data for the analysis, and documenting the methodology for completing the analysis for flooding, earthquake, and/or hurricanes.
   Develop a map to illustrate the findings and provide a narrative summary. This study will provide a quantitative analysis and illustration of the potential loss that the community may experience from the hazard.
   Use the data compiled in tasks 2.5a and 2.5b to inform the structure and facility portions of the model. Use the latest DFIRMs and floodplain information, including base flood information from FEMA, to inform flood impact portions of the model.
   - 50 hours/Model

b. If drought is identified as a hazard, research and provide a tabular and narrative summary of the USDA historical loss data to provide an analysis of the past insurance losses, to inform future estimates. Use USDA Risk Management Agency historical loss data to inform this analysis.
    - 10 hours
c. Identify the information related to potential losses as demonstrated by National Flood Insurance Program (NFIP) coverage and pay outs (if information is available for student use from the State's emergency management agency). Use this information to provide an analysis of the past insurance losses to inform future estimates.
    - 5 hours

3. Capability Assessment

Purpose: The capability assessment provides an inventory of the county or community's existing planning and regulatory, administrative and technical, financial, and education and outreach capabilities that may be used to implement mitigation priorities. The assessment identifies how the planning and regulatory tools are integrated with the content of the hazard mitigation plan, and provides recommendations to improve implementation of mitigation actions and priorities in the future. This assessment provides the last piece of analysis before the creation of the mitigation strategy, because it identifies how the community or county will be able to implement the actions and priorities in the strategy so that the actions can be realistic and obtainable by the community.

3.1 Existing Planning Mechanisms

a. Research and prepare a tabular and narrative summary of county and local plans that relate to the area's abilities to implement mitigation principles, including comprehensive plans, zoning ordinances, floodplain ordinances, SALDOs, climate adaptation plans, long-range transportation plans, emergency operations plans, recovery plans, building codes, stormwater management plans, COOP plans, capital improvement plans, and historic preservation plans. This analysis will provide the information about the community's current regulatory capabilities to implement hazard mitigation priorities and actions. This information can be found through internet research, but is better obtained through a survey of county or community departments and officials.
    - 30 hours
b. Identify how mitigation principles are integrated into the county and local plans listed above. Identify gaps, if mitigation principles are not identified or are conflicting with the goals of the plan. This analysis will provide the information about how well mitigation priorities are being currently implemented using regulatory tools and will identify areas where they can be better integrated in the future to facilitate better mitigation action. This information will be gathered through a review of the plan, as well as through discussions with the agency or department who developed the plan.
    - 20 hours/Identified Plan
c. Identify and provide a tabular and narrative summary of the NFIP participation characteristics of the county (if information is available for student use from the State's emergency management agency). Use this information to provide an analysis of the current use of regulations to implement NFIP in the communities.
    - 3 hours

3.2 Other Existing Capabilities

a. Research and provide a narrative summary of the existing administrative and technical capabilities (including grant administration, floodplain management, and code enforcement) that the county or community has to implement mitigation principles. This analysis will provide the information about the community's current administrative or technical capabilities to implement hazard mitigation priorities and actions. This information can be found through internet research, but is better obtained through a survey of county or community departments and officials.
    - 10 hours

b. Research and provide a narrative summary of the existing financial capabilities (including funding sources and budget processes) that the county or community has to implement mitigation principles. This analysis will provide the information about the community's current financial capabilities to implement hazard mitigation priorities and actions. This information can be found through internet research, but is better obtained through a survey of county or community departments and officials.
    - 10 hours

c. Research and provide a narrative summary of the existing education and outreach capabilities (including risk education programs and outreach mediums) that the county or community has to implement mitigation principles. This analysis will provide the information about the community's current public education capabilities that they can use to implement hazard mitigation priorities and actions. This information can be found through internet research, but is better obtained through a survey of county or community departments and officials.
    - 10 hours