

# CLINTON COUNTY HAZARD MITIGATION PLAN

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b>	1 - 4
<b>1.0 INTRODUCTION</b>	5 - 11
1.1 Hazard Mitigation Planning and the Disaster Mitigation Act of 2000	5 - 6
1.2 Multi-Jurisdictional Plan Adoption	7
1.3 Multi-Jurisdictional Planning Participation	7
1.4 The Planning Process	7 - 11
Table 1.1 Municipal Questionnaire Participation	8
Figure 1.1 Location Map Clinton County	10
Table 1.2 Mitigation Team meeting Dates	11
<b>2.0 HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>	12 - 60
2.1 Hazard Identification	12 - 14
Table 2-1 Clinton County Disaster History	12 - 13
Table 2-2 Clinton County Hazard Identification Summary Table	14
2.2 Hazard Event Profiles	14 - 48
Table 2-2 A	15
2.2.1 Dam Failure	14 - 19
Figure 2.1 Major Dams Clinton County	17
2.2.2 Flooding	19 - 40
Figure 2.2 Flooding Hazards Clinton County	21
Table 2-3 Clinton County NFIP Participation Status by Municipality	22 - 23
Table 2-4 Peak Annual Susquehanna Discharge and Stage Recorded at Renovo, Pennsylvania (1901-2004)	25 - 27
Table 2-5 Peak Annual Susquehanna River Discharge and Stage Recorded at Lock Haven, Pennsylvania (1975-2004)	28
Table 2-6 Peak Annual Bald Eagle Creek Discharge and Stage Recorded at Beech Creek Station, Pennsylvania (1911-2004)	29 - 31
Figure 2-3 Discharge in CFS at Renovo, West Branch of Susquehanna	32
Figure 2-4 River Stage at Renovo, West Branch of Susquehanna	33
Photographs 1 and 2 (Ivan Flooding Event)	34
Photographs 3 (Ivan Flooding Event)	35
Photographs 4 and 5 (1936 Flood and Agnes Flooding Event)	37
Photographs 6 and 7 (Agnes Flooding Event and Winter Storm Event)	38
Photographs 8 and 9 (Ice Jam Events)	39
2.2.3 Hurricanes/Tropical Storms	40
Photographs 10 and 11 (Lock Haven Dike Levy Project)	41

# CLINTON COUNTY HAZARD MITIGATION PLAN

## TABLE OF CONTENTS

2.2.4	Landslides .....	40 - 47
	Figure 2-5 Geologic Formations & Slide/Slump Hazards Clinton County .....	43
	Figure 2-6 Potential for Mass Wasting Hazards in Northern Clinton County, Pennsylvania .....	44
	Figure 2-7 Potential for Mass Wasting Hazards in Southern Clinton County, Pennsylvania .....	45
	Photographs 12 and 13 (Ice Mine Cut Project) .....	47
2.2.5	Severe Storms .....	48 - 50
2.2.6	Tornadoes .....	50 - 51
2.3	Vulnerability Assessment: Identifying Assets .....	52 - 56
	Table 2-7 Clinton county Vulnerable Structures by Municipality .....	54
	Table 2-8 Clinton County Critical Facilities by Municipality .....	55
2.4	Vulnerability Assessment: Estimating Potential Losses .....	56 - 60
2.4.1	Potential Dam Failure Losses .....	56 - 57
2.4.2	Potential Flooding Losses .....	58
2.4.3	Potential Hurricane/Tropical Storm Losses .....	58
2.4.4	Potential Landslide Losses .....	58 - 59
2.4.5	Potential Severe Storm Losses .....	59
2.4.6	Potential Tornado Losses .....	59
2.5	Multi-Jurisdictional Risk Assessment .....	59 - 60
<b>3.0</b>	<b>HAZARD MITIGATION GOALS .....</b>	<b>61 - 63</b>
3.1	High-Priority Hazard Mitigation Goals .....	61 - 62
3.2	Medium-Priority Hazard Mitigation Goals .....	62 - 63
3.3	Low-Priority Hazard Mitigation Goals .....	63
<b>4.0</b>	<b>CAPABILITY ASSESSMENT .....</b>	<b>64 - 71</b>
4.1	Introduction .....	64
4.2	Institutional Capability .....	64 - 66
4.3	Legal Capability .....	66 - 67

# CLINTON COUNTY HAZARD MITIGATION PLAN

## TABLE OF CONTENTS

4.4 Fiscal Capability .....	67 - 69
4.5 Political Capability .....	70
4.6 Technical Capability .....	70 - 71
<b>5.0 HAZARD MITIGATION STRATEGY .....</b>	<b>72 - 116</b>
5.1 Identification and Analysis of Hazard Mitigation Measures .....	72 - 77
5.1.1 Preventive Measures .....	72 - 73
5.1.1.1 Land Use Planning/Zoning Efforts .....	73
PM-1 .....	73
PM-2 .....	73
PM-3 .....	73
5.1.1.2 Subdivision and Land Development Ordinances .....	73 - 74
PM-4 .....	74
5.1.1.3 Building Codes .....	74 - 75
PM-5 .....	75
5.1.1.4 Floodplain Development Regulations .....	75 - 76
PM-6 .....	76
5.1.1.5 Stormwater Management .....	76 - 77
PM-7 .....	77
5.1.1.6 Operations and maintenance Procedures .....	77
PM-8 .....	77
5.1.2 Emergency Services .....	77 - 84
5.1.2.1 Hazard Warning .....	78 - 81
ES-1 .....	80
ES-2 .....	80
ES-3 .....	80
ES-4 .....	81
ES-5 .....	81
ES-6 .....	81
5.1.2.2 Hazard Response .....	81 - 82
ES-7 .....	82
ES-8 .....	82

# CLINTON COUNTY HAZARD MITIGATION PLAN

## TABLE OF CONTENTS

5.1.2.3	Critical Facilities Protection .....	82 - 83
	ES-9 .....	83
5.1.2.4	Health and Safety Maintenance .....	83
	ES-10 .....	83
5.1.2.5	Post-Disaster Recovery and Mitigation .....	84
	ES-11 .....	84
	ES-12 .....	84
5.1.3	Property Protection .....	84 - 90
5.1.3.1	Relocation/Acquisition .....	87 - 89
	Table 5-1 Relocation Cost Guide .....	87
	PP-1 .....	89
5.1.3.2	Insurance .....	89
	PP-2 .....	89
5.1.3.3	Emergency Response Planning .....	89 - 90
	PP-3 .....	90
5.1.4	Structural Projects .....	90 - 94
5.1.4.1	Dams/Levees/Floodwalls .....	91
5.1.4.2	Bridge/Culvert Modifications .....	92 - 93
	SP-1 .....	93
5.1.4.3	Landslide Abatement .....	93 - 94
	SP-2 .....	94
5.1.5	Natural Resource Protection .....	94 - 98
5.1.5.1	Open Space Preservation .....	95 - 96
	NR-1 .....	96
	NR-2 .....	96
	NR-3 .....	96
5.1.5.2	Wetland Protection .....	96 - 97
	NR-4 .....	97
	NR-5 .....	97
5.1.5.3	Identification and Implementation of Best Management Practices ..	97 - 98
	NR-6 .....	98
5.1.6	Public Information .....	98 - 102

# CLINTON COUNTY HAZARD MITIGATION PLAN

## TABLE OF CONTENTS

5.1.6.1	Map Information .....	100
	PI-1 .....	100
	PI-2 .....	100
5.1.6.2	Library Resources .....	101
	PI-3 .....	101
	PI-4 .....	101
	PI-5 .....	101
5.1.6.3	Outreach Projects .....	101 - 102
	PI-6 .....	102
	PI-7 .....	102
	PI-8 .....	102
5.2	Implementation of Hazard Mitigation Measures .....	103 - 114
5.2.1	Hazard Mitigation Action Plan .....	104 - 107
	Table 5-2 Prioritized Hazard Mitigation Action Plan .....	104 - 106
5.2.2	Potential Funding Sources .....	107 - 114
5.3	Multi-Jurisdictional Hazard Mitigation Strategy .....	115 - 116
	Table 5-3 Multi Jurisdictional Hazard Mitigation Strategy Preventative Measures, Emergency Services, Property Protection, Structural Projects, Natural Resource Protection, and Public Information ....	116
<b>6.0</b>	<b>PLAN MAINTENANCE PROCEDURES .....</b>	<b>117 - 121</b>
6.1	Monitoring, Evaluating, and Updating the Plan .....	117 - 119
	Table 5-4 Multi Jurisdictional Hazard Mitigation Progress for Preventative Measures, Emergency Services, Property Protection, Structural Projects Natural Resource Protection, and Public Information .....	118
6.2	Implementation Through Existing Programs .....	120
6.3	Continued Public Involvement .....	121
<b>APPENDICES</b>		
	Clinton County Resolution of Adoption by County Commissioners .....	x
	Municipal Resolutions of Adoption by Municipalities .....	x
	Resolution 2005-3: Bald Eagle Township .....	x
	Resolution 05-01: Beech Creek Borough .....	x
	Resolution 1-4405: Beech Creek Township .....	x
	Resolution 2005-11: Chapman Township .....	x

# CLINTON COUNTY HAZARD MITIGATION PLAN

## TABLE OF CONTENTS

Resolution 53: Colebrook Township .....	X
Resolution 3-05: Dunnstable Township .....	X
Resolution 4-2005: East Keating Township .....	X
Resolution 04-05: Flemington Borough .....	X
Resolution 2-05: Gallagher Township .....	X
Resolution 100305B: Greene Township .....	X
Resolution 2005-02: Grugan Township .....	X
Resolution 2-05: Leidy Township .....	X
Resolution 990: City of Lock Haven .....	X
Resolution 1-2005: Logan Township .....	X
Resolution 2005-01: Loganton Borough .....	X
Resolution 2005-5: Mill Hall Borough .....	X
Resolution: Noyes Township .....	X
Resolution 163: Porter Township .....	X
Resolution 3-05: Renovo Borough .....	X
Resolution 1-2005: South Renovo Borough .....	X
Resolution 7.18.2005: Wayne Township .....	X
Resolution 2005-5-10: Woodward Township .....	X
Meeting Agenda #1 Hazard Mitigation Planning Guidance .....	X
Meeting Agenda #2 Hazard Mitigation Planning Guidance .....	X
Meeting Agenda #3 Hazard Mitigation Planning Guidance .....	X
Meeting Agenda #4 Hazard Mitigation Planning Guidance .....	X
Meeting Agenda #5 Hazard Mitigation Planning Guidance .....	X
Hazard Mitigation Questionnaire (Blank) .....	X
Questionnaire - Beech Creek Borough .....	X
Questionnaire - Beech Creek Township .....	X
Questionnaire - Chapman Township .....	X
Questionnaire - East Keating Township .....	X
Questionnaire - Flemington Borough .....	X
Questionnaire - Greene Township .....	X
Questionnaire - Grugan Township .....	X
Questionnaire - Leidy Township .....	X
Questionnaire - Lock Haven City .....	X
Questionnaire - Logan Township .....	X
Questionnaire - Loganton Borough .....	X
Questionnaire - Mill Hall Borough .....	X
Questionnaire - Noyes Township .....	X
Questionnaire - Pine Creek Township .....	X
Questionnaire - Renovo Borough .....	X
Questionnaire - Woodward Township .....	X

# CLINTON COUNTY HAZARD MITIGATION PLAN

## TABLE OF CONTENTS

Critical Facilities Inventory .....	x
Capability Assessment Matrix .....	x
Recommended Scope of Work - County Wide All Hazard Mitigation Plan .....	