APPENDICES

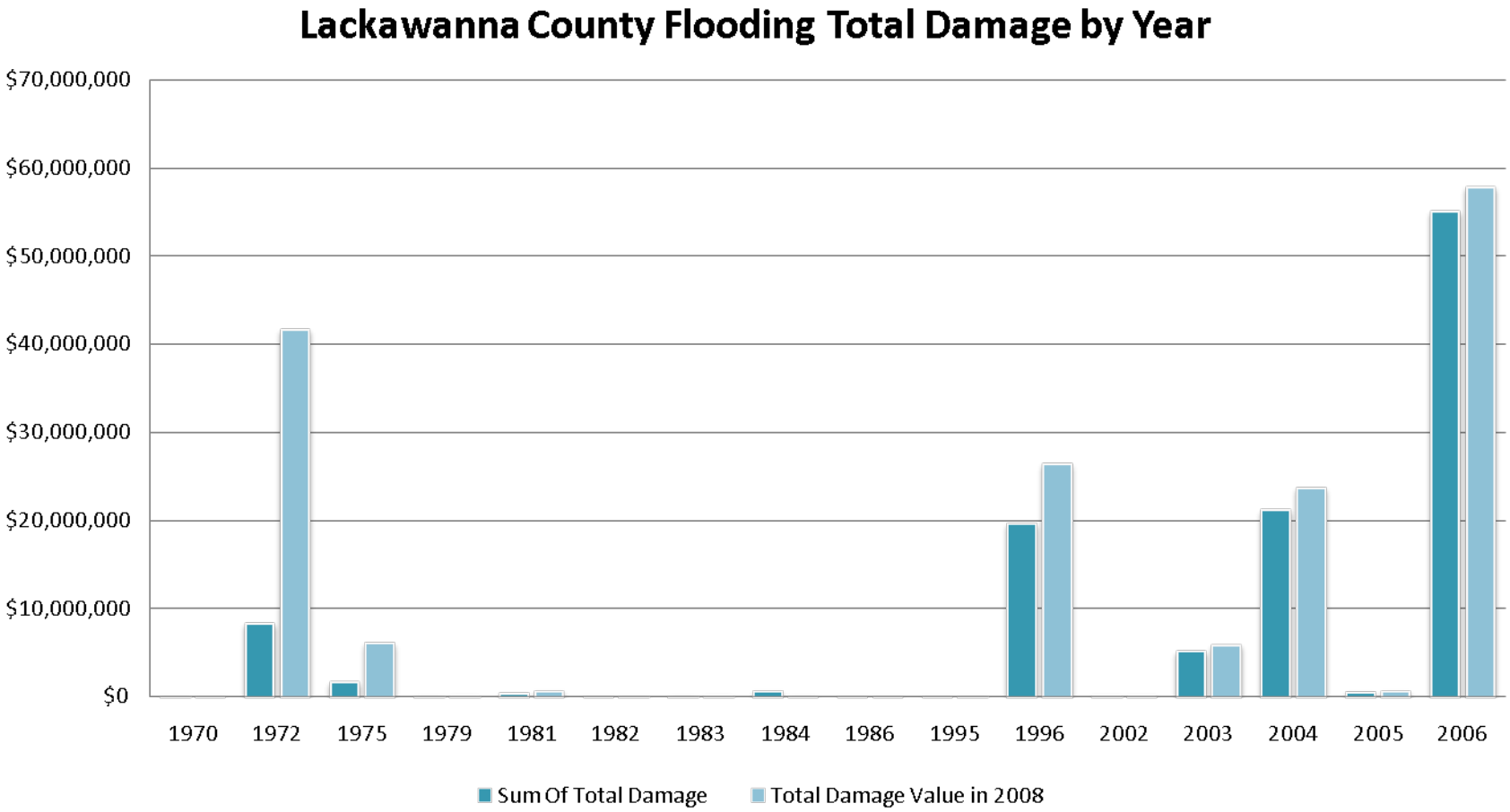
TECHNICAL APPENDICES

GENERAL APPENDICES

APPENDIX A: BAR CHARTS

Flooding – Lackawanna County Total Damage = $112 Million

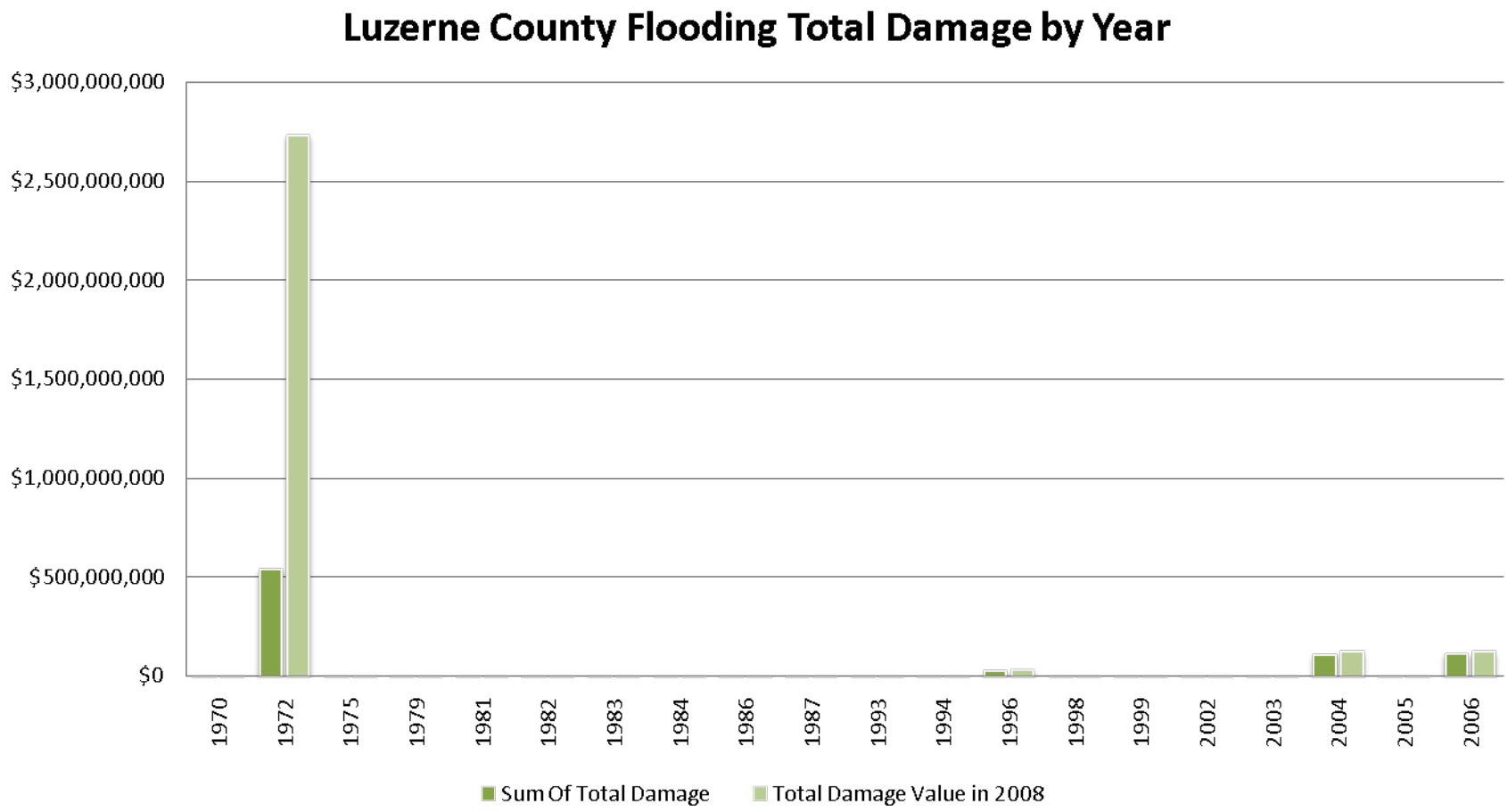
($162 Million in 2008 $)



Source: NCDC, SHELDUS

Flooding – Luzerne County
Total Damage = $787 Million

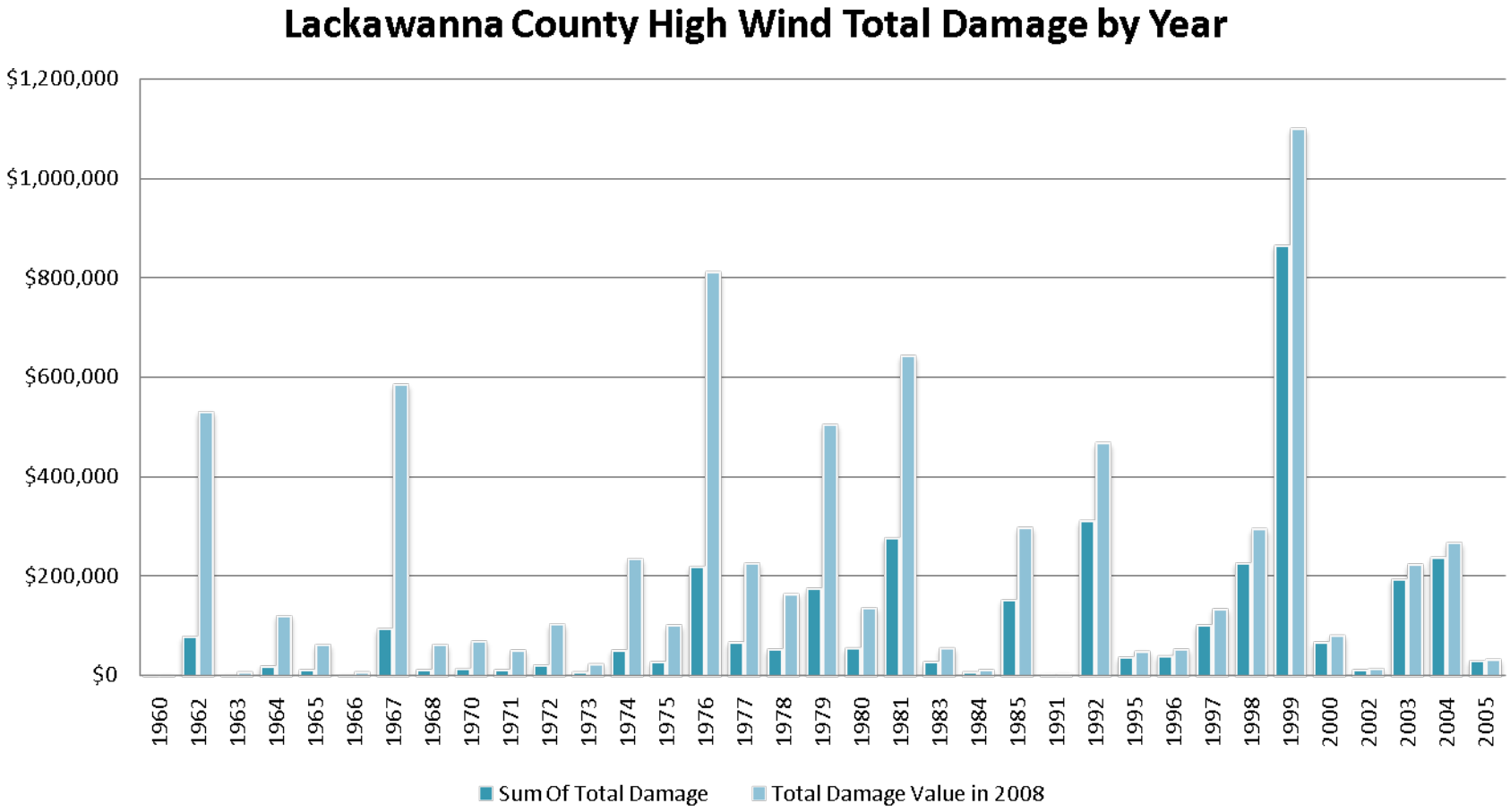
($3.02 Billion in 2008 $)



Source: NCDC, SHELDUS

High Wind – Lackawanna County Total Damage = $3.44 Million

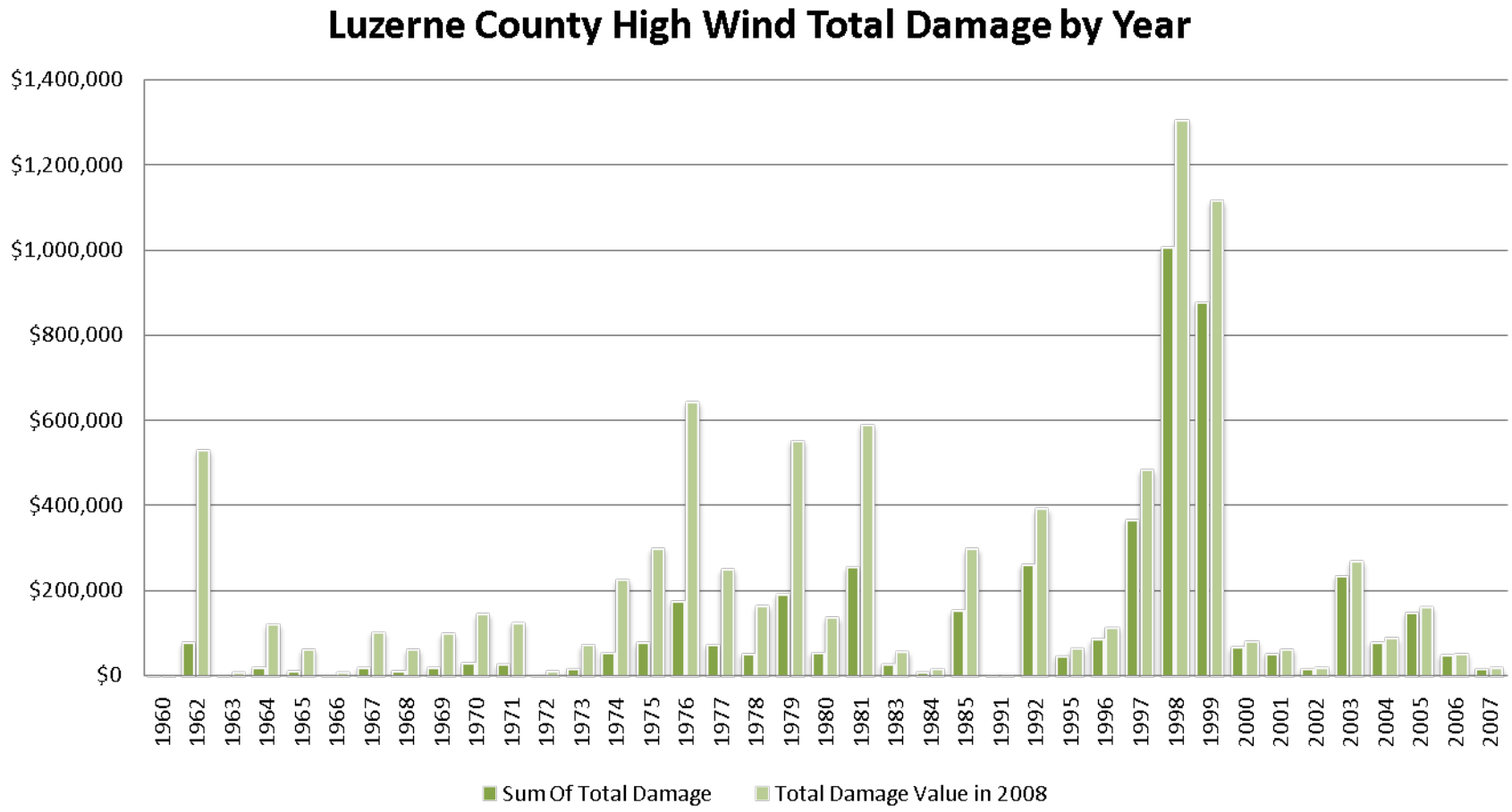
($7.46 Million in 2008 $)



Source: NCDC, SHELDUS

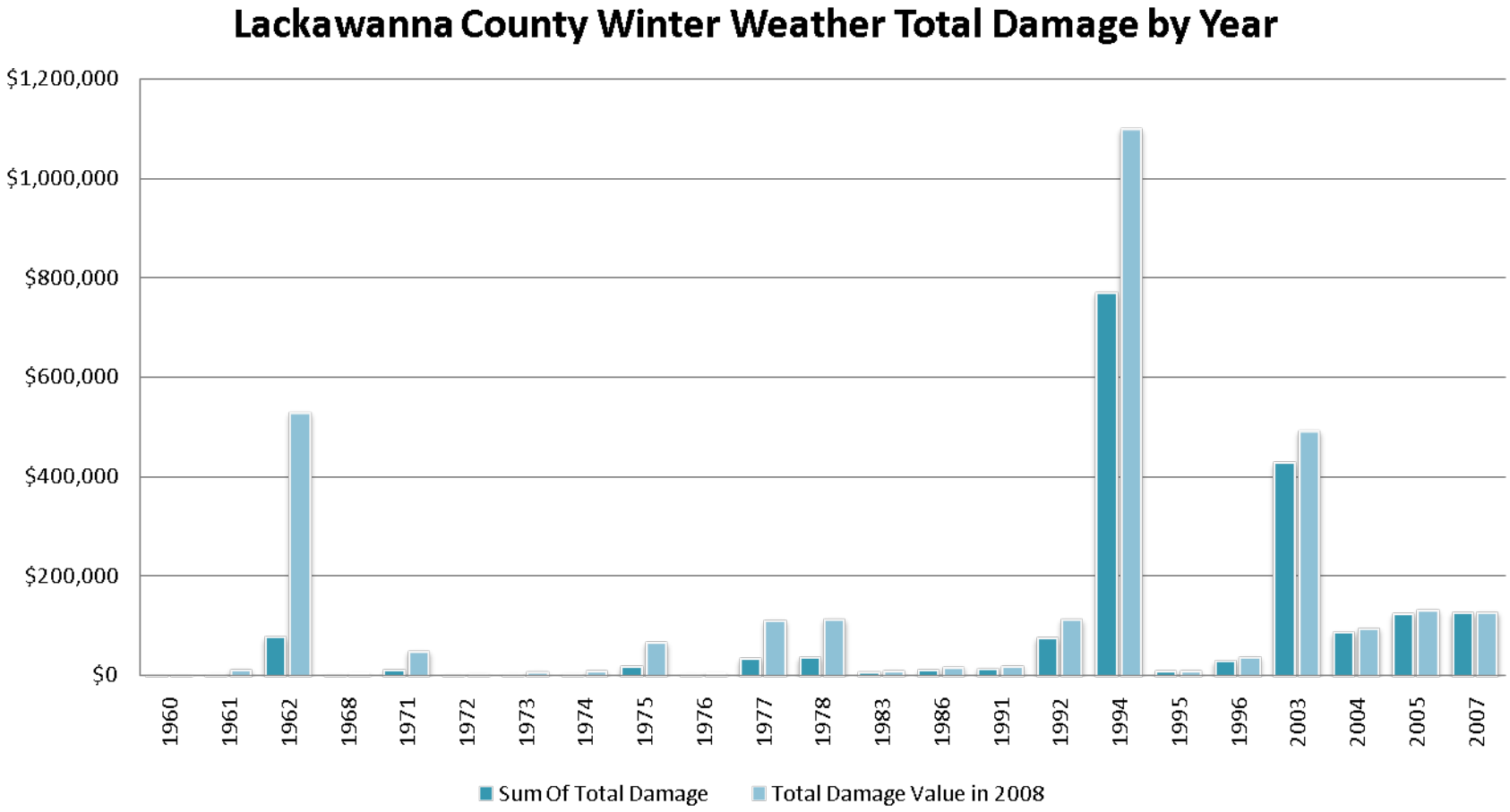
High Wind – Luzerne County
Total Damage = $4.59 Million

($8.72 Million in 2008 $)



Source: NCDC, SHELDUS

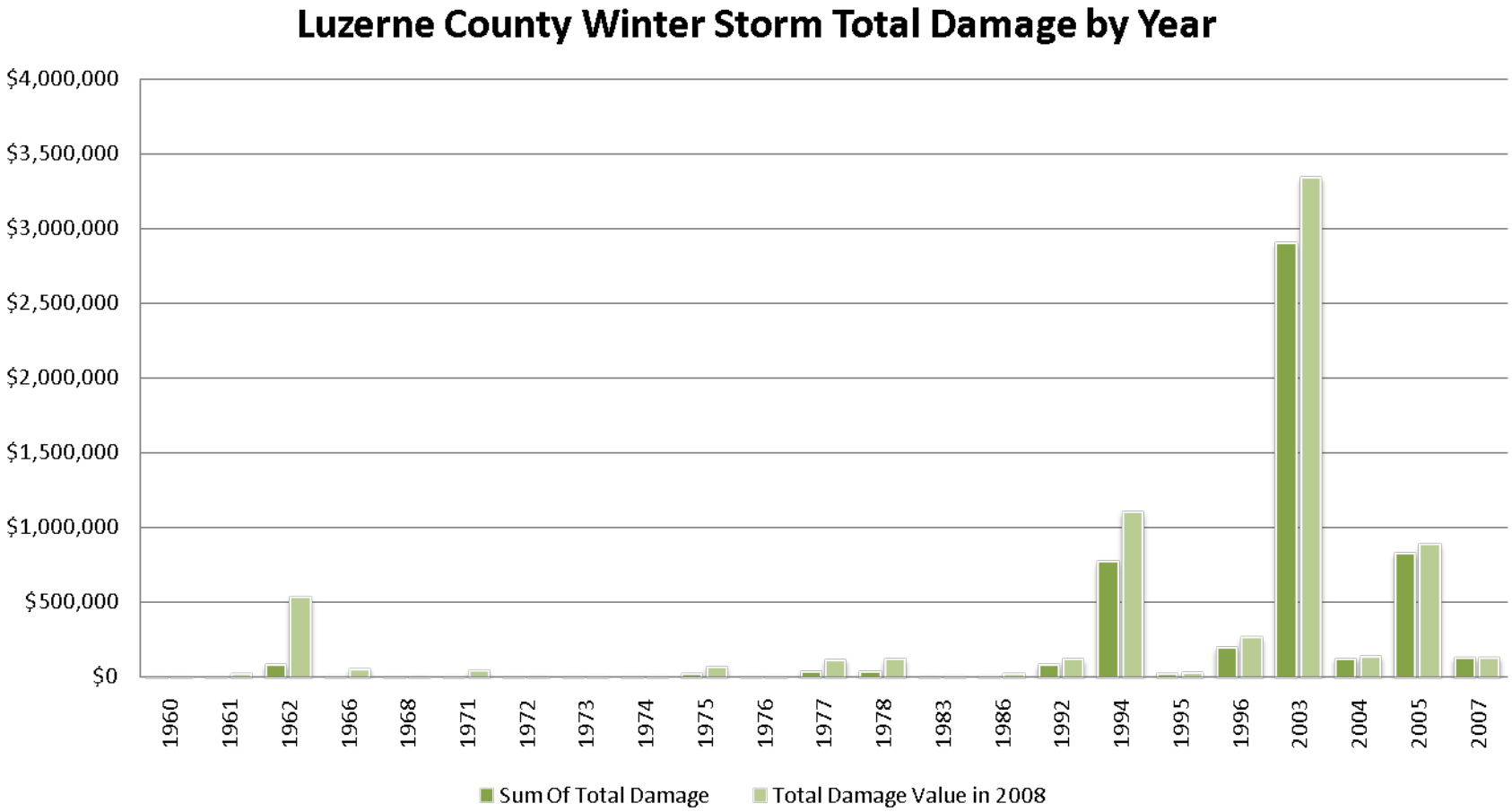
Winter Storms – Lackawanna County
Total Damage = $1.84 Million
($3.06 Million in 2008 $)



Source: NCDC, SHELDUS

Winter Storms – Luzerne County
Total Damage = $5.21 Million

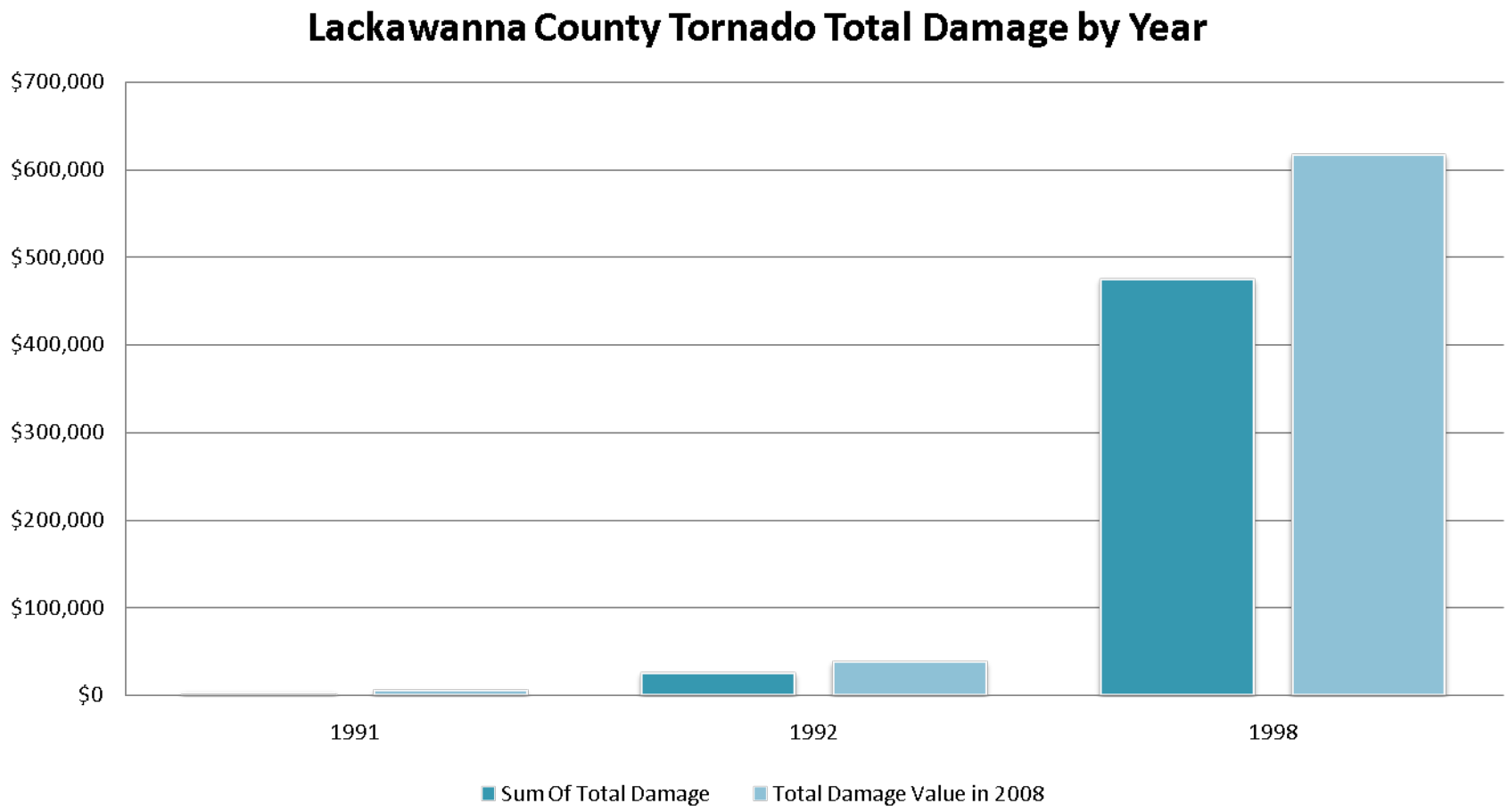
($6.96 Million in 2008 $)



Source: NCDC, SHELDUS

Tornadoes – Lackawanna County
Total Damage = $0.50 Million

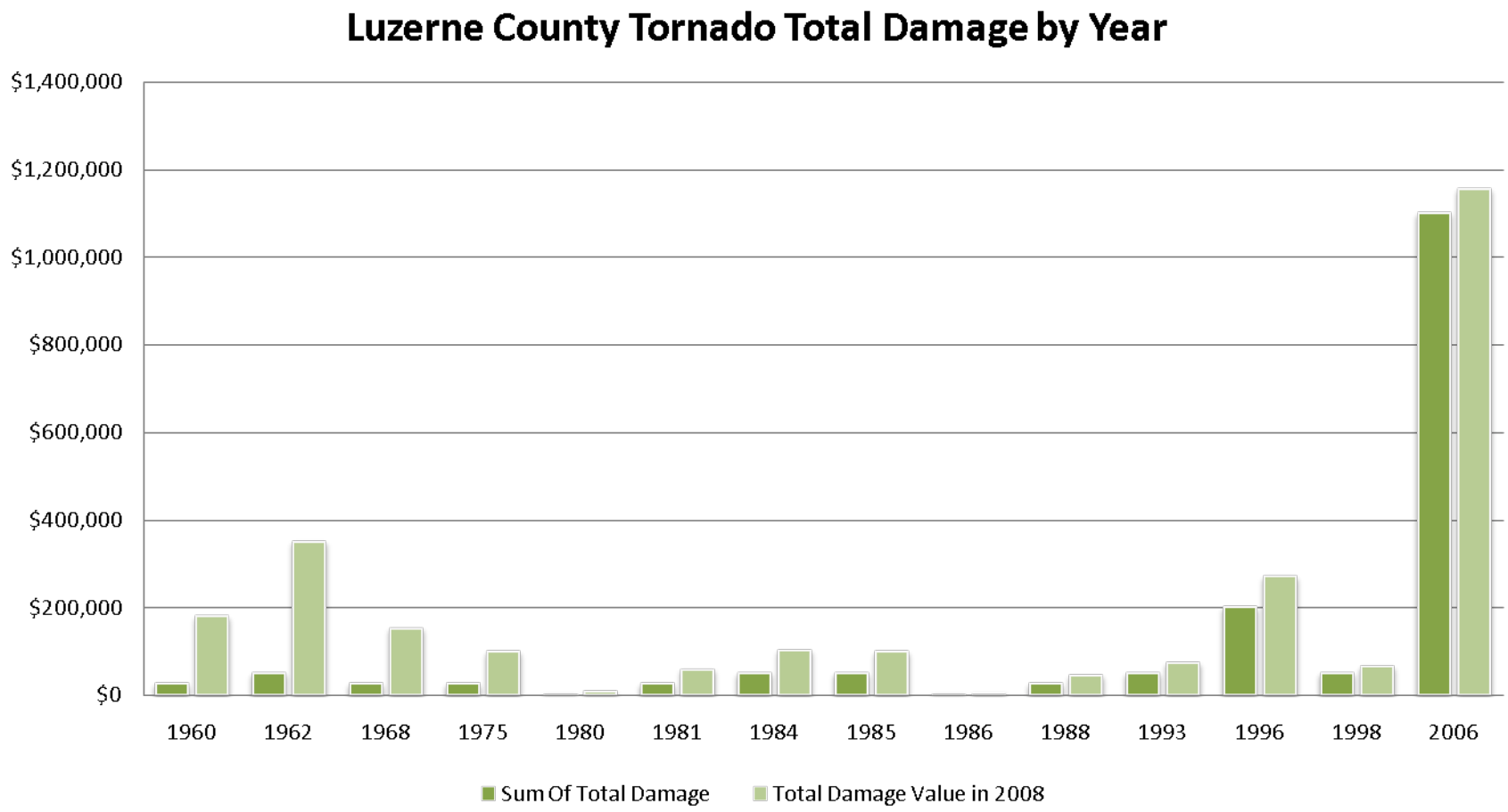
($0.66 Million in 2008 $)



Source: NCDC, SHELDUS

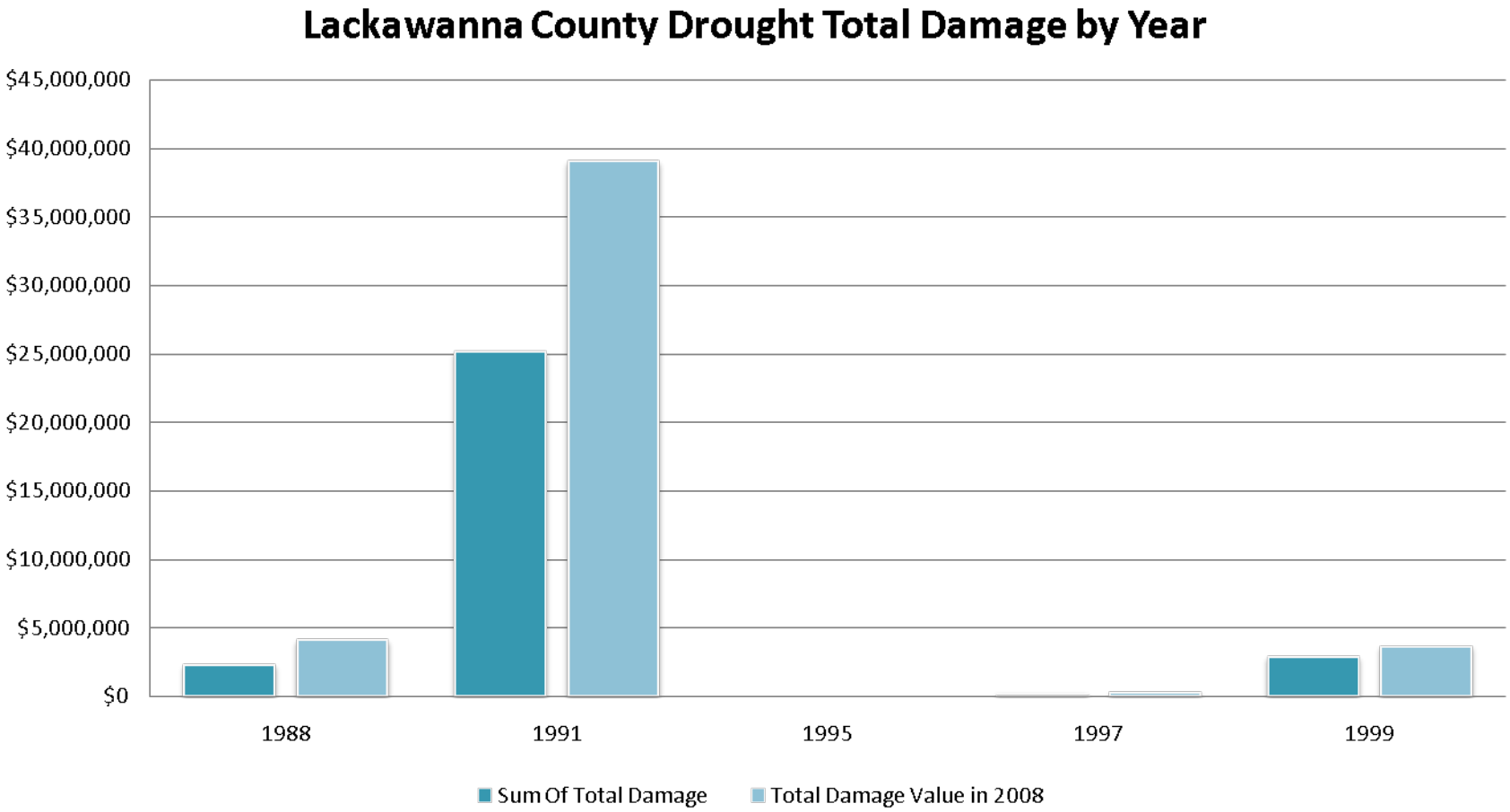
Tornadoes – Luzerne County
Total Damage = $1.68 Million

($2.66 Million in 2008 $)



Source: NCDC, SHELDUS

Drought
Total Damage = $30.4 Million*
($47.0 Million in 2008 $)



Source: NCDC, SHELDUS
*Damages are regional estimates; this includes Luzerne and Lackawanna Counties

APPENDIX B: TABLES

Lackawanna County Number of Structures and Bridges in 100-Year Floodplain and Corresponding Economic Exposure Value			
Municipality	**Structures in Floodplain**	**Bridges in Floodplain**	**100-Year Flood Economic Loss (Million $)**
Abington Township	13	5	5
Archbald Borough	146	1	57
Benton Township	129	17	50
Blakely Borough	380	7	148
Carbondale City	141	7	55
Carbondale Township	34	3	13
Clarks Green Borough	-	-	-
Clarks Summit Borough	72	1	28
Clifton Township	92	13	36
Covington Township	184	12	72
Dalton Borough	104	4	41
Dickson City Borough	773	2	302
Dunmore Borough	27	5	11
Elmhurst Township	30	2	12
Fell Township	212	10	83
Glenburn Township	17	4	7
Greenfield Township	7	3	3
Jefferson Township	4	2	2
Jermyn Borough	183	8	72
Jessup Borough	186	3	73
Laplume Township	50	7	20
Madison Township	39	11	15
Mayfield Borough	38	2	15
Moosic Borough	153	8	60
Moscow Borough	76	11	30
Newton Township	82	2	32
North Abington Township	41	7	16
Old Forge Borough	172	11	67
Olyphant Borough	470	3	184
Ransom Township	56	3	22
Roaring Brook Township	-	1	-
Scott Township	124	17	48
Scranton City	2,264	56	885
South Abington Township	118	15	46
Springbrook Township	35	13	14
Taylor Borough	43	6	17
Thornhurst Township	80	11	31
Throop Borough	42	-	16
Vandling Borough	-	-	-
West Abington Township	4	-	2
Total Number of Structures	6,621	293	
Total Economic Loss ($ Million)			2,587

Lackawanna County Future Number of Structures in 100-Year Floodplain and Corresponding Economic Exposure Value (Extrapolated to year 2030)				
Municipality	**Structures in Floodplain**	**Additional Structures in Floodplain**	**Existing 100-Year Flood Economic Loss (Million $)**	**Future 100-Year Flood Economic Loss (Million $)**
Abington Township	13	-	5	5
Archbald Borough	146	-	57	57
Benton Township	129	-	50	50
Blakely Borough	380	400	148	305
Carbondale City	141	440	55	227
Carbondale Township	34	-	13	13
Clarks Green Borough	-	-	-	-
Clarks Summit Borough	72	-	28	28
Clifton Township	92	150	36	95
Covington Township	184	320	72	197
Dalton Borough	104	170	41	107
Dickson City Borough	773	420	302	466
Dunmore Borough	27	-	11	11
Elmhurst Township	30	-	12	12
Fell Township	212	-	83	83
Glenburn Township	17	-	7	7
Greenfield Township	7	-	3	3
Jefferson Township	4	-	2	2
Jermyn Borough	183	-	72	72
Jessup Borough	186	-	73	73
Laplume Township	50	-	20	20
Madison Township	39	-	15	15
Mayfield Borough	38	-	15	15
Moosic Borough	153	-	60	60
Moscow Borough	76	-	30	30
Newton Township	82	-	32	32
North Abington Township	41	-	16	16
Old Forge Borough	172	-	67	67
Olyphant Borough	470	-	184	184
Ransom Township	56	-	22	22
Roaring Brook Township	-	-	-	-
Scott Township	124	-	48	48
Scranton City	2,264	-	885	885
South Abington Township	118	-	46	46
Springbrook Township	35	-	14	14
Taylor Borough	43	-	17	17
Thornhurst Township	80	-	31	31
Throop Borough	42	-	16	16
Vandling Borough	-	-	-	-
West Abington Township	4	20	2	9
Total Number of Structures	6,621	3,070		
Total Economic Loss ($ Million)			2,587	3,337

Luzerne County Number of Structures and Bridges in 100-Year Floodplain and Corresponding Economic Exposure Value			
Municipality	**Structures in Floodplain**	**Bridges in Floodplain**	**100-Year Flood Economic Loss (Million $)**
Ashley Borough	87	8	32
Avoca Borough	138	2	51
Bear Creek Township	63	24	23
Bear Creek Village Borough	15	7	6
Black Creek Township	164	13	61
Buck Township	50	6	19
Butler Township	142	32	53
Conyngham Borough	143	4	53
Conyngham Township	10	4	4
Courtdale Borough	4	3	1
Dallas Borough	44	19	16
Dallas Township	73	7	27
Dennison Township	45	13	17
Dorrance Township	83	22	31
Dupont Borough	128	13	48
Duryea Borough	60	3	22
Edwardsville Borough	14	1	5
Exeter Borough	75	-	28
Exeter Township	132	5	49
Fairmount Township	132	22	49
Fairview Township	107	12	40
Forty Fort Borough	121	3	45
Foster Township	91	18	34
Franklin Township	12	12	4
Freeland Borough	-	-	-
Hanover Township	328	18	122
Harveys Lake Borough	332	7	124
Hazle Township	98	31	37
Hazleton City	-	-	-
Hollenback Township	85	16	32
Hughestown Borough	-	-	-
Hunlock Township	176	19	66
Huntington Township	143	28	53
Jackson Township	58	20	22
Jeddo Borough	-	-	-
Jenkins Township	103	-	38
Kingston Borough	110	20	41
Kingston Township	497	-	185
Laflin Borough	10	8	4
Lake Township	47	13	18
Larksville Borough	18	2	7
Laurel Run Borough	37	-	14
Lehman Township	7	11	3
Luzerne Borough	310	1	116
Nanticoke City	66	4	25
Nescopeck Borough	82	8	31
Nescopeck Township	17	-	6
New Columbus Borough	26	4	10
Newport Township	10	3	4

Nuangola Borough	103	-	38
Penn Lake Park Borough	20	2	7
Pittston City	18	-	7
Pittston Township	67	6	25
Plains Township	243	1	91
Plymouth Borough	279	4	104
Plymouth Township	34	2	13
Pringle Borough	16	2	6
Rice Township	42	13	16
Ross Township	122	37	45
Salem Township	251	16	94
Shickshinny Borough	254	4	95
Slocum Township	-	-	-
Sugar Notch Borough	-	-	-
Sugarloaf Township	50	15	19
Swoyersville Borough	60	1	22
Union Township	81	16	30
Warrior Run Borough	-	-	-
West Hazleton Borough	-	1	-
West Pittston Borough	393	2	147
West Wyoming Borough	92	2	34
White Haven Borough	21	1	8
Wilkes-Barre Township (excluding City)	6	4	2
Wilkes-Barre City	1,330	22	496
Wright Township	31	10	12
Wyoming Borough	15	3	6
Yatesville Borough	-	-	-
Total Number of Structures	**8,021**	**630**	
Total Economic Loss ($ Million)			**2,991**

Luzerne County Future Number of Structures and Bridges in 100-Year Floodplain and Corresponding Economic Exposure Value (Extrapolated to year 2030)				
Municipality	**Existing Structures in Floodplain**	**Additional Structures in Floodplain**	**Existing 100-Year Flood Economic Loss (Million $)**	**Future 100-Year Flood Economic Loss (Million $)**
Ashley Borough	87	-	32	32
Avoca Borough	138	-	51	51
Bear Creek Township	63	-	23	23
Bear Creek Village Borough	15	-	6	6
Black Creek Township	164	-	61	61
Buck Township	50	-	19	19
Butler Township	142	-	53	53
Conyngham Borough	143	-	53	53
Conyngham Township	10	-	4	4
Courtdale Borough	4	-	1	1
Dallas Borough	44	-	16	16
Dallas Township	73	320	27	147
Dennison Township	45	-	17	17
Dorrance Township	83	-	31	31
Dupont Borough	128	-	48	48
Duryea Borough	60	-	22	22
Edwardsville Borough	14	-	5	5
Exeter Borough	75	-	28	28
Exeter Township	132	-	49	49
Fairmount Township	132	-	49	49
Fairview Township	107	-	40	40
Forty Fort Borough	121	-	45	45
Foster Township	91	150	34	90
Franklin Township	12	-	4	4
Freeland Borough	-	-	-	-
Hanover Township	328	-	122	122
Harveys Lake Borough	332	-	124	124
Hazle Township	98	-	37	37
Hazleton City	-	-	-	-
Hollenback Township	85	-	32	32
Hughestown Borough	-	-	-	-
Hunlock Township	176	-	66	66
Huntington Township	143	-	53	53
Jackson Township	58	20	22	29
Jeddo Borough	-	-	-	-
Jenkins Township	103	400	38	188
Kingston Borough	110	-	41	41
Kingston Township	497	-	185	185
Laflin Borough	10	-	4	4
Lake Township	47	-	18	18
Larksville Borough	18	-	7	7
Laurel Run Borough	37	-	14	14
Lehman Township	7	-	3	3
Luzerne Borough	310	-	116	116
Nanticoke City	66	400	25	174
Nescopeck Borough	82	-	31	31
Nescopeck Township	17	-	6	6
New Columbus Borough	26	-	10	10
Newport Township	10	170	4	67
Nuangola Borough	103	-	38	38
Penn Lake Park Borough	20	-	7	7
Pittston City	18	-	7	7
Pittston Township	67	-	25	25
Plains Township	243	20	91	98
Plymouth Borough	279	-	104	104
Plymouth Township	34	40	13	28
Pringle Borough	16	-	6	6

Rice Township	42	150	16	72
Ross Township	122	-	45	45
Salem Township	251	-	94	94
Shickshinny Borough	254	-	95	95
Slocum Township	-	150	-	56
Sugar Notch Borough	-	-	-	-
Sugarloaf Township	50	150	19	75
Swoyersville Borough	60	400	22	172
Union Township	81	-	30	30
Warrior Run Borough	-	-	-	-
West Hazleton Borough	-	-	-	-
West Pittston Borough	393	-	147	147
West Wyoming Borough	92	-	34	34
White Haven Borough	21	-	8	8
Wilkes-Barre Township (excluding City)	6	820	2	308
Wilkes-Barre City	1,330	-	496	496
Wright Township	31	-	12	12
Wyoming Borough	15	-	6	6
Yatesville Borough	-	-	-	-
Total Number of Structures	**8,021**	**3,190**		
Total Economic Loss ($ Million)			**2,991**	**4,181**

Lackawanna County Number of Structures and Bridges Over Deep Mines and Corresponding Economic Exposure Value			
Municipality	**Structures over Deep Mines**	**Bridges over Deep Mines**	**Subsidence Economic Loss (Million $)**
Abington Township	-	-	-
Archbald Borough	4	-	2
Benton Township	-	-	-
Blakely Borough	23	-	9
Carbondale City	557	-	218
Carbondale Township	168	1	66
Clarks Green Borough	-	-	-
Clarks Summit Borough	-	-	-
Clifton Township	-	-	-
Covington Township	-	-	-
Dalton Borough	-	-	-
Dickson City Borough	94	-	37
Dunmore Borough	587	-	229
Elmhurst Township	-	-	-
Fell Township	-	-	-
Glenburn Township	-	-	-
Greenfield Township	-	-	-
Jefferson Township	-	-	-
Jermyn Borough	299	1	117
Jessup Borough	611	-	239
Laplume Township	-	-	-
Madison Township	-	-	-
Mayfield Borough	786	3	307
Moosic Borough	37	-	14
Moscow Borough	-	-	-
Newton Township	-	-	-
North Abington Township	-	-	-
Old Forge Borough	2,292	1	896
Olyphant Borough	756	-	295
Ransom Township	-	-	-
Roaring Brook Township	-	-	-
Scott Township	-	-	-
Scranton City	6,614	6	2,584
South Abington Township	-	-	-
Springbrook Township	-	-	-
Taylor Borough	293	1	114
Thornhurst Township	-	-	-
Throop Borough	163	-	64
Vandling Borough	-	-	-
West Abington Township	-	-	-
Total Number of Structures	13,284	13	
Total Economic Loss ($ Million)			5,191

Lackawanna County Future Number of Structures and Bridges Over Deep Mines and Corresponding Economic Exposure Value (Extrapolated to year 2030)				
Municipality	**Structures over Deep Mines**	**Additional Structures over Deep Mines**	**Existing Subsidence Economic Loss (Million $)**	**Future Subsidence Economic Loss (Million $)**
Abington Township	-	-	-	-
Archbald Borough	4	-	2	2
Benton Township	-	-	-	-
Blakely Borough	23	-	9	9
Carbondale City	557	-	218	218
Carbondale Township	168	-	66	66
Clarks Green Borough	-	-	-	-
Clarks Summit Borough	-	-	-	-
Clifton Township	-	-	-	-
Covington Township	-	-	-	-
Dalton Borough	-	-	-	-
Dickson City Borough	94	420	37	201
Dunmore Borough	587	20	229	237
Elmhurst Township	-	-	-	-
Fell Township	-	-	-	-
Glenburn Township	-	-	-	-
Greenfield Township	-	-	-	-
Jefferson Township	-	-	-	-
Jermyn Borough	299	-	117	117
Jessup Borough	611	-	239	239
Laplume Township	-	-	-	-
Madison Township	-	-	-	-
Mayfield Borough	786	-	307	307
Moosic Borough	37	-	14	14
Moscow Borough	-	-	-	-
Newton Township	-	-	-	-
North Abington Township	-	-	-	-
Old Forge Borough	2,292	-	896	896
Olyphant Borough	756	-	295	295
Ransom Township	-	-	-	-
Roaring Brook Township	-	-	-	-
Scott Township	-	-	-	-
Scranton City	6,614	3,060	2,584	3,780
South Abington Township	-	-	-	-
Springbrook Township	-	-	-	-
Taylor Borough	293	-	114	114
Thornhurst Township	-	-	-	-
Throop Borough	163	-	64	64
Vandling Borough	-	-	-	-
West Abington Township	-	-	-	-
Total Number of Structures	13,284	3,500		
Total Economic Loss ($ Million)			5,191	6,558

Luzerne County Number of Structures and Bridges Over Deep Mines and Corresponding Economic Exposure Value			
Municipality	**Structures over Deep Mines**	**Bridges over Deep Mines**	**Subsidence Economic Loss (Million $)**
Ashley Borough	236	-	88
Avoca Borough	139	-	52
Bear Creek Township	-	-	-
Bear Creek Village Borough	-	-	-
Black Creek Township	-	-	-
Buck Township	-	-	-
Butler Township	-	-	-
Conyngham Borough	-	-	-
Conyngham Township	-	-	-
Courtdale Borough	15	-	6
Dallas Borough	-	-	-
Dallas Township	-	-	-
Dennison Township	-	-	-
Dorrance Township	-	-	-
Dupont Borough	201	-	75
Duryea Borough	355	-	132
Edwardsville Borough	64	-	24
Exeter Borough	297	-	111
Exeter Township	-	1	-
Fairmount Township	-	-	-
Fairview Township	-	-	-
Forty Fort Borough	500	-	186
Foster Township	-	-	-
Franklin Township	-	-	-
Freeland Borough	-	-	-
Hanover Township	314	-	117
Harveys Lake Borough	-	-	-
Hazle Township	5	-	2
Hazleton City	16	-	6
Hollenback Township	-	-	-
Hughestown Borough	45	-	17
Hunlock Township	-	-	-
Huntington Township	-	-	-
Jackson Township	-	-	-
Jeddo Borough	-	-	-
Jenkins Township	521	-	194
Kingston Township	-	-	-
Kingston Borough	2,339	-	872
Laflin Borough	1	-	0
Lake Township	-	-	-
Larksville Borough	113	-	42
Laurel Run Borough	1	-	0
Lehman Township	-	-	-
Luzerne Borough	148	-	55
Nanticoke City	396	-	148
Nescopeck Borough	-	-	-
Nescopeck Township	-	-	-
New Columbus Borough	-	-	-
Newport Township	36	-	13

Nuangola Borough	-	-	-
Penn Lake Park Borough	-	-	-
Pittston City	1,044	-	389
Pittston Township	221	2	82
Plains Township	1,104	-	412
Plymouth Borough	18	-	7
Plymouth Township	955	5	356
Pringle Borough	-	-	-
Rice Township	-	-	-
Ross Township	-	-	-
Salem Township	-	-	-
Shickshinny Borough	-	-	-
Slocum Township	-	-	-
Sugar Notch Borough	4	-	1
Sugarloaf Township	-	-	-
Swoyersville Borough	148	1	55
Union Township	-	-	-
Warrior Run Borough	-	-	-
West Hazleton Borough	-	-	-
West Pittston Borough	201	-	75
West Wyoming Borough	58	-	22
White Haven Borough	-	-	-
Wilkes-Barre City	394	-	147
Wilkes-Barre Township	1,927	-	719
Wright Township	-	-	-
Wyoming Borough	24	-	9
Yatesville Borough	17	-	6
Total Number of Structures	**11,857**	**9**	
Total Economic Loss ($ Million)			**4,421**

Luzerne County Future Number of Structures and Bridges Over Deep Mines and Corresponding Economic Exposure Value (Extrapolated to year 2030)				
Municipality	**Existing Structures over Deep Mines**	**Additional Structures over Deep Mines**	**Existing Subsidence Economic Loss (Million $)**	**Future Subsidence Economic Loss (Million $)**
Ashley Borough	236	-	88	88
Avoca Borough	139	-	52	52
Bear Creek Township	-	-	-	-
Bear Creek Village Borough	-	-	-	-
Black Creek Township	-	-	-	-
Buck Township	-	-	-	-
Butler Township	-	-	-	-
Conyngham Borough	-	-	-	-
Conyngham Township	-	-	-	-
Courtdale Borough	15	-	6	6
Dallas Borough	-	-	-	-
Dallas Township	-	-	-	-
Dennison Township	-	-	-	-
Dorrance Township	-	-	-	-
Dupont Borough	201	-	75	75
Duryea Borough	355	-	132	132
Edwardsville Borough	64	-	24	24
Exeter Borough	297	-	111	111
Exeter Township	-	-	-	-
Fairmount Township	-	-	-	-
Fairview Township	-	-	-	-
Forty Fort Borough	500	-	186	186
Foster Township	-	-	-	-
Franklin Township	-	-	-	-
Freeland Borough	-	-	-	-
Hanover Township	314	-	117	117
Harveys Lake Borough	-	-	-	-
Hazle Township	5	-	2	2
Hazleton City	16	1,040	6	394
Hollenback Township	-	-	-	-
Hughestown Borough	45	-	17	17
Hunlock Township	-	-	-	-
Huntington Township	-	-	-	-
Jackson Township	-	-	-	-
Jeddo Borough	-	-	-	-
Jenkins Township	521	-	194	194
Kingston Township	-	-	-	-
Kingston Borough	2,339	-	872	872
Laflin Borough	1	-	0	0
Lake Township	-	-	-	-
Larksville Borough	113	-	42	42
Laurel Run Borough	1	-	0	0
Lehman Township	-	-	-	-
Luzerne Borough	148	-	55	55
Nanticoke City	396	-	148	148
Nescopeck Borough	-	-	-	-
Nescopeck Township	-	-	-	-
New Columbus Borough	-	-	-	-
Newport Township	36	300	13	125
Nuangola Borough	-	-	-	-
Penn Lake Park Borough	-	-	-	-
Pittston City	1,044	20	389	397
Pittston Township	221	-	82	82
Plains Township	1,104	20	412	419
Plymouth Borough	18	-	7	7
Plymouth Township	955	-	356	356
Pringle Borough	-	-	-	-

Rice Township	-	-	-	-
Ross Township	-	-	-	-
Salem Township	-	-	-	-
Shickshinny Borough	-	-	-	-
Slocum Township	-	-	-	-
Sugar Notch Borough	4	-	1	1
Sugarloaf Township	-	-	-	-
Swoyersville Borough	148	-	55	55
Union Township	-	-	-	-
Warrior Run Borough	-	-	-	-
West Hazleton Borough	-	-	-	-
West Pittston Borough	201	-	75	75
West Wyoming Borough	58	-	22	22
White Haven Borough	-	-	-	-
Wilkes-Barre City	394	1,420	147	676
Wilkes-Barre Township	1,927	-	719	719
Wright Township	-	-	-	-
Wyoming Borough	24	-	9	9
Yatesville Borough	17	-	6	6
Total Number of Structures	**11,857**	**2,800**		
Total Economic Loss ($ Million)			**4,421**	**5,466**

Lackawanna County Number of Structures Vulnerable to Wildfires and Corresponding Economic Exposure		
Municipality	**Structures Vulnerable to Wildfires**	**Economic Exposure (Million $)**
Abington Township	799	312
Archbald Borough	883	345
Benton Township	921	360
Blakely Borough	666	260
Carbondale City	1,667	651
Carbondale Township	481	188
Clarks Green Borough	595	232
Clarks Summit Borough	1,563	611
Clifton Township	1,129	441
Covington Township	2,715	1,061
Dalton Borough	586	229
Dickson City Borough	510	199
Dunmore Borough	1,177	460
Elmhurst Township	383	150
Fell Township	955	373
Glenburn Township	576	225
Greenfield Township	1,379	539
Jefferson Township	2,006	784
Jermyn Borough	566	221
Jessup Borough	436	170
Laplume Township	237	93
Madison Township	1,419	554
Mayfield Borough	494	193
Moosic Borough	418	163
Moscow Borough	676	264
Newton Township	1,325	518
North Abington Township	321	125
Old Forge Borough	488	191
Olyphant Borough	391	153
Ransom Township	897	351
Roaring Brook Township	866	338
Scott Township	2,827	1,105
Scranton City	3,848	1,504
South Abington Township	2,335	912
Springbrook Township	1,302	509
Taylor Borough	231	90
Thornhurst Township	840	328
Throop Borough	354	138
Vandling Borough	149	58
West Abington Township	217	85
Total Number of Structures	39,628	
Total Economic Loss (Million $)		15,485

Lackawanna County Critical Facilities Vulnerable to Wildfires	
Municipality	**Type of Facility**
Abington Township	Hospital
Abington Township	Government
Abington Township	Government
Archbald Borough	School
Carbondale City	Hazardous Storage
Carbondale City	Hazardous Storage
Clarks Summit Borough	School
Covington Township	Hazardous Storage
Dalton Borough	Government
Dalton Borough	Emergency Response Building
Dunmore Borough	Emergency Response Building
Elmhurst Township	Nursing Home
Elmhurst Township	Government
Jessup Borough	Emergency Response Building
Laplume Township	School
Laplume Township	Government
Moscow Borough	School
Moscow Borough	School
Newton Township	Hospital
Newton Township	School
Olyphant Borough	Emergency Response Building
Ransom Township	Government
Roaring Brook Township	Government
Roaring Brook Township	Emergency Response Building
Scott Township	Hazardous Storage
Scott Township	Hazardous Storage
Scott Township	Hazardous Storage
Scott Township	Hazardous Storage
Scott Township	Hazardous Storage
Scott Township	Hazardous Storage
Scott Township	Hazardous Storage
Scranton City	Nursing Home
Scranton City	Hazardous Storage
Scranton City	Hazardous Storage
Scranton City	Hazardous Storage
Scranton City	Government
South Abington Township	School
Thornhurst Township	Hazardous Storage
Thornhurst Township	Emergency Response Building
Total Number of Facilities	39

Luzerne County Number of Structures Vulnerable to Wildfires and Corresponding Economic Exposure		
Municipality	**Structures Vulnerable to Wildfires**	**Economic Exposure (Million $)**
Ashley Borough	38	14
Avoca Borough	143	53
Bear Creek Township	1,612	601
Bear Creek Village Borough	168	63
Black Creek Township	1,058	395
Buck Township	348	130
Butler Township	2,654	990
Conyngham Borough	473	176
Conyngham Township	571	213
Courtdale Borough	56	21
Dallas Borough	435	162
Dallas Township	1,716	640
Dennison Township	741	276
Dorrance Township	1,135	423
Dupont Borough	90	34
Duryea Borough	197	73
Edwardsville Borough	217	81
Exeter Borough	160	60
Exeter Township	805	300
Fairmount Township	807	301
Fairview Township	1,122	418
Forty Fort Borough	120	45
Foster Township	2,057	767
Franklin Township	545	203
Freeland Borough	694	259
Hanover Township	357	133
Harveys Lake Borough	1,203	449
Hazle Township	2,796	1,043
Hazleton City	1,355	505
Hollenback Township	554	207
Hughestown Borough	53	20
Hunlock Township	1,506	562
Huntington Township	821	306
Jackson Township	782	292
Jeddo Borough	51	19
Jenkins Township	338	126
Kingston Borough	220	82
Kingston Township	1,435	535
Laflin Borough	113	42
Lake Township	967	361

Larksville Borough	28	10
Laurel Run Borough	278	104
Lehman Township	1,220	455
Luzerne Borough	22	8
Nanticoke City	208	78
Nescopeck Borough	98	37
Nescopeck Township	425	158
New Columbus Borough	37	14
Newport Township	361	135
Nuangola Borough	350	131
Penn Lake Park Borough	159	59
Pittston City	133	50
Pittston Township	480	179
Plains Township	349	130
Plymouth Borough	84	31
Plymouth Township	685	255
Pringle Borough	4	1
Rice Township	851	317
Ross Township	1,264	471
Salem Township	805	300
Shickshinny Borough	109	41
Slocum Township	518	193
Sugar Notch Borough	95	35
Sugarloaf Township	1,223	456
Swoyersville Borough	80	30
Union Township	942	351
Warrior Run Borough	67	25
West Hazleton Borough	240	89
West Pittston Borough	59	22
West Wyoming Borough	168	63
White Haven Borough	179	67
Wilkes-Barre City	276	103
Wilkes-Barre Township	117	44
Wright Township	1,579	589
Wyoming Borough	56	21
Yatesville Borough	18	7
Total Number of Structures	44,080	
Total Economic Loss (Million $)		16,437

Luzerne County Critical Facilities Vulnerable to Wildfires	
Municipality	**Type of Facility**
Ashley Borough	Dam
Bear Creek Township	Dam
Bear Creek Township	Primary Electrical Substation
Bear Creek Township	Dam
Bear Creek Township	Dam
Bear Creek Village Borough	Government
Bear Creek Village Borough	Dam
Black Creek Township	Dam
Black Creek Township	Government
Buck Township	Government
Buck Township	Dam
Butler Township	Dam
Butler Township	Primary Electrical Substation
Butler Township	Dam
Butler Township	School
Conyngham Township	Dam
Conyngham Township	Dam
Dallas Township	Dam
Dallas Township	Nursing Home
Dallas Township	Hazardous Storage
Dallas Township	Government
Dallas Township	Dam
Dallas Township	Dam
Dennison Township	Government
Dennison Township	Dam
Duryea Borough	Hazardous Storage
Duryea Borough	Dam
Duryea Borough	Dam
Fairmount Township	Government
Fairmount Township	School
Fairview Township	Hazardous Storage
Fairview Township	Emergency Response Building
Fairview Township	School
Fairview Township	Hazardous Storage
Fairview Township	Hazardous Storage
Foster Township	Government
Foster Township	Primary Electrical Substation
Foster Township	Dam
Franklin Township	Dam
Franklin Township	Dam
Franklin Township	Dam
Franklin Township	Government
Franklin Township	Dam
Franklin Township	Dam

Hanover Township	Dam
Hanover Township	Dam
Hanover Township	Primary Electrical Substation
Hanover Township	Pumping Station
Harveys Lake Borough	Dam
Hazle Township	Dam
Hazle Township	Primary Electrical Substation
Hazle Township	Hazardous Storage
Hazle Township	Dam
Hazle Township	Hazardous Storage
Hazle Township	Dam
Hazle Township	Hazardous Storage
Hazle Township	Dam
Hazleton City	Nursing Home
Hollenback Township	School
Hunlock Township	Government
Huntington Township	Government
Huntington Township	Dam
Huntington Township	Dam
Huntington Township	Nursing Home
Jackson Township	Prison
Jackson Township	Emergency Response Building
Jackson Township	Hazardous Storage
Jackson Township	Government
Jackson Township	Dam
Jenkins Township	Primary Electrical Substation
Kingston Township	Dam
Kingston Township	Emergency Response Building
Kingston Township	Emergency Response Building
Lake Township	Dam
Lake Township	Government
Laurel Run Borough	Government
Lehman Township	Dam
Nanticoke City	Nursing Home
Nanticoke City	School
Nescopeck Township	Sanitary Pumping Station
Newport Township	Dam
Newport Township	Dam
Newport Township	Dam
Newport Township	Hazardous Storage
Newport Township	School
Nuangola Borough	Government
Pittston City	Hazardous Storage
Pittston Township	Emergency Response Building
Pittston Township	Dam
Plains Township	Primary Electrical Substation
Plains Township	Nursing Home

Plains Township	Dam
Plains Township	Dam
Plains Township	School
Plains Township	Dam
Plains Township	Hazardous Storage
Plains Township	Dam
Plymouth Borough	Bridge
Plymouth Borough	Dam
Plymouth Township	Dam
Plymouth Township	Dam
Plymouth Township	Dam
Plymouth Township	Dam
Plymouth Township	Dam
Rice Township	School
Rice Township	Emergency Response Building
Rice Township	Government
Ross Township	Dam
Ross Township	Dam
Ross Township	Dam
Salem Township	Dam
Salem Township	Dam
Sugar Notch Borough	Emergency Response Building
Sugarloaf Township	Primary Electrical Substation
Sugarloaf Township	Primary Electrical Substation
Union Township	School
Union Township	Dam
Union Township	Government
Union Township	Dam
Union Township	Dam
White Haven Borough	Hazardous Storage
White Haven Borough	Hazardous Storage
Wilkes-Barre City	Pumping Station
Wright Township	Primary Electrical Substation
Wright Township	Nursing Home
Wright Township	School
Wright Township	Hazardous Storage
Wright Township	Primary Electrical Substation
Wright Township	School
Wright Township	Government
Total Number of Facilities	**130**

Lackawanna County High Hazard Dams and Affected Municipalities		
Dam Name	**Municipality Affected**	**Number of Residents Affected**
Big Bass Lake Dam	Clifton Township	50
Brownell Dam	Carbondale Township	8,000
Carbondale #4 Dam	Carbondale Township	20,000
Curtis Dam	Madison Township	55
Duck Pond Dam	Benton Township	1
Dunmore #1 Dam	Dunmore Borough	400
Dunmore #3 Dam	Roaring Brook Township	50
Dunmore #7 Dam	Dunmore Borough	21,400
Eagle Lake Dam	Covington Township	Several
Elmcrest Dam	Roaring Brook Township	Multiple
Elmhurst Dam	Roaring Brook Township	20,000
Falling Springs Dam	Ransom Township	Many
Ford's Lake Dam	Newton Township	8
Glenburn Dam	Glenburn Township	465
Glenwood Lake Dam	Moosic Borough	Several
Griffin Dam	South Abington Township	20,000
Interlaken Dam	South Abington Township	Several
Lake Scranton Dam	Roaring Brook Township	28,000
Larsen Lake Dam	Clifton Township	108
Laurel Run Dam	Archbald Borough	Many
Lower Klondike Dam	Clifton Township	465
Maple Lake Dam	Springbrook Township	3,500
Marshwood Dam	Olyphant Borough	50
Nesbitt Dam	Springbrook Township	3,500
Oakford Glen Dam	Abington Township	none
Olyphant #3 Dam	Jessup Borough	Many
Rocky Glen Dam	Moosic Borough	Several
Springbrook Intake Dam	Springbrook Township	3,500
Summit Lake Dam	South Abington Township	270
Watres Dam	Springbrook Township	Several
Williams Bridge Dam	Roaring Brook Township	5,000

APPENDIX C: HAZUS REPORTS

HAZUS-MH: Hurricane Event Report

Region Name: Lackawanna High Wind

Hurricane Scenario: Probabilistic 100-year Return Period

Print Date: Tuesday, August 19, 2008

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

HAZUS is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Pennsylvania

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 463.86 square miles and contains 58 census tracts. There are over 86 thousand households in the region and has a total population of 213,295 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 64 thousand buildings in the region with a total building replacement value (excluding contents) of 16,912 million dollars (2002 dollars). Approximately 97% of the buildings (and 67% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

HAZUS estimates that there are 64,874 buildings in the region which have an aggregate total replacement value of 16,912 million (2002 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	11,376,663	67.3%
Commercial	3,727,581	22.0%
Industrial	1,139,291	6.7%
Agricultural	32,004	0.2%
Religious	253,616	1.5%
Government	183,368	1.1%
Education	199,891	1.2%
Total	**16,912,414**	**100.0%**

Essential Facility Inventory

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 1,235 beds. There are 94 schools, 15 fire stations, 23 police stations and no emergency operation facilities.

Hurricane Scenario

HAZUS used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

HAZUS estimates that about 1 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the HAZUS Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 100 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	33	99.85	0	0.15	0	0.00	0	0.00	0	0.00
Commercial	1,193	99.78	3	0.22	0	0.00	0	0.00	0	0.00
Education	40	99.77	0	0.23	0	0.00	0	0.00	0	0.00
Government	44	99.76	0	0.24	0	0.00	0	0.00	0	0.00
Industrial	278	99.76	1	0.24	0	0.00	0	0.00	0	0.00
Religion	67	99.83	0	0.17	0	0.00	0	0.00	0	0.00
Residential	63,186	99.95	28	0.04	1	0.00	0	0.00	0	0.00
Total	**64,841**		**31**		**1**		**0**		**0**	

Table 3: Expected Building Damage by Building Type : 100 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	621	99.68	2	0.32	0	0.00	0	0.00	0	0.00
Masonry	20,701	99.87	26	0.12	1	0.01	0	0.00	0	0.00
MH	2,570	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	1,068	99.74	3	0.26	0	0.00	0	0.00	0	0.00
Wood	39,790	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had 1,235 hospital beds available for use. On the day of the hurricane, the model estimates that 1235 hospital beds (only 100.00%) are available for use. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	15	0	0	15
Hospitals	7	0	0	7
Police Stations	23	0	0	23
Schools	94	0	0	94

Induced Hurricane Damage

Debris Generation

HAZUS estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into three general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, and c) Trees. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the hurricane.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 213,295) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 0.1 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 100% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	95.27	0.00	0.00	0.00	95.27
	Content	0.07	0.00	0.00	0.00	0.07
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**95.35**	**0.00**	**0.00**	**0.00**	**95.35**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	2.31	0.00	0.00	0.00	2.31
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**2.31**	**0.00**	**0.00**	**0.00**	**2.31**
Total						
	Total	**97.66**	**0.00**	**0.00**	**0.00**	**97.66**

Appendix A: County Listing for the Region

Pennsylvania
- Lackawanna

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Pennsylvania				
Lackawanna	213,295	11,376,663	5,535,751	16,912,414
Total	**213,295**	**11,376,663**	**5,535,751**	**16,912,414**
Study Region Total	**213,295**	**11,376,663**	**5,535,751**	**16,912,414**

HAZUS-MH: Hurricane Event Report

Region Name: Lackawanna High Wind

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Tuesday, August 19, 2008

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

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The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Pennsylvania

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 463.86 square miles and contains 58 census tracts. There are over 86 thousand households in the region and has a total population of 213,295 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 64 thousand buildings in the region with a total building replacement value (excluding contents) of 16,912 million dollars (2002 dollars). Approximately 97% of the buildings (and 67% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

HAZUS estimates that there are 64,874 buildings in the region which have an aggregate total replacement value of 16,912 million (2002 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

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Commercial	3,727,581	22.0%
Industrial	1,139,291	6.7%
Agricultural	32,004	0.2%
Religious	253,616	1.5%
Government	183,368	1.1%
Education	199,891	1.2%
Total	**16,912,414**	**100.0%**

Essential Facility Inventory

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 1,235 beds. There are 94 schools, 15 fire stations, 23 police stations and no emergency operation facilities.

Hurricane Scenario

HAZUS used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

HAZUS estimates that about 13 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the HAZUS Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	33	99.45	0	0.53	0	0.02	0	0.00	0	0.00
Commercial	1,188	99.36	7	0.63	0	0.02	0	0.00	0	0.00
Education	40	99.37	0	0.63	0	0.00	0	0.00	0	0.00
Government	44	99.31	0	0.69	0	0.00	0	0.00	0	0.00
Industrial	277	99.30	2	0.70	0	0.00	0	0.00	0	0.00
Religion	67	99.50	0	0.50	0	0.00	0	0.00	0	0.00
Residential	62,916	99.53	287	0.45	11	0.02	1	0.00	0	0.00
Total	**64,564**		**297**		**12**		**1**		**0**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	617	99.03	6	0.96	0	0.00	0	0.00	0	0.00
Masonry	20,575	99.26	142	0.68	10	0.05	1	0.00	0	0.00
MH	2,570	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	1,063	99.24	8	0.74	0	0.02	0	0.00	0	0.00
Wood	39,665	99.69	124	0.31	1	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had 1,235 hospital beds available for use. On the day of the hurricane, the model estimates that 1235 hospital beds (only 100.00%) are available for use. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	15	0	0	15
Hospitals	7	0	0	7
Police Stations	23	0	0	23
Schools	94	0	0	94

Induced Hurricane Damage

Debris Generation

HAZUS estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into three general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, and c) Trees. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 11,767 tons of debris will be generated. Of the total amount, Brick/Wood comprises 16% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 74 truckloads (@25 tons/truck) to remove the debris generated by the hurricane.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 213,295) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 13.0 million dollars, which represents 0.08 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 13 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 94% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	11,572.91	535.00	170.29	92.52	12,370.73
	Content	177.85	0.00	30.44	0.00	208.29
	Inventory	0.00	0.00	2.75	0.00	2.75
	Subtotal	**11,750.76**	**535.00**	**203.48**	**92.52**	**12,581.77**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	157.58	3.90	0.00	0.03	161.51
	Rental	227.02	0.00	0.00	0.00	227.02
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**384.60**	**3.90**	**0.00**	**0.03**	**388.53**
Total						
	Total	**12,135.36**	**538.90**	**203.48**	**92.55**	**12,970.30**

Appendix A: County Listing for the Region

Pennsylvania
- Lackawanna

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Pennsylvania				
Lackawanna	213,295	11,376,663	5,535,751	16,912,414
Total	**213,295**	**11,376,663**	**5,535,751**	**16,912,414**
Study Region Total	**213,295**	**11,376,663**	**5,535,751**	**16,912,414**

HAZUS-MH: Hurricane Event Report

Region Name: Luzerne High Wind

Hurricane Scenario: Probabilistic 100-year Return Period

Print Date: Tuesday, August 19, 2008

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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General Description of the Region

HAZUS is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Pennsylvania

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 905.91 square miles and contains 103 census tracts. There are over 130 thousand households in the region and has a total population of 319,250 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 103 thousand buildings in the region with a total building replacement value (excluding contents) of 23,437 million dollars (2002 dollars). Approximately 98% of the buildings (and 71% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

HAZUS estimates that there are 103,245 buildings in the region which have an aggregate total replacement value of 23,437 million (2002 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	16,623,234	70.9%
Commercial	4,199,393	17.9%
Industrial	1,586,619	6.8%
Agricultural	92,904	0.4%
Religious	401,603	1.7%
Government	262,728	1.1%
Education	270,417	1.2%
Total	**23,436,898**	**100.0%**

Essential Facility Inventory

For essential facilities, there are 11 hospitals in the region with a total bed capacity of 1,619 beds. There are 122 schools, 40 fire stations, 32 police stations and 3 emergency operation facilities.

Hurricane Scenario

HAZUS used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

HAZUS estimates that about 1 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the HAZUS Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 100 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	63	99.86	0	0.14	0	0.00	0	0.00	0	0.00
Commercial	1,582	99.79	3	0.21	0	0.00	0	0.00	0	0.00
Education	53	99.78	0	0.22	0	0.00	0	0.00	0	0.00
Government	69	99.76	0	0.24	0	0.00	0	0.00	0	0.00
Industrial	522	99.77	1	0.23	0	0.00	0	0.00	0	0.00
Religion	99	99.84	0	0.16	0	0.00	0	0.00	0	0.00
Residential	100,815	99.96	37	0.04	1	0.00	0	0.00	0	0.00
Total	**103,202**		**42**		**1**		**0**		**0**	

Table 3: Expected Building Damage by Building Type : 100 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	672	99.69	2	0.31	0	0.00	0	0.00	0	0.00
Masonry	32,699	99.89	34	0.10	1	0.00	0	0.00	0	0.00
MH	5,543	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	1,376	99.75	4	0.25	0	0.00	0	0.00	0	0.00
Wood	62,806	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had 1,619 hospital beds available for use. On the day of the hurricane, the model estimates that 1619 hospital beds (only 100.00%) are available for use. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	3	0	0	3
Fire Stations	40	0	0	40
Hospitals	11	0	0	11
Police Stations	32	0	0	32
Schools	122	0	0	122

Induced Hurricane Damage

Debris Generation

HAZUS estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into three general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, and c) Trees. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 118 tons of debris will be generated. Of the total amount, Brick/Wood comprises 8% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the hurricane.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 319,250) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 0.3 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 100% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	312.52	0.00	0.00	0.00	312.52
	Content	0.92	0.00	0.06	0.00	0.98
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**313.44**	**0.00**	**0.06**	**0.00**	**313.50**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	1.97	0.00	0.00	0.00	1.97
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**1.97**	**0.00**	**0.00**	**0.00**	**1.97**
Total						
	Total	**315.41**	**0.00**	**0.06**	**0.00**	**315.47**

Appendix A: County Listing for the Region

Pennsylvania
- Luzerne

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Pennsylvania				
Luzerne	319,250	16,623,234	6,813,664	23,436,898
Total	**319,250**	**16,623,234**	**6,813,664**	**23,436,898**
Study Region Total	**319,250**	**16,623,234**	**6,813,664**	**23,436,898**

HAZUS-MH: Hurricane Event Report

Region Name: Luzerne High Wind

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Tuesday, August 19, 2008

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Pennsylvania

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 905.91 square miles and contains 103 census tracts. There are over 130 thousand households in the region and has a total population of 319,250 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 103 thousand buildings in the region with a total building replacement value (excluding contents) of 23,437 million dollars (2002 dollars). Approximately 98% of the buildings (and 71% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

HAZUS estimates that there are 103,245 buildings in the region which have an aggregate total replacement value of 23,437 million (2002 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	16,623,234	70.9%
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Agricultural	92,904	0.4%
Religious	401,603	1.7%
Government	262,728	1.1%
Education	270,417	1.2%
Total	**23,436,898**	**100.0%**

Essential Facility Inventory

For essential facilities, there are 11 hospitals in the region with a total bed capacity of 1,619 beds. There are 122 schools, 40 fire stations, 32 police stations and 3 emergency operation facilities.

Hurricane Scenario

HAZUS used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

HAZUS estimates that about 25 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the HAZUS Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	63	99.48	0	0.49	0	0.02	0	0.00	0	0.00
Commercial	1,574	99.30	11	0.67	0	0.03	0	0.00	0	0.00
Education	53	99.36	0	0.64	0	0.00	0	0.00	0	0.00
Government	69	99.31	0	0.69	0	0.00	0	0.00	0	0.00
Industrial	519	99.15	4	0.83	0	0.01	0	0.00	0	0.00
Religion	98	99.49	1	0.51	0	0.00	0	0.00	0	0.00
Residential	100,262	99.41	567	0.56	23	0.02	1	0.00	0	0.00
Total	**102,637**		**583**		**24**		**1**		**0**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	667	98.97	7	1.03	0	0.01	0	0.00	0	0.00
Masonry	32,470	99.19	246	0.75	18	0.05	1	0.00	0	0.00
MH	5,542	99.99	0	0.01	0	0.00	0	0.00	0	0.00
Steel	1,369	99.17	11	0.80	0	0.03	0	0.00	0	0.00
Wood	62,523	99.55	278	0.44	4	0.01	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had 1,619 hospital beds available for use. On the day of the hurricane, the model estimates that 1619 hospital beds (only 100.00%) are available for use. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	3	0	0	3
Fire Stations	40	0	0	40
Hospitals	11	0	0	11
Police Stations	32	0	0	32
Schools	122	0	0	122

Induced Hurricane Damage

Debris Generation

HAZUS estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into three general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, and c) Trees. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 40,696 tons of debris will be generated. Of the total amount, Brick/Wood comprises 6% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 100 truckloads (@25 tons/truck) to remove the debris generated by the hurricane.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 319,250) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 19.2 million dollars, which represents 0.08 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 19 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 94% of the total loss. Table 4 below provides a summary of the losses associated with the building damage.

Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	17,368.94	637.86	262.95	137.48	18,407.23
	Content	180.42	0.00	31.04	0.32	211.78
	Inventory	0.00	0.00	2.17	0.01	2.17
	Subtotal	**17,549.35**	**637.86**	**296.16**	**137.81**	**18,621.18**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	342.80	8.20	0.61	0.12	351.73
	Rental	253.16	0.00	0.00	0.00	253.16
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**595.96**	**8.20**	**0.61**	**0.12**	**604.89**
Total						
	Total	**18,145.31**	**646.07**	**296.77**	**137.92**	**19,226.07**

Appendix A: County Listing for the Region

Pennsylvania
- Luzerne

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Pennsylvania				
Luzerne	319,250	16,623,234	6,813,664	23,436,898
Total	**319,250**	**16,623,234**	**6,813,664**	**23,436,898**
Study Region Total	**319,250**	**16,623,234**	**6,813,664**	**23,436,898**

HAZUS-MH: Earthquake Event Report

Region Name Lackawanna Earthquake

Earthquake Scenario: Lackawanna Earthquake 100yr

Print Date: August 19, 2008

Totals only reflect data for those census tracts/blocks included in the user's study region.

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General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Pennsylvania

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 463.74 square miles and contains 58 census tracts. There are over 86 thousand households in the region and has a total population of 213,295 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 64 thousand buildings in the region with a total building replacement value (excluding contents) of 16,912 (millions of dollars). Approximately 97.00 % of the buildings (and 67.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 2,544 and 1,428 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 64 thousand buildings in the region which have an aggregate total replacement value of 16,912 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 61% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 1,235 beds. There are 94 schools, 15 fire stations, 23 police stations and 0 emergency operation facilities. With respect to HPL facilities, there are 47 dams identified within the region. Of these, 33 of the dams are classified as 'high hazard'. The inventory also includes 67 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 3,972.00 (millions of dollars). This inventory includes over 497 kilometers of highways, 253 bridges, 6,869 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	253	309.50
	Segments	187	1,823.40
	Tunnels	0	0.00
		Subtotal	**2,132.90**
Railways	Bridges	0	0.00
	Facilities	2	4.80
	Segments	115	121.90
	Tunnels	0	0.00
		Subtotal	**126.70**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	5	5.90
		Subtotal	**5.90**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	7	41.60
	Runways	7	237.10
		Subtotal	**278.70**
		Total	**2,544.20**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	68.70
	Facilities	2	72.60
	Pipelines	0	0.00
		Subtotal	**141.30**
Waste Water	Distribution Lines	NA	41.20
	Facilities	17	1,234.10
	Pipelines	0	0.00
		Subtotal	**1,275.30**
Natural Gas	Distribution Lines	NA	27.50
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**27.50**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	1	119.90
		Subtotal	**119.90**
Communication	Facilities	14	1.50
		Subtotal	**1.50**
		Total	**1,565.50**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Lackawanna Earthquake 100yr
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	100.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

HAZUS estimates that about 0 buildings will be at least moderately damaged. This is over 0.00 % of the total number of buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	33	0.05	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	1,196	1.84	0	0.00	0	0.00	0	0.00	0	0.00
Education	40	0.06	0	0.00	0	0.00	0	0.00	0	0.00
Government	44	0.07	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	279	0.43	0	0.00	0	0.00	0	0.00	0	0.00
Other Residential	12,729	19.62	0	0.00	0	0.00	0	0.00	0	0.00
Religion	67	0.10	0	0.00	0	0.00	0	0.00	0	0.00
Single Family	50,486	77.82	0	0.00	0	0.00	0	0.00	0	0.00
Total	**64,874**		**0**		**0**		**0**		**0**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	39,796	61.34	0	0.00	0	0.00	0	0.00	0	0.00
Steel	1,104	1.70	0	0.00	0	0.00	0	0.00	0	0.00
Concrete	550	0.85	0	0.00	0	0.00	0	0.00	0	0.00
Precast	78	0.12	0	0.00	0	0.00	0	0.00	0	0.00
RM	1,071	1.65	0	0.00	0	0.00	0	0.00	0	0.00
URM	19,699	30.37	0	0.00	0	0.00	0	0.00	0	0.00
MH	2,576	3.97	0	0.00	0	0.00	0	0.00	0	0.00
Total	**64,874**		**0**		**0**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 1,235 hospital beds available for use. On the day of the earthquake, the model estimates that only 1,233 hospital beds (100.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	7	0	0	7
Schools	94	0	0	94
EOCs	0	0	0	0
PoliceStations	23	0	0	23
FireStations	15	0	0	15

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	187	0	0	187	187
	Bridges	253	0	0	253	253
	Tunnels	0	0	0	0	0
Railways	Segments	115	0	0	115	115
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	5	0	0	5	5
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	7	0	0	7	7
	Runways	7	0	0	7	7

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	2	0	0	2	2
Waste Water	17	0	0	17	17
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	1	0	0	1	1
Communication	14	0	0	14	14

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	3,435	1	0
Waste Water	2,061	1	0
Natural Gas	1,374	1	0
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	86,218	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 0.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 213,295) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
	Total				

Economic Loss

The total economic loss estimated for the earthquake is 0.04 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.00 (millions of dollars); 0 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.00	0.00	0.00	0.00	0.00
	Capital-Related	0.00	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Capital Stock Loses							
	Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Non_Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	1,823.36	$0.00	0.00
	Bridges	309.53	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2132.90**	**0.00**	
Railways	Segments	121.94	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	4.75	$0.00	0.01
	Subtotal	**126.70**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	5.94	$0.00	0.03
	Subtotal	**5.90**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	41.58	$0.01	0.03
	Runways	237.14	$0.00	0.00
	Subtotal	**278.70**	**0.00**	
	Total	**2544.20**	**0.00**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	72.60	$0.00	0.00
	Distribution Line	68.70	$0.00	0.01
	Subtotal	**141.29**	**$0.01**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	1,234.10	$0.01	0.00
	Distribution Line	41.20	$0.00	0.01
	Subtotal	**1,275.31**	**$0.01**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Line	27.50	$0.00	0.01
	Subtotal	**27.48**	**$0.00**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	119.90	$0.00	0.00
	Subtotal	**119.90**	**$0.00**	
Communication	Facilities	1.50	$0.00	0.00
	Subtotal	**1.53**	**$0.00**	
	Total	**1,565.51**	**$0.02**	

Table 15. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

	LOSS	Total	%

Appendix A: County Listing for the Region

Lackawanna,PA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Pennsylvania					
	Lackawanna	213,295	11,376	5,535	16,912
Total State		**213,295**	**11,376**	**5,535**	**16,912**
Total Region		**213,295**	**11,376**	**5,535**	**16,912**

HAZUS-MH: Earthquake Event Report

Region Name Lackawanna Earthquake

Earthquake Scenario: Lackawanna Earthquake 500yr

Print Date: August 19, 2008

Totals only reflect data for those census tracts/blocks included in the user's study region.

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Pennsylvania

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 463.74 square miles and contains 58 census tracts. There are over 86 thousand households in the region and has a total population of 213,295 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 64 thousand buildings in the region with a total building replacement value (excluding contents) of 16,912 (millions of dollars). Approximately 97.00 % of the buildings (and 67.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 2,544 and 1,428 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 64 thousand buildings in the region which have an aggregate total replacement value of 16,912 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 61% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 1,235 beds. There are 94 schools, 15 fire stations, 23 police stations and 0 emergency operation facilities. With respect to HPL facilities, there are 47 dams identified within the region. Of these, 33 of the dams are classified as 'high hazard'. The inventory also includes 67 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 3,972.00 (millions of dollars). This inventory includes over 497 kilometers of highways, 253 bridges, 6,869 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	253	309.50
	Segments	187	1,823.40
	Tunnels	0	0.00
		Subtotal	**2,132.90**
Railways	Bridges	0	0.00
	Facilities	2	4.80
	Segments	115	121.90
	Tunnels	0	0.00
		Subtotal	**126.70**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	5	5.90
		Subtotal	**5.90**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	7	41.60
	Runways	7	237.10
		Subtotal	**278.70**
		Total	**2,544.20**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	68.70
	Facilities	2	72.60
	Pipelines	0	0.00
		Subtotal	**141.30**
Waste Water	Distribution Lines	NA	41.20
	Facilities	17	1,234.10
	Pipelines	0	0.00
		Subtotal	**1,275.30**
Natural Gas	Distribution Lines	NA	27.50
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**27.50**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	1	119.90
		Subtotal	**119.90**
Communication	Facilities	14	1.50
		Subtotal	**1.50**
		Total	**1,565.50**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Lackawanna Earthquake 500yr
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	500.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

HAZUS estimates that about 962 buildings will be at least moderately damaged. This is over 1.00 % of the total number of buildings in the region. There are an estimated 11 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	31	0.05	1	0.06	0	0.05	0	0.05	0	0.02
Commercial	1,116	1.82	56	2.29	21	2.49	3	2.42	0	1.46
Education	38	0.06	2	0.07	1	0.07	0	0.07	0	0.05
Government	41	0.07	2	0.08	1	0.08	0	0.07	0	0.04
Industrial	262	0.43	12	0.50	5	0.55	1	0.50	0	0.27
Other Residential	11,961	19.46	551	22.67	197	23.72	18	15.05	1	11.07
Religion	63	0.10	3	0.12	1	0.13	0	0.15	0	0.13
Single Family	47,968	78.02	1,804	74.21	606	72.89	97	81.70	10	86.95
Total	**61,480**		**2,431**		**832**		**119**		**12**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	39,062	63.54	666	27.40	64	7.70	3	2.92	0	0.00
Steel	1,046	1.70	42	1.74	15	1.78	1	1.09	0	0.20
Concrete	522	0.85	21	0.88	6	0.78	0	0.30	0	0.00
Precast	71	0.11	4	0.16	2	0.30	0	0.38	0	0.04
RM	1,016	1.65	35	1.42	18	2.19	3	2.12	0	0.00
URM	17,498	28.46	1446	59.46	636	76.44	108	91.06	12	99.76
MH	2,266	3.69	217	8.94	90	10.81	3	2.13	0	0.00
Total	**61,480**		**2,431**		**832**		**119**		**12**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 1,235 hospital beds available for use. On the day of the earthquake, the model estimates that only 1,188 hospital beds (96.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 99.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	7	0	0	7
Schools	94	0	0	94
EOCs	0	0	0	0
PoliceStations	23	0	0	23
FireStations	15	0	0	15

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	187	0	0	187	187
	Bridges	253	0	0	253	253
	Tunnels	0	0	0	0	0
Railways	Segments	115	0	0	115	115
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	5	0	0	5	5
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	7	0	0	7	7
	Runways	7	0	0	7	7

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	2	0	0	2	2
Waste Water	17	0	0	17	17
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	1	0	0	1	1
Communication	14	0	0	14	14

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	3,435	16	4
Waste Water	2,061	13	3
Natural Gas	1,374	13	3
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	86,218	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 1 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 0.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 213,295) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
	Total				

Economic Loss

The total economic loss estimated for the earthquake is 50.44 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 46.19 (millions of dollars); 15 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 58 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.11	1.63	0.06	0.08	1.87
	Capital-Related	0.00	0.04	1.23	0.03	0.02	1.32
	Rental	0.99	1.30	1.02	0.03	0.03	3.37
	Relocation	0.11	0.03	0.05	0.00	0.01	0.21
	Subtotal	**1.11**	**1.48**	**3.92**	**0.13**	**0.14**	**6.78**
Capital Stock Loses							
	Structural	5.43	1.80	2.77	0.70	0.46	11.16
	Non_Structural	9.20	5.01	5.21	1.48	0.95	21.87
	Content	1.65	0.92	2.31	0.94	0.41	6.24
	Inventory	0.00	0.00	0.05	0.09	0.00	0.14
	Subtotal	**16.28**	**7.74**	**10.35**	**3.22**	**1.83**	**39.41**
	Total	**17.38**	**9.22**	**14.28**	**3.34**	**1.97**	**46.19**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	1,823.36	$0.00	0.00
	Bridges	309.53	$0.03	0.01
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2132.90**	**0.00**	
Railways	Segments	121.94	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	4.75	$0.04	0.88
	Subtotal	**126.70**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	5.94	$0.11	1.87
	Subtotal	**5.90**	**0.10**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	41.58	$0.76	1.83
	Runways	237.14	$0.00	0.00
	Subtotal	**278.70**	**0.80**	
	Total	**2544.20**	**0.90**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	72.60	$0.16	0.22
	Distribution Line	68.70	$0.07	0.10
	Subtotal	**141.29**	**$0.23**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	1,234.10	$2.67	0.22
	Distribution Line	41.20	$0.06	0.14
	Subtotal	**1,275.31**	**$2.73**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Line	27.50	$0.06	0.22
	Subtotal	**27.48**	**$0.06**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	119.90	$0.28	0.23
	Subtotal	**119.90**	**$0.28**	
Communication	Facilities	1.50	$0.00	0.22
	Subtotal	**1.53**	**$0.00**	
	Total	**1,565.51**	**$3.30**	

Table 15. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

	LOSS	Total	%

Appendix A: County Listing for the Region

Lackawanna,PA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Pennsylvania					
	Lackawanna	213,295	11,376	5,535	16,912
Total State		**213,295**	**11,376**	**5,535**	**16,912**
Total Region		**213,295**	**11,376**	**5,535**	**16,912**

HAZUS-MH: Earthquake Event Report

Region Name Luzerne Earthquake

Earthquake Scenario: 100 year luzerne earthquake

Print Date: August 19, 2008

Totals only reflect data for those census tracts/blocks included in the user's study region.

Disclaimer:
The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

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General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Pennsylvania

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 905.67 square miles and contains 103 census tracts. There are over 130 thousand households in the region and has a total population of 319,250 people (2000 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 103 thousand buildings in the region with a total building replacement value (excluding contents) of 23,436 (millions of dollars). Approximately 98.00 % of the buildings (and 71.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 3,129 and 2,261 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 103 thousand buildings in the region which have an aggregate total replacement value of 23,436 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 61% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 11 hospitals in the region with a total bed capacity of 1,619 beds. There are 122 schools, 40 fire stations, 32 police stations and 3 emergency operation facilities. With respect to HPL facilities, there are 55 dams identified within the region. Of these, 35 of the dams are classified as 'high hazard'. The inventory also includes 98 hazardous material sites, 0 military installations and 1 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 5,390.00 (millions of dollars). This inventory includes over 563 kilometers of highways, 322 bridges, 11,060 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	322	264.70
	Segments	178	2,082.80
	Tunnels	0	0.00
		Subtotal	**2,347.50**
Railways	Bridges	0	0.00
	Facilities	2	4.80
	Segments	194	220.70
	Tunnels	0	0.00
		Subtotal	**225.40**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	14	16.60
		Subtotal	**16.60**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	11	65.30
	Runways	14	474.30
		Subtotal	**539.60**
		Total	**3,129.20**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	110.60
	Facilities	5	181.50
	Pipelines	0	0.00
		Subtotal	**292.10**
Waste Water	Distribution Lines	NA	66.40
	Facilities	22	1,597.10
	Pipelines	0	0.00
		Subtotal	**1,663.40**
Natural Gas	Distribution Lines	NA	44.20
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**44.20**
Oil Systems	Facilities	2	0.20
	Pipelines	0	0.00
		Subtotal	**0.20**
Electrical Power	Facilities	4	479.60
		Subtotal	**479.60**
Communication	Facilities	29	3.20
		Subtotal	**3.20**
		Total	**2,482.70**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	100 year luzerne earthquake
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	100.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

HAZUS estimates that about 0 buildings will be at least moderately damaged. This is over 0.00 % of the total number of buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	63	0.06	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	1,585	1.54	0	0.00	0	0.00	0	0.00	0	0.00
Education	53	0.05	0	0.00	0	0.00	0	0.00	0	0.00
Government	69	0.07	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	523	0.51	0	0.00	0	0.00	0	0.00	0	0.00
Other Residential	14,610	14.15	0	0.00	0	0.00	0	0.00	0	0.00
Religion	99	0.10	0	0.00	0	0.00	0	0.00	0	0.00
Single Family	86,243	83.53	0	0.00	0	0.00	0	0.00	0	0.00
Total	**103,245**		**0**		**0**		**0**		**0**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	62,794	60.82	0	0.00	0	0.00	0	0.00	0	0.00
Steel	1,430	1.38	0	0.00	0	0.00	0	0.00	0	0.00
Concrete	567	0.55	0	0.00	0	0.00	0	0.00	0	0.00
Precast	111	0.11	0	0.00	0	0.00	0	0.00	0	0.00
RM	1,021	0.99	0	0.00	0	0.00	0	0.00	0	0.00
URM	31,759	30.76	0	0.00	0	0.00	0	0.00	0	0.00
MH	5,564	5.39	0	0.00	0	0.00	0	0.00	0	0.00
Total	**103,245**		**0**		**0**		**0**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 1,619 hospital beds available for use. On the day of the earthquake, the model estimates that only 1,617 hospital beds (100.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	11	0	0	11
Schools	122	0	0	122
EOCs	3	0	0	3
PoliceStations	32	0	0	32
FireStations	40	0	0	40

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	178	0	0	178	178
	Bridges	322	0	0	322	322
	Tunnels	0	0	0	0	0
Railways	Segments	194	0	0	194	194
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	14	0	0	14	14
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	11	0	0	11	11
	Runways	14	0	0	14	14

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	5	0	0	5	5
Waste Water	22	0	0	22	22
Natural Gas	0	0	0	0	0
Oil Systems	2	0	0	2	2
Electrical Power	4	0	0	4	4
Communication	29	0	0	29	29

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	5,530	2	0
Waste Water	3,318	1	0
Natural Gas	2,212	1	0
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	130,687	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 0.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 319,250) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
	Total				

Economic Loss

The total economic loss estimated for the earthquake is 0.05 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.00 (millions of dollars); 0 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.00	0.00	0.00	0.00	0.00
	Capital-Related	0.00	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Capital Stock Loses							
	Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Non_Structural	0.00	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,082.83	$0.00	0.00
	Bridges	264.68	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2347.50**	**0.00**	
Railways	Segments	220.66	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	4.75	$0.00	0.01
	Subtotal	**225.40**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	16.63	$0.00	0.03
	Subtotal	**16.60**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	65.35	$0.02	0.03
	Runways	474.28	$0.00	0.00
	Subtotal	**539.60**	**0.00**	
	Total	**3129.20**	**0.00**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	181.50	$0.00	0.00
	Distribution Line	110.60	$0.01	0.01
	Subtotal	**292.09**	**$0.01**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	1,597.10	$0.01	0.00
	Distribution Line	66.40	$0.01	0.01
	Subtotal	**1,663.43**	**$0.01**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Line	44.20	$0.01	0.01
	Subtotal	**44.24**	**$0.01**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.20	$0.00	0.00
	Subtotal	**0.22**	**$0.00**	
Electrical Power	Facilities	479.60	$0.00	0.00
	Subtotal	**479.60**	**$0.00**	
Communication	Facilities	3.20	$0.00	0.00
	Subtotal	**3.16**	**$0.00**	
	Total	**2,482.73**	**$0.03**	

Table 15. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

	LOSS	Total	%

Appendix A: County Listing for the Region

Luzerne,PA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Pennsylvania					
	Luzerne	319,250	16,623	6,813	23,436
Total State		**319,250**	**16,623**	**6,813**	**23,436**
Total Region		**319,250**	**16,623**	**6,813**	**23,436**

HAZUS-MH: Earthquake Event Report

Region Name Luzerne Earthquake

Earthquake Scenario: Luzerne 500 Year Earthquake

Print Date: August 19, 2008

Totals only reflect data for those census tracts/blocks included in the user's study region.

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Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 11 hospitals in the region with a total bed capacity of 1,619 beds. There are 122 schools, 40 fire stations, 32 police stations and 3 emergency operation facilities. With respect to HPL facilities, there are 55 dams identified within the region. Of these, 35 of the dams are classified as 'high hazard'. The inventory also includes 98 hazardous material sites, 0 military installations and 1 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 2 and 3.

The total value of the lifeline inventory is over 5,390.00 (millions of dollars). This inventory includes over 563 kilometers of highways, 322 bridges, 11,060 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	322	264.70
	Segments	178	2,082.80
	Tunnels	0	0.00
		Subtotal	**2,347.50**
Railways	Bridges	0	0.00
	Facilities	2	4.80
	Segments	194	220.70
	Tunnels	0	0.00
		Subtotal	**225.40**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	14	16.60
		Subtotal	**16.60**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	11	65.30
	Runways	14	474.30
		Subtotal	**539.60**
		Total	**3,129.20**

Table 3: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	110.60
	Facilities	5	181.50
	Pipelines	0	0.00
		Subtotal	**292.10**
Waste Water	Distribution Lines	NA	66.40
	Facilities	22	1,597.10
	Pipelines	0	0.00
		Subtotal	**1,663.40**
Natural Gas	Distribution Lines	NA	44.20
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**44.20**
Oil Systems	Facilities	2	0.20
	Pipelines	0	0.00
		Subtotal	**0.20**
Electrical Power	Facilities	4	479.60
		Subtotal	**479.60**
Communication	Facilities	29	3.20
		Subtotal	**3.20**
		Total	**2,482.70**

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Luzerne 500 Year Earthquake
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	500.00
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	5.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

HAZUS estimates that about 1,529 buildings will be at least moderately damaged. This is over 1.00 % of the total number of buildings in the region. There are an estimated 18 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 4 below summaries the expected damage by general occupancy for the buildings in the region. Table 5 summaries the expected damage by general building type.

Table 4: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	60	0.06	3	0.07	1	0.06	0	0.06	0	0.03
Commercial	1,483	1.52	72	1.81	26	1.97	4	1.96	0	1.25
Education	50	0.05	2	0.06	1	0.06	0	0.05	0	0.04
Government	65	0.07	3	0.07	1	0.07	0	0.06	0	0.04
Industrial	492	0.50	22	0.56	8	0.60	1	0.54	0	0.31
Other Residential	13,588	13.90	734	18.44	269	20.28	18	9.79	1	6.22
Religion	93	0.10	4	0.11	2	0.12	0	0.13	0	0.12
Single Family	81,906	83.80	3,140	78.89	1,019	76.84	161	87.40	17	91.99
Total	**97,736**		**3,980**		**1,326**		**184**		**19**	

Table 5: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	61,531	62.96	1147	28.82	110	8.30	6	3.39	0	0.00
Steel	1,357	1.39	53	1.33	18	1.35	2	0.87	0	0.20
Concrete	540	0.55	21	0.53	6	0.47	0	0.18	0	0.00
Precast	101	0.10	5	0.14	3	0.26	1	0.34	0	0.04
RM	969	0.99	33	0.82	17	1.28	2	1.27	0	0.00
URM	28,292	28.95	2282	57.34	997	75.17	168	91.43	19	99.76
MH	4,946	5.06	439	11.03	175	13.17	5	2.51	0	0.00
Total	**97,736**		**3,980**		**1,326**		**184**		**19**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 1,619 hospital beds available for use. On the day of the earthquake, the model estimates that only 1,562 hospital beds (97.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 99.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 6: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	11	0	0	11
Schools	122	0	0	122
EOCs	3	0	0	3
PoliceStations	32	0	0	32
FireStations	40	0	0	40

Transportation and Utility Lifeline Damage

Table 7 provides damage estimates for the transportation system.

Table 7: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	178	0	0	178	178
	Bridges	322	0	0	322	322
	Tunnels	0	0	0	0	0
Railways	Segments	194	0	0	194	194
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	14	0	0	14	14
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	11	0	0	11	11
	Runways	14	0	0	14	14

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 8-10 provide information on the damage to the utility lifeline systems. Table 8 provides damage to the utility system facilities. Table 9 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 10 provides a summary of the system performance information.

Table 8 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	5	0	0	5	5
Waste Water	22	0	0	22	22
Natural Gas	0	0	0	0	0
Oil Systems	2	0	0	2	2
Electrical Power	4	0	0	4	4
Communication	29	0	0	29	29

Table 9 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	5,530	24	6
Waste Water	3,318	19	5
Natural Gas	2,212	21	5
Oil	0	0	0

Table 10: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	130,687	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 1 ignitions that will burn about 0.01 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 2 people and burn about 0 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.00 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 0.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 319,250) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 11 provides a summary of the casualties estimated for this earthquake

Table 11: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
	Total				

Economic Loss

The total economic loss estimated for the earthquake is 70.18 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 63.29 (millions of dollars); 14 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 62 % of the total loss. Table 12 below provides a summary of the losses associated with the building damage.

Table 12: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Loses							
	Wage	0.00	0.24	2.10	0.11	0.09	2.53
	Capital-Related	0.00	0.10	1.67	0.06	0.02	1.85
	Rental	1.67	1.33	1.41	0.04	0.03	4.47
	Relocation	0.19	0.04	0.07	0.00	0.01	0.31
	Subtotal	**1.86**	**1.70**	**5.24**	**0.21**	**0.16**	**9.16**
Capital Stock Loses							
	Structural	8.86	2.10	3.08	0.92	0.73	15.69
	Non_Structural	15.53	5.57	5.68	2.01	1.38	30.17
	Content	2.81	1.00	2.44	1.19	0.59	8.04
	Inventory	0.00	0.00	0.06	0.16	0.00	0.23
	Subtotal	**27.20**	**8.68**	**11.26**	**4.28**	**2.71**	**54.12**
	Total	**29.05**	**10.38**	**16.50**	**4.48**	**2.87**	**63.29**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 13 & 14 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 13: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,082.83	$0.00	0.00
	Bridges	264.68	$0.05	0.02
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2347.50**	**0.00**	
Railways	Segments	220.66	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	4.75	$0.04	0.86
	Subtotal	**225.40**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	16.63	$0.30	1.82
	Subtotal	**16.60**	**0.30**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	65.35	$1.16	1.78
	Runways	474.28	$0.00	0.00
	Subtotal	**539.60**	**1.20**	
	Total	**3129.20**	**1.60**	

Table 14: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	181.50	$0.40	0.22
	Distribution Line	110.60	$0.11	0.10
	Subtotal	**292.09**	**$0.51**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	1,597.10	$3.67	0.23
	Distribution Line	66.40	$0.09	0.13
	Subtotal	**1,663.43**	**$3.75**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Line	44.20	$0.09	0.21
	Subtotal	**44.24**	**$0.09**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.20	$0.00	0.23
	Subtotal	**0.22**	**$0.00**	
Electrical Power	Facilities	479.60	$0.98	0.20
	Subtotal	**479.60**	**$0.98**	
Communication	Facilities	3.20	$0.01	0.22
	Subtotal	**3.16**	**$0.01**	
	Total	**2,482.73**	**$5.34**	

Table 15. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

	LOSS	Total	%

Appendix A: County Listing for the Region

Luzerne,PA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Pennsylvania					
	Luzerne	319,250	16,623	6,813	23,436
Total State		**319,250**	**16,623**	**6,813**	**23,436**
Total Region		**319,250**	**16,623**	**6,813**	**23,436**

APPENDIX D: STEERING COMMITTEE MEETINGS

STEERING COMMITTEE MEETING: MARCH 4, 2008

LACKAWANNA-LUZERNE JOINT COUNTY

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
STEERING COMMITTEE MEETING #1

March 4, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
Rich Davis	Hunlock Twp.	256-7410 342-7912	
Charlie Krommes	Plains Twp.	cell 814-3130 or home 824-0507	M2R222@AOL.COM
Stephen Bekanich	Luzerne County EMA	570-820-4400	sbekanich@luzernecounty.org
Jack Dodson	Dallas Twp EMS	(570) 675-3334 / (570) 690-2200	Kuwicke31@Epix.net
Kevin Howard	Lackawanna County EMA	570-307-7331	howardk@lackawannacounty.org
Julie McMonagle	PA. Env. Council	570-718-6507	jmcmonagle@pecpa.org
Steven Valvano	Borton-Lawson	570-821-1994	svalvano@borton.lawson.com
Nancy Snee	Luz. Co. Planning Comm.	570-825-1564	Nancy.Snee@luzernecounty.org
Steve Pitoniak	Lacka. Cnty Planning Comm	570-963-6400	PitoniakS@Lackawannacounty.org
Mary Liz Donato	Lacka. Co. Planning Comm.	570-963-6400	donatoml@lackawannacounty.org

LACKAWANNA-LUZERNE JOINT COUNTY
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
STEERING COMMITTEE MEETING #1

March 4, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
Alan Tamm	PEMA	717 651 2702	atamm@state.pa.us
Deepa Srinivasan	Vision Plan & Consulting	240 893 8719	dsrinivasan@vision-pc.net
LEE JAMISON	ABINGTON C.O.G + S.A.P.A.	570 586-5438	LEEJAM18411@AOL.COM
WILLIAM SHACKSNAS	WILKES-BARRE CITY EMC	570 208-4260	bshacksnas@wilkesbarre.pa.us
JOSH LONGMORE	LUZERNE CONSERVATION DISTRICT	570-674-7991	j.longmore@luzernecd.org
Joseph Gibbons	Luzerne County Engineer	570. 820-6347	joe.gibbons@luzernecounty.org
Don King	City of Scranton	570-840-6450	dking@scrantonpa.gov
Stanley R. Gutkowski III	Wright Township EMA Coordinator Secretary Wright Twp Fire Dept	570-474-5785 (570) 574-8515*	cdc100@ptd.net
BERT COSSABOON	MT	215 592 4200	LBCOSSABOON@MTMAIL.BIZ

LACKAWANNA-LUZERNE JOINT COUNTY
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
STEERING COMMITTEE MEETING #1

March 4, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
Adrian Merolli	Luzerne County Planning Commission	570-825-1560	planzone@epix.net
Jim Brozena	Luzerne County Flood Protection Authority	570.825.1601	jim.brozena@luzernecounty.org
David Skoronski	Luzerne County GIS Director	570 825 1521	dskoronski@luzernecounty.org
John Ankenbrand	Luzerne County EMA	570 820-4400	johnank@luz911.com

Luzerne Lackawanna Bi-County Hazard Mitigation Plan

Steering Committee Meeting #1
4 March 2008

Presented by:
Deepa Srinivasan, AICP, CFM, Vision Planning and Consulting, LLC
Steve Boone, Borton-Lawson Engineering

Disaster Mitigation Act of 2000

Established in 2000, requires communities and states to develop and adopt hazard mitigation plans by November 2004 to be eligible for future mitigation funding.

- ✓Every jurisdiction must participate in the process
- ✓Every jurisdiction must formally adopt the plan within 1 year of approval
- ✓Open public involvement is required
- ✓Planning process must be documented

Participation of Jurisdictions

"EACH jurisdiction MUST participate on their own, to the planning process, or they cannot adopt the plan and will not get funding."

- Letter of Participation
- 1st Workshop (12 Mar 08)– Overview of planning process and invitation to attend 2nd workshop
- 2nd Workshop (Apr 08)- Identification of hazards, problem areas, critical facilities, goals, and mitigation actions
- Follow up via email and phone calls
- Questionnaires

Municipality Participation Matrix

Local Planning Guidance

- Similar to DMA 2000 Crosswalk
- FMA Requirements
  - Preventive Activities
  - Property Protection
  - Natural & Beneficial Functions
  - Emergency Services
  - Structural
  - Public Information
- Severe Repetitive Loss Properties
- NFIP Continued Compliance
- To be released in October 2008
- FEMA will review Bi-County HMP in light of new guidance

Hazard Mitigation Planning Process

Organize Resources

Step 1: Assess Community Support

- Coordinate with State Agencies
- Educate Elected and Appointed Officials
- Determine Stakeholders
- Conduct Public Meetings

Step 2: Establish the Planning Team

Steering Committee

Luzerne and Lackawanna Counties

- Departments of Public Works
- Departments of Planning
- Emergency Management Agencies
- Lackawanna River Watershed Committee
- Luzerne County Flood Protection Authority
- Municipal Representatives

Step 3: Engage the Public

- **Two Municipal Workshops**
- **Two Public Meetings**
- **County Commission Meetings**
- **County Internet Website**
- **Newspaper Advertisements**

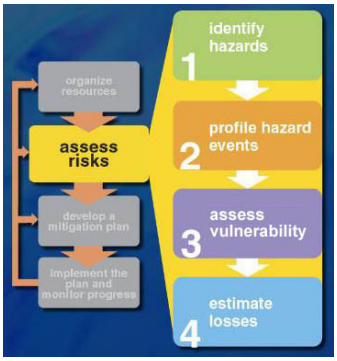
Assess Risks

Step 1: Identify Hazards

Step 2: Profile Hazard Events

- Frequency of Hazard Events
- Severity
- Unique Characteristics

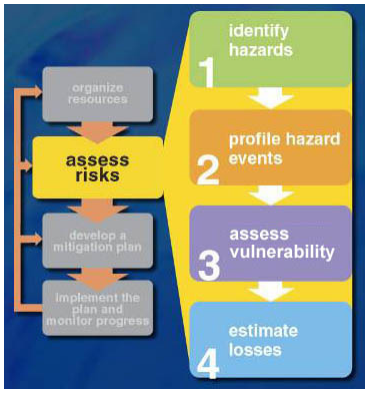
Step 3: Assess Vulnerability



- Identify locations where residents could suffer greatest injury or property damage
- Estimate exposure of people, buildings, infrastructure to hazardous conditions
- Determine vulnerability
  - Number of buildings
  - Number of people

    (based on availability of data)

Step 4: Estimate Losses



- Number of structures
- Site specific characteristics
  - first-floor elevations
  - number of stories
  - construction type
  - foundation type
  - age and condition of the structure
  - use of structure
  - contents within structure

Develop a Mitigation Plan

Mitigation Capability Assessment

Evaluation of the jurisdiction with respect to:

- Governmental structure
- Policies & programs
- Regulations and ordinances
- Resource availability
- Capacity to carry out actions

Mitigation Capabilities

- Government Structure
  - Departments and Functions
- Planning and Development Processes
  - Zoning and Subdivision Regulations
  - Flood and Stormwater management
  - Development Activity
  - Emergency Operations
  - CIP
- Bi-County Initiatives

Categories – Mitigation Capability Assessment

1. Preventive Activities
2. Property Protection
3. Natural & Beneficial Functions
4. Emergency Services
5. Structural
6. Public Information

1. Preventive Activities

- Comprehensive Plan
- Economic Development Plan
- Revitalization Plan
- Zoning and Subdivision Regulations
- Flood and Stormwater Management Ordinances

2. Property Protection

- Retrofitting Programs
  - Floodproofing
  - Structure Elevation
  - Roof Strengthening (snow loads)
- Acquisition Programs
- Insurance – flood, sewer back-up protection

3. Natural & Beneficial Functions

- Open Space Zoning
- Wetlands Protection
- Erosion & Sedimentation Control
- Best Management Practices (BMPs)

4. Emergency Services

- Emergency Management Plan
- Emergency Warning Capabilities
- Emergency Response Capabilities
- Critical Facilities Protection
- Health & Safety Maintenance
- Post Disaster Recovery & Mitigation Plan

5. Structural Projects

- Floodwalls
- Dams
- Levees

6.Public Information

- Mailings
- Website
- Library
- Media Coverage/Cooperation including Newspapers & Radio Broadcasts
- Technical Assistance

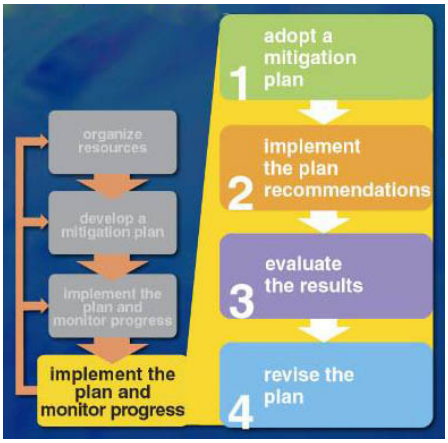
Step 2: Identify & Prioritize Mitigation Measures

- Identify Mitigation Measures
- Evaluate Mitigation Measures
- Rank Mitigation Measures

Step 3: Prepare an Implementation Strategy

- Identify who will implement mitigation measures
- Identify how mitigation measures will be funded
- Identify when mitigation measures should be completed
- Write up implementation strategy

Implement the Plan & Monitor Progress



Next Steps

- Finalize Mitigation Capability Assessment
- Finalize Hazard Identification and Risk Assessment
- March 12, 2008 - 1st Planning Workshop – Overview of Planning Process and Distribution of Questionnaires
- April 2008 - 2nd Steering Committee Meeting - Develop Goals and Objectives
- April 2008 - 2nd Planning Workshop - Identification of hazards, problem areas, critical facilities, goals, and mitigation actions

Thank you for your participation in the Hazard Mitigation Planning Process!

STEERING COMMITTEE MEETING: MAY 28, 2008

LACKAWANNA-LUZERNE JOINT COUNTY PLANS
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
STEERING COMMITTEE MEETING #2

May 28, 2008

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LACKAWANNA & LUZERNE COUNTIES

Comprehensive Plan, Long Range Transportation Plan and Hazard Mitigation Plan

Hazard Mitigation Plan
Steering Committee Meeting # 2

May 28, 2008

In association with:

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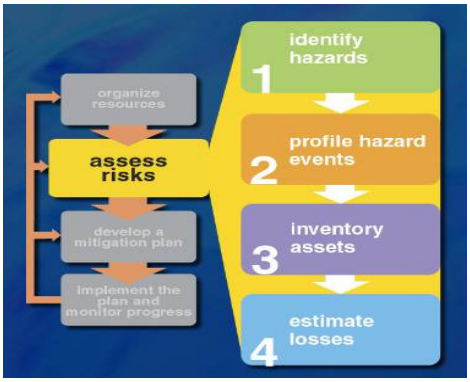
ASSESSING RISKS

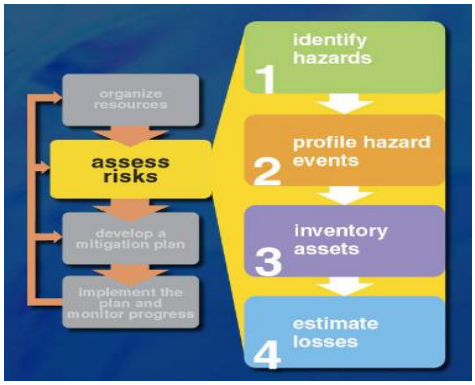
Step 3: Assess Vulnerability



- Identify locations where residents could suffer greatest injury or property damage
- Estimate exposure of people, buildings, infrastructure to hazardous conditions
- Determine vulnerability
  - Number of buildings
  - Number and types of Critical Facilities

ASSESSING RISKS

Step 4: Estimate Losses



- Number of structures
- Dollar Value of Exposure
- Site specific characteristics
  - Types of structures
  - Construction material

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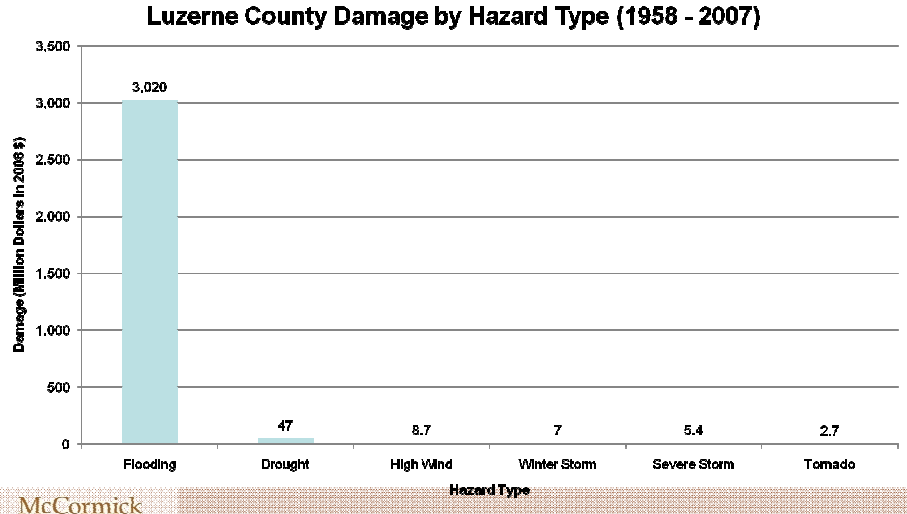
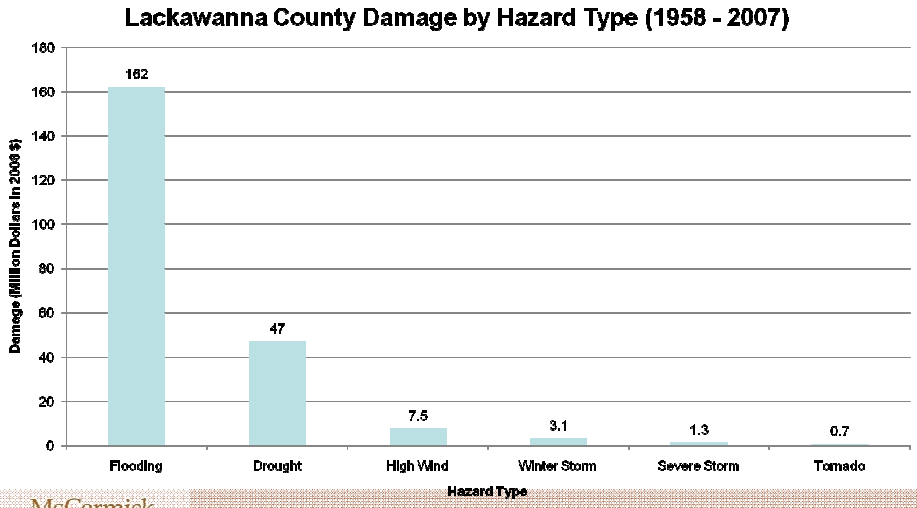
ASSESSING RISKS – HISTORIC HAZARDS



ASSESSING RISKS – HISTORIC HAZARDS



LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

VULNERABILITY ASSESSMENT

FLOODING VULNERABILITY

- **Luzerne County – Structures in 100-Year Floodplain**
  - 8,021 Structures
  - 630 Bridges and Culverts
  - 45 Critical Facilities
    - 7 are Emergency Response Buildings
  - 7 Historic Places

- **Economic Loss**
  - $2,991 Million Estimated in 100-Year Flood
    - Damage to structures
    - Business Interruption

VULNERABILITY ASSESSMENT

FLOODING VULNERABILITY

- **Lackawanna County – Structures in 100-Year Floodplain**
  - 6,621 Structures
  - 293 Bridges and Culverts
  - 28 Critical Facilities
    - 7 are Emergency Response Buildings
  - 2 Historic Places
- **Economic Loss**
  - $2,587 Million Estimated in 100-Year Flood
    - Damage to structures
    - Business Interruption

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

VULNERABILITY ASSESSMENT

SUBSIDENCE VULNERABILITY

- **Luzerne County – Structures in Potential Subsidence Areas**
  - 11,857 Structures
  - 9 Bridges and Culverts
  - 35 Critical Facilities
    - 13 are Emergency Response Buildings
    - 6 are Government Buildings
    - 6 are Schools
- **Economic Loss**
  - $4,421 Million Estimated Total Exposure to Subsidence
    - Damage to structures
    - Business Interruption

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VULNERABILITY ASSESSMENT

SUBSIDENCE VULNERABILITY

- **Lackawanna County – Structures in Potential Subsidence Areas**
  - 13,284 Structures
  - 13 Bridges and Culverts
  - 34 Critical Facilities
    - 9 are Emergency Response Buildings
    - 14 are Government Buildings
    - 7 are Schools
  - 6 Historic Places
- **Economic Loss**
  - $5,191 Million Estimated Total Exposure to Subsidence
    - Damage to structures
    - Business Interruption

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

VULNERABILITY ASSESSMENT

OTHER HAZARD VULNERABILITY – LUZERNE COUNTY

- **Drought**
  - Affected Areas: Countywide
  - Frequency: 3 Years
  - Average 3 Year Economic Loss: ~$9 Million (Skewed by 1991 Drought)
  - Average 3 Year Economic Loss w/o 1991 Data: ~$1 Million
- **High Wind**
  - Affected Areas: Countywide
  - Frequency: Annual
  - Average Annual Economic Loss: ~$225,000
- **Winter Storms**
  - Affected Areas: Countywide
  - Frequency: 2 Years on Average
  - Average 2 Year Economic Loss: ~$300,000

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VULNERABILITY ASSESSMENT

OTHER HAZARD VULNERABILITY – LACKAWANNA COUNTY

- **Drought**
  - Affected Areas: Countywide
  - Frequency: 3 Years
  - Average 3 Year Economic Loss: ~$9 Million (Skewed by 1991 Drought)
  - Average 3 Year Economic Loss w/o 1991 Data: ~$1 Million
- **High Wind**
  - Affected Areas: Countywide
  - Frequency: Annual
  - Average Annual Economic Loss: ~$200,000
- **Winter Storms**
  - Affected Areas: Countywide
  - Frequency: 2 Years on Average
  - Average 2 Year Economic Loss: ~$130,000

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

VULNERABILITY ASSESSMENT

OTHER HAZARD VULNERABILITY

- **Landslide**
  - Affected Areas: River Communities
  - Frequency: Low
  - Potential Economic Loss: High
- **Earthquake**
  - Affected Areas: Countywide
  - Frequency: 500 Years
  - Potential Economic Loss: ~$5 Billion per County (if it happened today)

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VULNERABILITY ASSESSMENT

HAZARD RANKING

1. Flooding: High Frequency – High Loss
2. High Wind: High Frequency – Medium Loss
3. Winter Storms: High Frequency – Medium Loss
4. Drought: Medium Frequency – Medium Loss
5. Landslide: Low Frequency – High Loss
6. Earthquake: Low Frequency – High Loss

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

MITIGATION CAPABILITY ASSESSMENT

Evaluation of governmental structure; policies and programs; regulations and ordinances

Purpose:

1. Document roles of various agencies that develop and implement the various plans and ordinances to identify areas for coordination and/or improvement;
2. Provide a review of sample plans and ordinances and identify sections that address hazard mitigation related issues;
3. Identify joint-county initiatives;
4. Provide a platform to integrate plans so recommendations/strategies are not in contradiction with one another.

LACKAWANNA COUNTY GOVERNMENT STRUCTURE

Office of Economic and Community Development - CDBG program

Lackawanna County Regional Planning Commission - policy decisions on planning, subdivision, land development issues, local land use regulations, transportation planning, environmental issues

Lackawanna Redevelopment Authority - acquires and redevelops blighted areas so they become available for economically and socially sound redevelopment

County Emergency Management Agency - planning, assignment and coordination of resources in the areas of mitigation, preparedness, response and recovery for natural or human-caused emergencies.

County Conservation District – conservation of soil and water resources through control and prevention of soil erosion and conservation, restoration and planning of watersheds

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

LACKAWANNA COUNTY GOVERNMENT STRUCTURE

Environmental Education Programs - educational programs - lake and pond management workshops, County Envirothon, and the Water Discovery Day Camp.

Emergency Communications Center - designated 911 center, responsible for the dispatch of police, fire, rescue and emergency medical services during emergency situations

Roads and Bridges - snowplowing and salting, filling potholes, maintaining storm and drainage pipes, black topping, repairing guide rails and installing signs.

Transportation - County Transit System, County Railroad Authority and Coordinated Transportation System.

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LUZERNE COUNTY GOVERNMENT STRUCTURE

County Engineer's Office - technical review and administration of County projects, subdivision and land development review, design/construction of roads and bridges, and contract administration

Luzerne County Planning Commission - recommendations on zoning, subdivision/land development and comprehensive plans administers zoning and subdivision ordinances for 18 and 26 municipalities resp.

Luzerne County Emergency Management Agency - manage emergencies or threats to security; LEPC responsible for overseeing the hazardous materials response account and approving emergency response plans.

Luzerne County Office of Community Development - ensures decent housing, suitable living environment, and expanded economic opportunities; administers 3 HUD programs: CDBG, HOME, ESG.

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

LUZERNE COUNTY GOVERNMENT STRUCTURE

Luzerne County Department of Roads and Bridges - maintains county roads and bridges. State highways - maintained by PennDOT; local roads maintained by municipalities (roads bridges, culverts, pipes, inlets)

Public Information Officer - serve as the Commissioners' liaison to the press and relays information to public during floods or other emergencies; works closely with County Engineer during emergencies.

Luzerne County Flood Protection Authority - maintains flood control facilities by contractual agreement with COE; contracts with Levee Department in the County Engineer's Office; administers Floodplain Acquisition Program

Flood warning systems - small streams - County EMA is coordinating agency. For river flooding and major events (> 27 feet) - County FPA serves as technical arm for EMA

Storm Ready Program - timeliness and effectiveness of hazardous weather related warnings

COMMONWEALTH OF PENNSYLVANIA REGULATIONS

Uniform Construction Code - State-wide building code mandated for all municipalities; establishes minimum regulations for most new construction, additions and renovations to existing structures.

Comprehensive Planning - Governor's Executive Order 1999-1 (Land Use Planning) provides basis to integrate hazard mitigation into comprehensive land use planning.

The Pennsylvania Code - Chapter 102 Title 25 Sediment and Erosion Control - Requires all earthmoving projects to develop an erosion and sediment pollution control plan to ensure proper site development practices are employed for land development.

Growing Greener - Addresses critical environmental concerns; farmland-preservation projects; protection of open space; restoration of watersheds; funding for recreational trails/parks; land use; and water and sewer systems.

Enhanced All-Hazard Mitigation Plan, August 2007 - mitigation actions where State assistance is available: acquisition, relocation, flood proofing, elevation of structures; stormwater conveyance upgrade actions and adequate size bridge/culvert openings; stream bank stabilization; structural alternatives - repetitive flooding.

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

JOINT COUNTY/REGIONAL PLANNING INITIATIVES

Joint County Comprehensive Plan - plan elements : housing, economic development, community facilities, environment, historic preservation and land use.

Joint County Long Range Transportation Plan - ISETEA requires all MPOs to prepare 20-year transportation plans. The original plan for the Lackawanna/Luzerne MPO prepared in 1994 and updated every 3 years.

2004 Open Space, Greenways, and Outdoors Master Plan for Lackawanna/Luzerne Counties - recommendations to achieve a balance between growth and protecting natural resources; regulatory methods include density transfers, zoning overlays, buffer zones.

FEMA Region III Post-Flood Community Flood Risk Evaluation – April 2008 – information related to the flooding and accuracy of the effective FIRMs and data used to prioritize spending of federal dollars during upcoming MapMod projects. A summary table included about the effective study type for each stream reach and future study recommendations.

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LACKAWANNA COUNTY DOCUMENT REVIEW

Zoning - No county zoning ordinance, only municipality zoning ordinances

1. Luzerne County has a county-wide zoning ordinance; 18 municipalities use County Ordinance and 58 have their own.
2. 39 of 40 municipalities in Lackawanna (except Madison Township) have zoning ordinances.

Subdivision and Land Development Regulations -

1. Luzerne County administers the Land Development and Subdivision Ordinance for 26 municipalities and the remaining 50 municipalities have their own ordinance
2. Each municipality in Lackawanna County has its own zoning, land development and subdivision ordinance.

UCC Building Code

1. City of Scranton conducts its own inspections with municipal inspectors. The other 39 municipalities contract with private firms to conduct inspections.
2. All municipalities in Luzerne County covered by the UCC; 53 out of 76 municipalities issue permits and have a building code that is based on the UCC code and 7 municipalities do not issue permits or perform UCC functions.

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

ORDINANCE HIGHLIGHTS

Floodplain Ordinance – included in the individual municipalities' zoning ordinances. Required freeboard is 1.5 feet above BFE; no building permits issued for structures in the floodway; elevation certificates required by all municipalities for structures in the floodplain.

Comprehensive Planning Efforts – Lackawanna County Comprehensive Plan completed in the 1970s - never adopted; 28 out of County's 40 municipalities have developed and adopted comprehensive plans and 15 currently involved in 3 regional comprehensive plans (11 are part of the Scranton-Abington area plan).

Lackawanna River Watershed Act 167 Stormwater Management Ordinance - serves as the County's SWM ordinance; include provisions for the safe conveyance of excess stormwater and floodwaters.

Lackawanna County Emergency Operations Plan - June 2004 - serves as an emergency management link between the municipalities' EMAs and PEMA; coincides with the concepts of the National Response Plan.

DOCUMENT REVIEW

Drainage Improvements – Luzerne County drainage improvements conducted at the municipal level; municipalities request new developers or the State (for DEP projects) to make drainage improvements.

Luzerne County Emergency Operations Plan - February, 2004 - Luzerne County operates a separate 911 Center and an Emergency Operations Center (EOC). The Plan embraces an "all-hazards" principle: County EMC mobilizes functions and personnel as required by the emergency situation; resources available from municipalities via mutual aid agreements for reciprocal emergency assistance.

Municipal Hazard Mitigation Plans - In 1999, 53 downstream municipalities on the Susquehanna River in Luzerne, Columbia, Montour, Northumberland, and Snyder Counties developed HMPs through the Wyoming Valley Levee Raising Project. Communities applying for $16.2 million in funds allocated for mitigation projects.

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

CRS/NFIP Status

1. CRS - no municipality in Lackawanna County;1 municipality in Luzerne County (City of Wilkes Barre).
2. Community Assistance Visits being conducted for 12 municipalities in Luzerne County and expect to be active in the CRS program in October 2008.
3. Currently, all 40 municipalities in Lackawanna County and 75 out of 76 in Luzerne are in the NFIP Program (Slocum Township).
4. Repetitively flooded properties are located in the following 13 municipalities (137 properties) in Lackawanna County and 27 municipalities (393 properties) in Luzerne County.

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DEVELOP A MITIGATION PLAN

Step 1: Goals and Objectives

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

GOALS AND OBJECTIVES

- Preventive Activities
- Property Protection
- Natural and Beneficial Functions
- Emergency Services
- Structural Projects
- Public Information

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NEXT STEPS

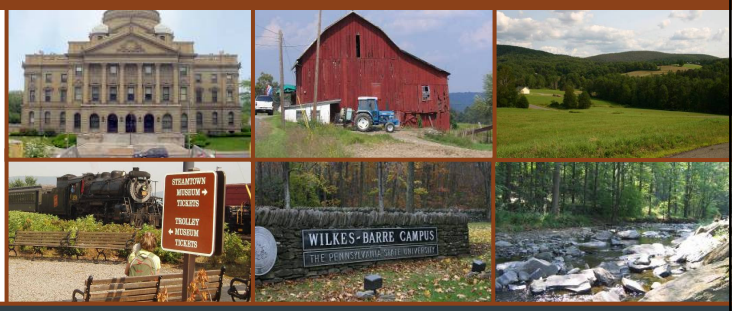
- Draft HIRA for review
- 3rd Steering Committee Meeting - end June 2008
- 1st Open House/Public Meeting - end June 2008

LACKAWANNA-LUZERNE
COME, SHAPE THE FUTURE

LACKAWANNA & LUZERNE COUNTIES

Comprehensive Plan, Long Range Transportation Plan and Hazard Mitigation Plan

THANK YOU



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STEERING COMMITTEE MEETING: SEPTEMBER 23, 2008

LACKAWANNA & LUZERNE COUNTIES
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN STEERING COMMITTEE MEETING #3

www.lackawanna-luzerneplans.com

September 23, 2008

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LACKAWANNA & LUZERNE COUNTIES
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN STEERING COMMITTEE MEETING #3

www.lackawanna-luzerneplans.com

September 23, 2008

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LACKAWANNA LUZERNE JOINT-COUNTY HAZARD MITIGATION PLAN

Hazard Mitigation Steering Committee Meeting #3
23 September 2008
1:30 – 4:00pm
AGENDA

Mitigation Actions – County Level

- **Discussion of Individual Projects**
- **Identification of Responsible Agencies and Project Timeline**

Mitigation Actions – Municipal Level

- **Discussion of Projects in Each County**

Wrap-up

- **Next steps**
- **Public Meetings (14-16 October, 2008)**
- **Final Steering Committee Meeting (October 2008)**
- **Draft Plan Review Options**
- **Questions**

Adjournment

STEERING COMMITTEE MEETING: DECEMBER 3, 2008

LACKAWANNA & LUZERNE COUNTIES
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN STEERING COMMITTEE MEETING
www.lackawanna-luzerneplans.com

December 3, 2008

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LACKAWANNA & LUZERNE COUNTIES
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN STEERING COMMITTEE MEETING
www.lackawanna-luzerneplans.com

December 3, 2008

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Hazard Mitigation Steering Committee Meeting #4
Agenda

Date: December 3, 2008

Time: 1 p.m. – 3:30 p.m.

Location: Lackawanna County EMA Building
30 Valley View Business Park
Jessup, PA 18434-1147

1. **Mitigation Actions – County Level**

   - Brief Discussion on Projects
   - Prioritization of Mitigation Actions

2. **Review of Draft Plan**

3. **Wrap-Up**

   - Next Steps
   - Schedule for Completion
   - Questions

4. **Adjournment**

APPENDIX E: PUBLIC MEETINGS/WORKSHOPS

MUNICIPAL WORKSHOP: MAY 28, 2008

LACKAWANNA-LUZERNE JOINT COUNTY PLANS
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

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LACKAWANNA-LUZERNE JOINT COUNTY PLANS
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

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Gerald Reilly	Mooj. EMA	510 706 9	

LACKAWANNA-LUZERNE JOINT COUNTY PLANS
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

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Richard Besanca	OLD FORGE	570-499-1741	RBEXC@VERIZON.NET
Ed Whitebread	Conyngham Township	570-241-4295	Conynghamtwp@pa.metrocast.net.

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
Joseph Simon	Emt	574-3287	Simonj1@Verizon
Patrick McLaine	Elmhurst Twp	842 9999	ELMHURSTTOWNSHIP@COMCAST.NET
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Tom Doughton	Dallas Twp Franklin Twp.	674-2007	tdoughton@Aol.com
Wayne Quick	Hughestown Boro	947.6455	WDQuick145@AOL.
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Marcia Thomas	Rice Twp	868 6400	ricetwp@pa.Metrocast
Anthony DeMark	Dupont Boro	654-9971	cocci817@msn.com.

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
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Vito Gatto	Hughestown Borough	655-6764	SSJAG@Comcast.Net

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
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Jeffrey Jones	SpringBrook Twp	570- 842- 4280	
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Merce Gregloch	Hughestown Boro	570 655 6074 (h)	
David Stirling	Butler Twp \ Conyngham Boro	570 956-5826	DS@DSLOGIC.NET
Ray Iwanowski	LEHMAN TWP	570 639-1390	RAYJULIWA@YAHOO.COM
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[illegible]	City of Wilkes-Barre	570-208-4177	bFrati@wilkes-barre.pa.us
Burit Frati			
Mayor Richard Bowen	Taylor Borough	570-562-1400	
Richard Bowen			

LACKAWANNA-LUZERNE JOINT COUNTY PLANS
COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
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Willard Hughes	Moosic Boro	570-457-5480	
Bexi Domenick	Dunmore Boro	3481730	
MARY FRANCES MARTIN	EXETER TWP	388-6090	
Larry West	Dickson City Boro	570 241-3450	Larry.West@dicksoncityborough.org

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

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Angela Petroski	Plymouth Twp Luz. Cty.	570-709-3494 570.779.5388	
Stanley Knick Jr	Dupont PA Luz. Co.	570.655-6977 570-212-0358.	
Bill Williams	City of Pittston EMA	570 655 6663 570 655 9354	BUDDHARENE@MSN.COM
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LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

HAZARD MITIGATION PLAN
MUNICIPAL WORKSHOP

May 28, 2008

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ART PENCEK	MOSCOW BORO	842-2627	
MIKE SAVITSKY	GLENBURN TWP	586-6147	MSAVITSKY@MARGOLISEDELSTEIN.COM

LACKAWANNA & LUZERNE COUNTIES

Comprehensive Plan, Long Range Transportation Plan and Hazard Mitigation Plan

Hazard Mitigation Plan Municipal Workshop

May 28, 2008

In association with:

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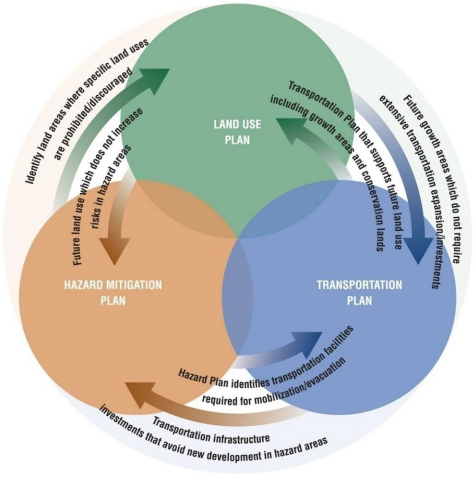
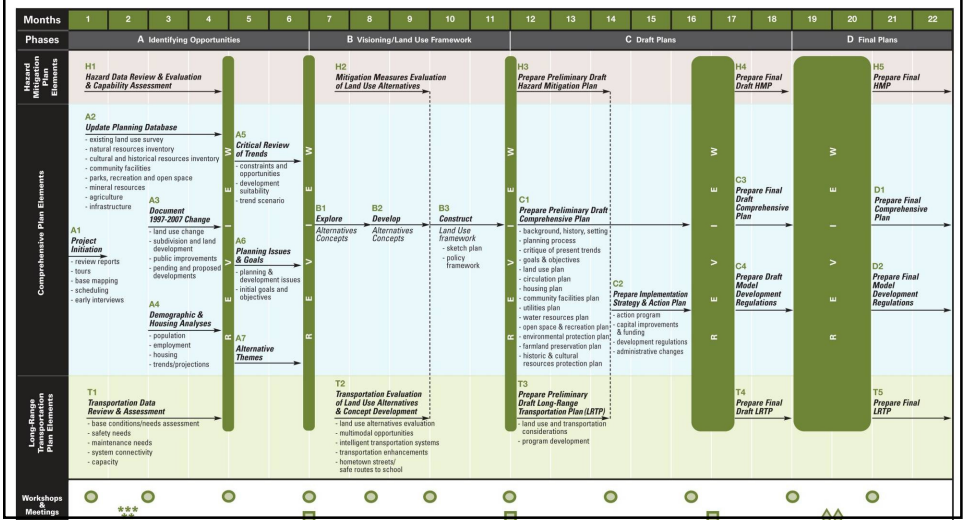
THREE PLANS – ONE EFFORT

- **Comprehensive Plan: Framework for Growth and Preservation (Land and Communities)**
- **Long Range Transportation Plan: Network to serve current and future population and economy**
- **Hazard Mitigation Plan: Considering potential hazards as we plan for the future**



LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

WORK PROGRAM SCHEDULE



LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

DISASTER MITIGATION ACT OF 2000

Established in 2000, requires communities and states to develop and adopt hazard mitigation plans by November 2004 to be eligible for future mitigation funding

- **Every jurisdiction must participate in the process**
- **Every jurisdiction must formally adopt the plan within 1 year of approval**
- **Open public involvement is required**
- **Planning process must be documented**

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PARTICIPATION OF JURISDICTIONS

"EACH jurisdiction MUST participate on their own, to the planning process, or they cannot adopt the plan and will not get funding."

- Letter of Participation
- 1st Workshop (6 Mar 08) – Overview of planning process and invitation to attend 2nd workshop
- 2nd Workshop (May 08) – Identification of hazards, problem areas, critical facilities, goals, and mitigation actions
- Follow up via email and phone calls
- Questionnaires

Municipality	Letter of Intent to Participate	Attendance at 1st workshop (3/08)	Attendance at 2nd workshop (4/08)	Provide information	Provide Mitigation Projects	Review Plan
Abington Twp						
Archbald Bor						
Benton Twp						
Blakely Bor						
Carbondale Twp						
City of Carbondale						
City of Scranton						
Clarks Green Bor						
Clarks Summit Bor						
Clifton Twp						
Covington Twp						
Dalton Bor						
Dickson City Bor						
Dunmore Bor						
Elmhurst Twp						
Fell Twp						
Glenburn Twp						
Greenfield Twp						
Jefferson Twp						
Jermyn Bor						
Jessup Bor						
LaPlume Twp						
Madison Twp						
Mayfield Bor						
Moosic Bor						
Moscow Bor						
Newton Twp						
Old Forge Bor						
Olyphant Bor						
Ransom Twp						
Roaring Brook Twp						
Scott Twp						
South Abington Twp						
Spring Brook Twp						
Taylor Bor						
Thornhurst Twp						
Throop Bor						
Vandling Bor						
West Abington Twp						

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LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

ORGANIZING RESOURCES

Step 1: Assess Community Support

- Coordinate with State Agencies
- Educate Elected and Appointed Officials
- Determine Stakeholders
- Conduct Public Meetings

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ORGANIZING RESOURCES

Step 2: Establish the Planning Team

Steering Committee:
Lackawanna and Luzerne Counties

- Planning
- Public Works
- Emergency Management
- Lackawanna River Watershed Committee
- Luzerne County Flood Protection Authority
- Municipal Representatives

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

ORGANIZING RESOURCES

Step 3: Engage the Public

- Two Municipal Workshops
- Two Public Meetings
- County Commission Meetings
- County Internet Websites
- Newspaper Advertisements

ASSESSING RISKS

Step 1: Identify Hazards

- Types of Hazards
- History
- Research
  - Historical documents / newspapers
  - Plans and reports
  - Experts
  - Internet websites

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

ASSESSING RISKS

Step 2: Profile Hazard Events

- Frequency of Hazard Events
- Severity
- Unique Characteristics

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ASSESSING RISKS

Step 3: Assess Vulnerability

- Identify locations where residents could suffer greatest injury or property damage
- Estimate exposure of people, buildings, infrastructure to hazardous conditions
- Determine vulnerability
  - Number of buildings
  - Number of people

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

ASSESSING RISKS

Step 4: Estimate Losses

- Number of structures
- Site specific characteristics
  - First-floor elevations
  - Number of stories
  - Construction type
  - Foundation type
  - Age and condition of the structure
  - Use of structure
  - Content within structure

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HAZARD IDENTIFICATION

Natural Hazards
- Flooding
- Severe Storms
- Winter Storms
- High Wind
  - Hurricanes
  - Tornadoes
- Geologic Hazards
  - Subsidence
  - Landslides
- Wildfires
- Drought

Manmade Hazards
- Nuclear Failure
- Dam Breach
- Hazardous Material Release

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WHAT IS A RISK ASSESSMENT?

- Identify hazards affecting the study area
- Profiling each hazard
  - Extent
  - Frequency
  - Damages
- Identify vulnerable areas and structures
  - Vulnerability Assessment

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VULNERABILITY ASSESSMENT

- Determine location specific vulnerable areas based on:
  - High hazard potential
    - – Floodplains
    - – Geologic subsidence areas
    - – Inundation areas
    - – Nuclear fallout zone
  - Inadequate construction
    - – Structures built prior to UCC methods
- Determine exposure / Estimate losses
  - Economic loss
  - Loss of life

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

RISK ASSESSMENT – KEY COMPONENTS

- Location Specific Hazards
  - Are some municipalities more vulnerable than others?
- Repetitive Loss Structures
  - Where? How many incidents?
  - Severe Repetitive Loss Structures
- Critical Facilities

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CRITICAL FACILITIES

- Facilities that are key in providing a basic service to promote the well being of the community
  - Hospitals / Care Facilities
  - Schools
  - Police Stations
  - Fire Stations
  - Water Treatment Plants
  - Wastewater Treatment Plants
- Also includes basic utilities
  - Natural Gas Facilities
  - Electric Utilities
  - Nuclear Power Generation Plants
  - Communications Facilities
- Hazardous Materials Plants

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

NATURAL HAZARD RANKING

LACKAWANNA COUNTY

Hazard	Total Damage 1958-2007 (Million $)	Most Affected Municipalities	Frequency
Flooding	$111.73	Scranton Old Forge Thornhurst Carbondale Moscow Clarks Summit	Medium-High
Drought	$30.44	Countywide	Low
High Wind	$3.44	Scranton Clarks Summit Dalton Carbondale Old Forge Moosic	High
Winter Storms	$1.84	Countywide	High
Tornadoes	$0.50	Old Forge Elmhurst Laplume	Low
Severe Storms	$0.35	Countywide	High

From Statewide Multi-Hazard Assessment 2000:

1. Winter Storms
2. Flooding
3. Drought

NATURAL HAZARD RANKING

LUZERNE COUNTY

Hazard	Total Damage 1958-2007 (Million $)	Most Affected Municipalities	Frequency
Flooding	$256 .04	Wilkes-Barre Fairmount Nescopeck Hanover Bear Creek Plains	Medium-High
Drought	$30.43	Countywide	Low
Winter Storms	$5.21	Countywide	High
High Wind	$4.59	Wilkes-Barre Dallas Lehman Conyngham Hazle Kingston Plymouth Huntington	High
Severe Storms	$2.67	Countywide	High
Tornadoes	$1.68	Dallas Pittston Bear Creek Hollenback	Low

From Luzerne County EOP 2004:

1. Flooding
2. Winter Storms
3. Drought

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

MITIGATION CAPABILITY ASSESSMENT

Evaluation of the jurisdiction with respect to:

- Governmental structure
- Policies and programs
- Regulations and ordinances
- Resource availability
- Capacity to carry out actions

MITIGATION CAPABILITY ASSESSMENT

Categories:

1. Preventive Activities
2. Property Protection
3. Natural and Beneficial Functions
4. Emergency Services
5. Structural
6. Public Information

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

DEVELOP A MITIGATION PLAN

Step 1: Goals and Objectives

DEVELOPING THE PLAN

Step 2: Identify and Prioritize Mitigation Measures

- Identify Mitigation Measures
- Evaluate Mitigation Measures
- Rank Mitigation Measures

LACKAWANNA & LUZERNE COUNTIES – Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

DEVELOPING THE PLAN

Step 3: Prepare an Implementation Strategy

- Identify who will implement mitigation measures
- Identify how mitigation measures will be funded
- Identify timeline for completion
- Write up implementation strategy

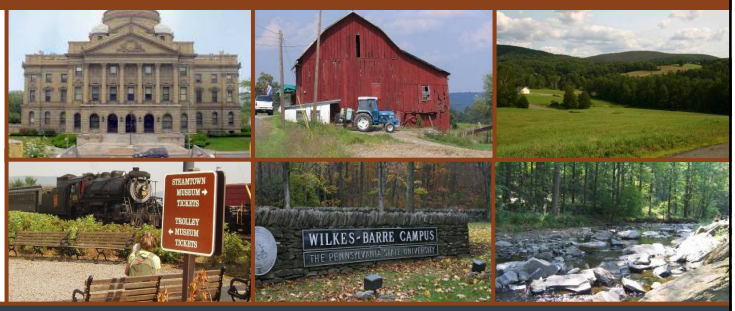
IMPLEMENT THE PLAN & MONITOR PROGRESS

LACKAWANNA-LUZERNE
COME, SHAPE THE FUTURE

LACKAWANNA & LUZERNE COUNTIES

Comprehensive Plan, Long Range Transportation Plan and Hazard Mitigation Plan

THANK YOU



In association with:

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PUBLIC MEETINGS: OCTOBER 14, 15, AND 16, 2008

Lackawanna & Luzerne Counties

Comprehensive Plan, Long Range Transportation Plan and Hazard Mitigation Plan

Public Meetings Scheduled

Planning officials will hold a series of **Public Information Meetings** about the Lackawanna & Luzerne Counties *Comprehensive Plan*, *Long Range Transportation Plan* and *Hazard Mitigation Plan*. The meetings will be held at the following locations:

Tuesday, October 14: **Luzerne County Community College**
Education Conference Center – Room 132
1333 South Prospect Street
Nanticoke, PA 18634

Wednesday, October 15: **Hazleton Area High School**
1601 West 23rd Street
Hazleton, PA 18202

Thursday, October 16: **Lackawanna County EMA**
30 Valley View Business Park
Jessup, PA 18434

Times: **6 p.m.** – Open House Mapping Displays
7 p.m. – Presentation
8 p.m. – Questions and Discussion

Comprehensive Plan - The Comprehensive Plan will serve as an overall planning guide for the counties and their municipalities. It will establish a framework for future growth, conservation and preservation that strengthens our existing communities and responsibly stewards our natural, agricultural and cultural resources.

Long Range Transportation Plan – The purpose of this plan is to develop, maintain, and manage an adequate, safe, accessible, and environmentally-sound transportation system. This transportation system will support our communities and provide for the reasonably efficient movement of people and goods within and through the counties.

Hazard Mitigation Plan – This plan will evaluate the potential for natural or technological hazards and determine an approach to manage those hazards.

For more information, please visit our website at:
www.lackawanna-luzerneplans.com.

Lackawanna and Luzerne Counties are committed to compliance with the nondiscrimination requirements of applicable civil rights statutes, executive orders, regulations, and policies. The meeting locations are accessible to persons with disabilities. With advance notification, accommodations may be provided for those with special needs related to language, sight, or hearing. If you have a request for a special need, wish to file a complaint, or desire additional information, please contact planning team representative John Mullen at McCormick Taylor, Inc., 2001 Market Street, 10th Floor, Philadelphia, PA 19103, or call (215) 592-4200.

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

October 14, 2008

Luzerne County Community College, Nanticoke, PA

NAME	ORGANIZATION	PHONE	E-MAIL
DR. BART BURNE	Luzerne County C&H=66	570-740-0328	bburne@luzerne.edu
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Ellen Ferretti	PEC	570-709-3143	eferretti@pecpa.org
Cindy Campbell	DCED	570-963-4574	CCAMPBELL@STATE.PA.US
Michele Schasberger	Wellness Trails Partnership	570-823-7000	michele@mths.org
Julie McMonagle	PEC	570-718-6507	JMCMONAGLE@PECPA.ORG

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

Luzerne County Community College, Nanticoke, PA

October 14, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
Tom Yonski	Sen. Lisa Baker	570 675-3931	TYonski@pasen.gov
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Kerry Dussinger	PennDOT	570. 963. 4044	KDUSSINGER@state.pa.us
Steve Fisher	PennDOT	570. 963. 4171	stfisher@state.pa.us
Nicholas Lylo	DCNR FORESTRY	570 963-4561	nlylo@state.pa.us

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

October 14, 2008

Luzerne County Community College, Nanticoke, PA

NAME	ORGANIZATION	PHONE	E-MAIL
Mike Burnside	Cultural Council of Luzerne City	408-4439	cclcarts@gmail.com
George Roberts	PADOT	570-963-4010	georobert@state.pa.us
Michael Hewitt	Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR)	570-674-3414	hardcoal@epcamr.org

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

October 15, 2008

Hazleton Area High School, Hazleton, PA

NAME	ORGANIZATION	PHONE	E-MAIL
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Pete Hawtness	EMARR INC	401-3514	emarrmc@yahoo.com
Marguerite Woelfel		956-5145	mwoel777@aol.com
Mia Light	Standard-Speaker News	501-3591	mlight@standardspeaker.com
Anthony Roslevich		454-9997	ajroslevich@verizon.net
DAVE MADL	DCNR-STATE PARKS	443-0400	dmadl@state.pa.us
Mary Malone	HLH	501-4915	mmalone@ghha.org
Bob Skulsky	Civic Partnership - D&L NHC	455-1509	civic@hazletonchamber.org

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

October 15, 2008

Hazleton Area High School, Hazleton, PA

NAME	ORGANIZATION	PHONE	E-MAIL
Fred Kudlick			
[illegible]	WYLN		
Donna Palermo	Greater Hazleton Chamber of Commerce	455-1509	dpalermo@hazletonchamber.org
Mike Kurs	PADEP BAMR	826-2371	
Steve Valvano	Barton-Lawson	821-1994	svalvano@barton-lawson.com
Dale Freudenberger	D+L NHC.	610-377-4063	dale@delawareandlehigh.org
Steve Fisher	PennDOT 4-0	570-963-4171	Stfisher@state.pa.us
Drew Magill	Friends of Nescopeck	570-788-2624	hurley123epix.net

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

Lackawanna County EMA, Jessup, PA

October 16, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
Don Stabeck	Moses Taylor/Hospice	570 340 3212	dstrubeck@ptd.net
Pat Conaboy	SAPA	(570) 586-5491	
Mark Reese	Schiffs	348-2980	schiffs@Aol.com
Ed Carlin	United Neighborhood CDC	346-0759	ecarlin@unenepa.org
Wendy Yaxtelis	Marywood University	348-6201	Yaxtelis@Marywood.edu
Barbara Scanlon	La Plume Twp.	570 945-3777	BarbaraDScanlon@aol.com
Renee Zehel	Marywood University	570 9614715	rzehel@marywood.edu
Kevin Howard	Lackawanna County EMA	570-307-7300	howardK@lackawanna county.org
Linda Melvin	Sierra Club	578 586 2617	

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

Lackawanna County EMA, Jessup, PA

October 16, 2008

NAME	ORGANIZATION	PHONE	E-MAIL
Patricia Janeski	SP Library	348-3000	pjaneski@albright.org
Lenard Janeski	"	346-0401	ltjaneski@aim.com
Eugene Vaczek	Jessup Planning Co	489-0411	
Jon Tabacchetti	Summit By The Lake Apts.	963-0724	
Paul Mahon	LaPlume Twp	575-3242	P.Mahon@EPIX.NET
George Roberts	PADOT	963-4010	georrobert@state.pa.us.
John Gigliotti	Planning Comm Lack	282-1102	Johng@echoes.net
Karl Pfeiffenberger	Scr Chamber of Commerce	342-7711	kpfeiffn@scrantonchamber.com

LACKAWANNA-LUZERNE JOINT COUNTY PLANS

COMPREHENSIVE PLAN, LONG-RANGE TRANSPORTATION PLAN AND HAZARD MITIGATION PLAN

PUBLIC MEETING

October 16, 2008

Lackawanna County EMA, Jessup, PA

NAME	ORGANIZATION	PHONE	E-MAIL
Cindy Campbell	DCED	963-4574	CCAMPBELL@STATE.PA.US
Brian M. Derenick	Borton Lawson	570-821-1994 x343	BDERENICK@BORTON-LAWSON.COM
Stephanie Milewski	LHVA	570 963 6730 x 8203	smilewski@LHVA.org
John Pocius	CECO Assoc Inc	570 342-3101	jpocius@cecoassociates.com
Sherry Tracewski	Joint Urban Studies Cent	570-408-9850	tracewski@urbanstudies.org
John Cosgrove	Condron & Co	570-344-6888	JCOSGROVE@CONDRONANDCOMPANY.COM

Lackawanna & Luzerne Counties

Comprehensive Plan, Long Range Transportation Plan and Hazard Mitigation Plan

Public Meeting

October 2008

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LACKAWANNA & LUZERNE COUNTIES

Joint Comprehensive Planning Will:

- Serve as an overall planning guide for the counties and their municipalities.
- Establish a framework for future growth, conservation, and preservation.
- Strengthen existing communities and responsibly steward natural, agricultural, and cultural resources.

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Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

LACKAWANNA & LUZERNE COUNTIES

Comprehensive Plan

What is it?

Framework for Growth and Preservation

- Establish a vision for the future of the two-county region, which is supported by goals and policies.
- Serves as a general policy guide for future growth, economic development, land use, conservation and community character.

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Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

LACKAWANNA & LUZERNE COUNTIES

Long-Range Transportation Plan

What is it?

Network to serve current and future population and economy

- Develop, maintain, and manage an adequate, safe, accessible, and environmentally-sound transportation system.
- Support our communities and provide for the reasonably efficient movement of people and goods through Lackawanna and Luzerne Counties.

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LACKAWANNA & LUZERNE COUNTIES

Hazard Mitigation Plan

What is it?

Considering potential hazards as we plan for the future

- Evaluate the potential for natural or technological hazards that could affect Lackawanna and Luzerne Counties.
- Determine an approach to manage those hazards.

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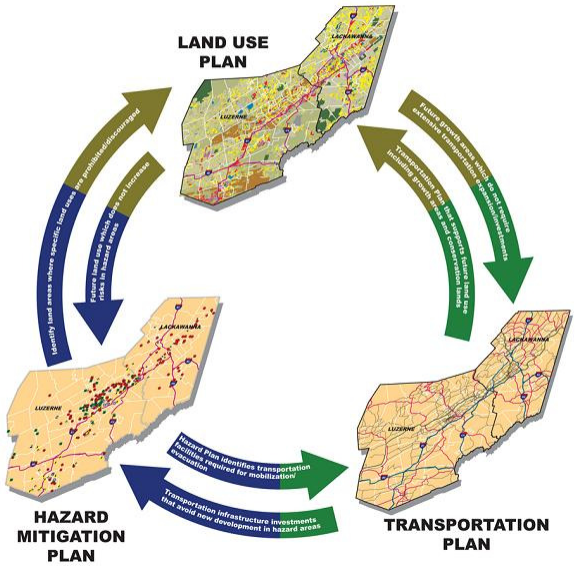
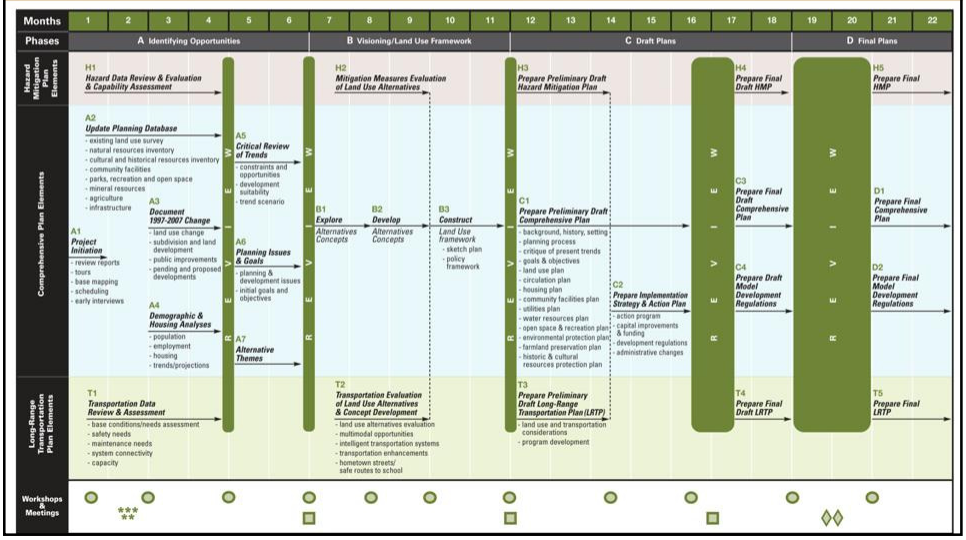
Comprehensive Plan, Long Range Transportation Plan & Hazard Mitigation Plan

LACKAWANNA & LUZERNE COUNTIES



LACKAWANNA & LUZERNE COUNTIES

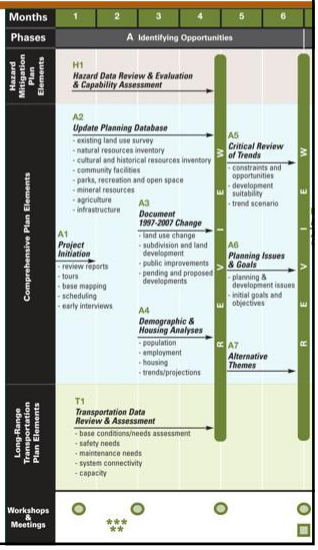
WORK PROGRAM SCHEDULE



LACKAWANNA & LUZERNE COUNTIES

PHASE A: IDENTIFYING OPPORTUNITIES

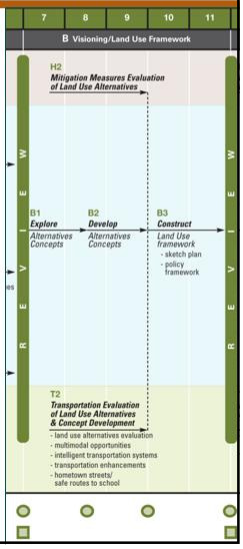
- Project Initiation
- Update Planning Database
- Document 1997-2007 Change
- Demographic and Housing Analysis
- Transportation Data Review & Assessment
- Hazard Data Review & Evaluation & Capability Assessment
- Critical Review of Trends
- Planning Issues and Initial Goals
- Alternative Development Themes



LACKAWANNA & LUZERNE COUNTIES

PHASE B: VISIONING

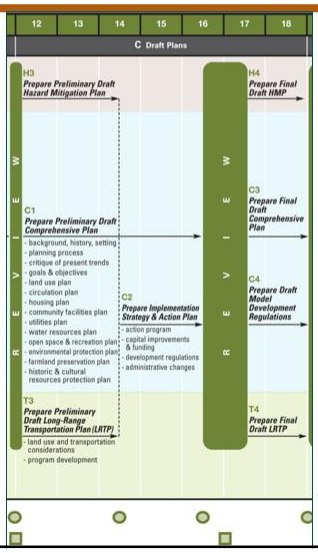
- Explore Initial Alternative Development Themes
- Explore Advanced Alternative Concepts
- Transportation Evaluation of Land Use Alternatives & Concept Development
- Mitigation Measures Evaluation of Land Use Alternatives
- Construct Basic Policy and Growth Management Framework



LACKAWANNA & LUZERNE COUNTIES

PHASE C: DRAFT PLANS

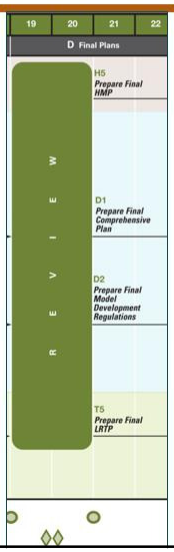
- Preliminary Draft Plans
- Action Plan and Implementation Strategy
- Final Draft Plans



LACKAWANNA & LUZERNE COUNTIES

PHASES D: FINAL PLAN

- Final Plans



LACKAWANNA & LUZERNE COUNTIES

PHASE A1: Project Initiation

A1
Project Initiation

- review reports
- tours
- base mapping
- scheduling
- early interviews

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LACKAWANNA & LUZERNE COUNTIES

PHASE A1: Project Initiation

Kick-off Meeting

- The project team and steering committee held their first meeting on Thursday, November 1, 2007.

LACKAWANNA & LUZERNE COUNTIES

Focus Group Meetings, January 15 and 16, 2008

Day 1 – Masonic Temple/Scranton Cultural Center

9:00am – 11:00am Transportation

11:30am – 1:30pm Land Development & Housing

2:00pm – 4:00pm Economic Revitalization

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PHASE A1: Project Initiation

Focus Group Meetings, January 15-16 2008

Day 2 – EMA Building, Wilkes-Barre

9:00am – 11:00am Utilities

11:30am – 1:30pm Historic Preservation

2:00pm – 4:00pm Natural Resources & Open Space Conservation

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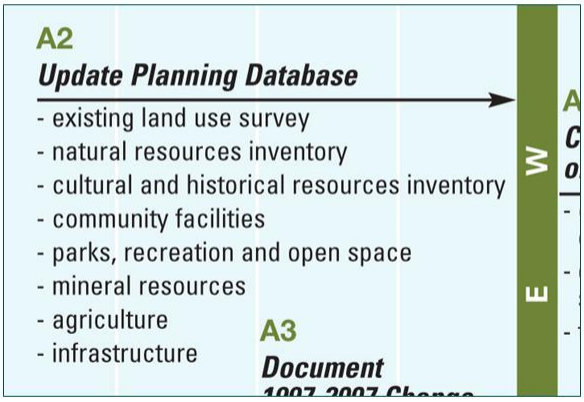
PHASE A2: Update Planning Database



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LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Location Map

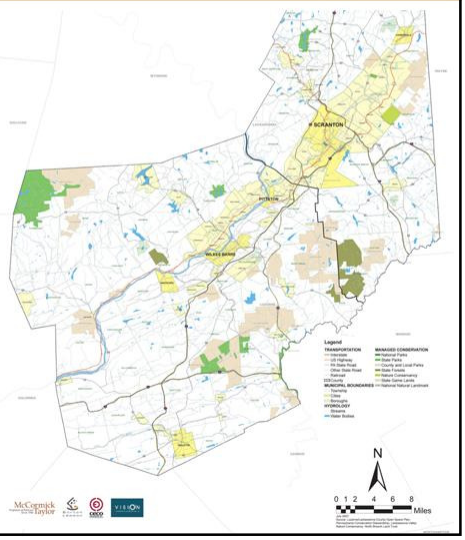
Legend

TRANSPORTATION
- Interstate
- US Highway
- PA State Road
- Other State Road
- Railroad
- County

MUNICIPAL BOUNDARIES
- Township
- Cities
- Boroughs

HYDROLOGY
- Streams
- Water Bodies

MANAGED CONSERVATION
- National Parks
- State Parks
- County and Local Parks
- State Forests
- Nature Conservancy
- State Game Lands
- National Natural Landmark



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Existing Land Use

- The majority of the two counties are non-urbanized, consisting of farmland, woodlands, wetlands, water bodies, and mining areas.
- Urban land uses (residential, commercial, and industrial) are focused along the Susquehanna and Lackawanna Rivers, with City of Hazleton in the southern portion of Luzerne County as exception.
- There has been a trend toward suburban residential development away from urban areas.

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LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Existing Land Use

	Acreage	Percent
Residential	136,473.45	24.14%
Commercial	24,867.57	4.40%
Institutional	14,560.45	2.58%
Industrial	12,687.26	2.24%
Transportation, Utilities, and Landfill	5,905.12	1.04%
Quarry/Mining	47,903.14	8.47%
Agriculture and Vacant Land	283,929.65	50.22%
Recreational and Open Space	39,037.48	6.90%
TOTAL	565,364.12	100.00%

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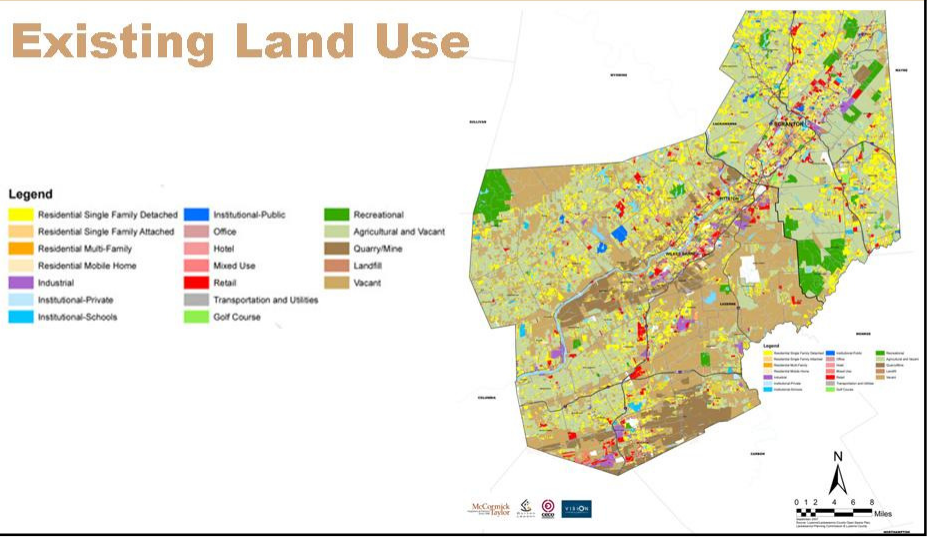
LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Existing Land Use



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Land Preservation

- Approximately 2,007 acres of conservation easements of private land currently exist.
- The two-county area also includes the following:
  - Lackawanna State Forest (southern Lackawanna County).
  - Six (6) State Parks.
  - Seven (7) County Parks, four (4) in Lackawanna County and three (3) in Luzerne County.
  - Fifteen (15) State Game Lands throughout the two-county area.

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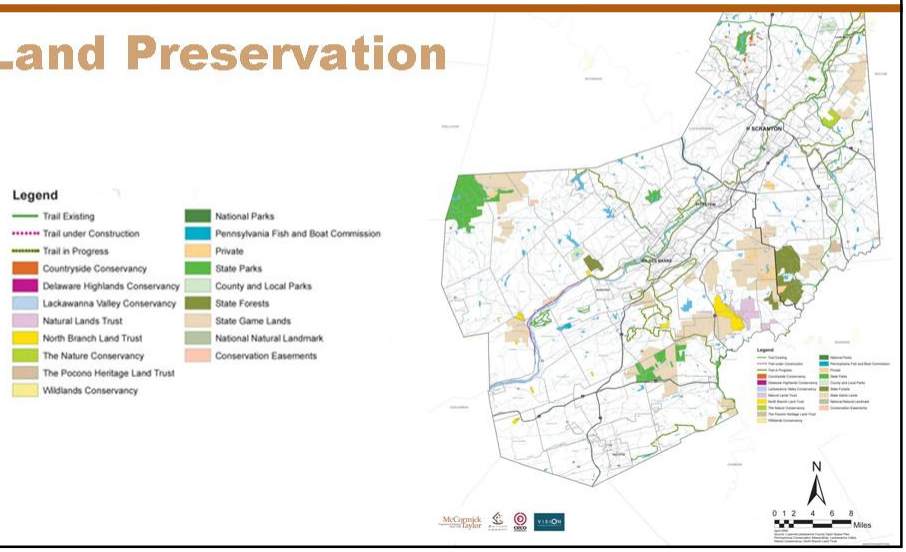
LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Land Preservation



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Geology

- The two-county region is located primarily within two physiographic provinces: the Appalachian Plateau Province and the Ridge and Valley Province.
- The Anthracite Valley, extending through the middle of both counties, including the Lackawanna and Wyoming Valleys and their respective mountains, is considered a section of the Ridge and Valley Province.
- Catskill Formation is the predominant bedrock throughout the northern third and in some areas central region of the two counties.
- Susquehanna and Lackawanna River Valleys run along the Llewellyn Formation.

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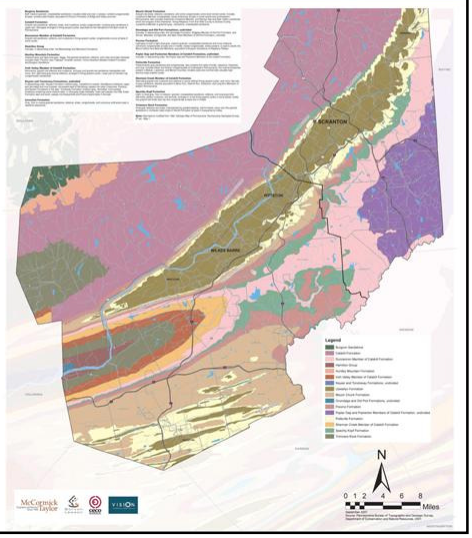
LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Geology



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Hydrology

- 2 major drainage basins incorporate the two-county area:
  - Delaware
  - Susquehanna
- Susquehanna and Lackawanna Rivers are two major bodies of water.
- Watersheds generally north of Nescopeck, Penobscot, Wilkes-Barre and Moosic Mountains through both counties drain into both Susquehanna and Lackawanna Rivers.
- The watershed to the southeast of these ranges drain into the Lehigh River.

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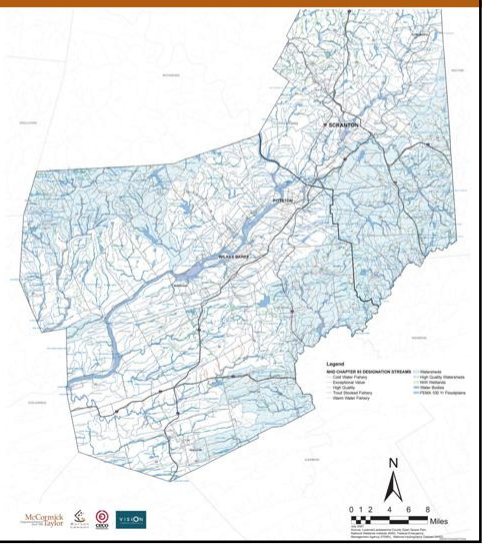
LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Hydrology



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Forested Areas

Lackawanna

Total Forested: 210,285 Acres
- Deciduous: 172,926 Acres
- Evergreen: 13,209 Acres
- Mixed: 24,150 Acres

Luzerne

Total Forested: 423,890 Acres
- Deciduous: 344,407 Acres
- Evergreen: 35,698 Acres
- Mixed: 43,784 Acres

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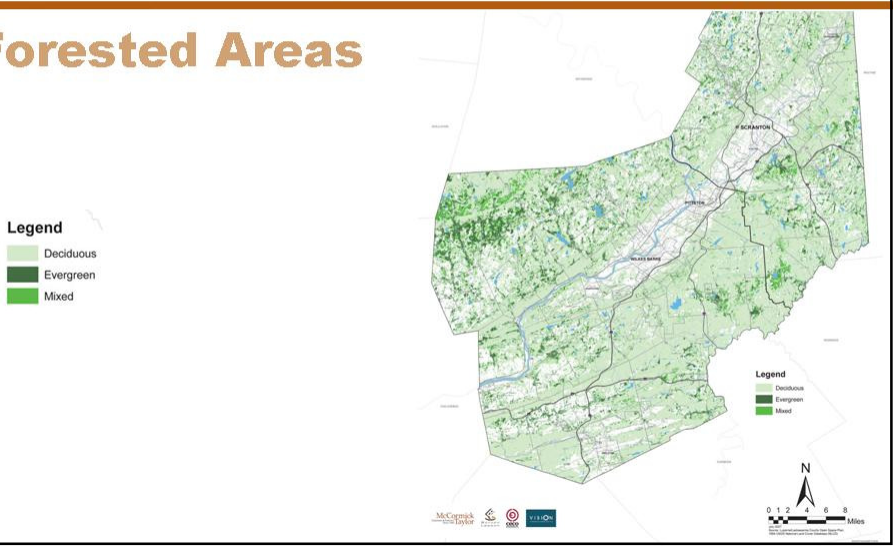
LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Forested Areas



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Agricultural Soils

- Approximately 32% of two-county lands are used for agriculture— roughly a little over 140,000 acres in each county.
- The highest concentration of agriculture in Lackawanna County is located to the immediate north and east of the Lackawanna River, surrounding the Bald and Bell Mountains.
- The highest concentration of agriculture in Luzerne County is identified along its western third abutting the Columbia County line.

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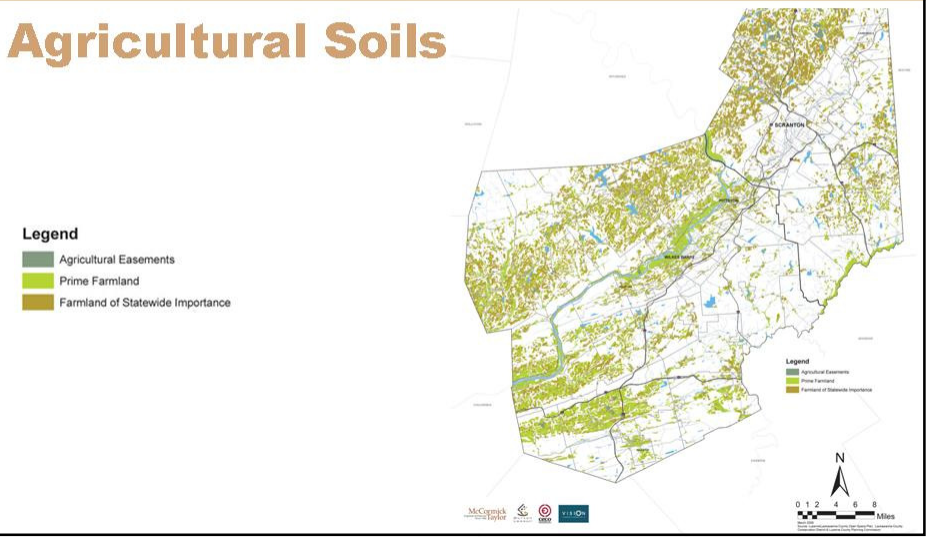
LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Agricultural Soils



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Historic Features

- Historic features include:
  - National Historic Landmarks
  - National Register Listed
  - National Register Eligibility
  - National Register Ineligibility
  - Bridges
  - Sites without stand-alone structures

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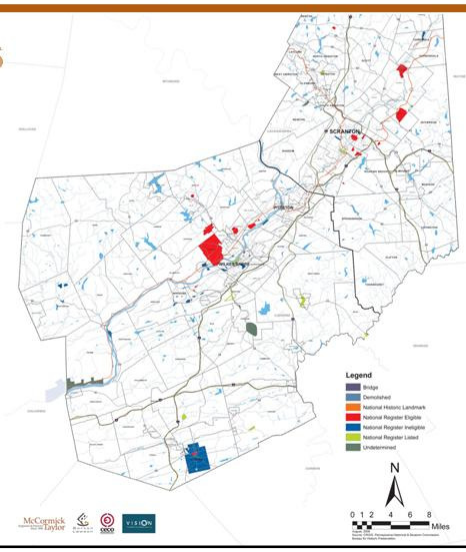
LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Historic Features

Legend
- Bridge
- Demolished
- National Historic Landmark
- National Register Eligible
- National Register Ineligible
- National Register Listed
- Undetermined



LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Community Features

- Includes educational sites, emergency medical service facilities, county prisons, fire and police stations.
- Lackawanna County includes 12 public school districts, 2 community and technical, 4 private, and 2 public colleges.
- Luzerne County includes 13 public school districts, 1 community and technical school, 3 public and 3 private colleges.

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LACKAWANNA & LUZERNE COUNTIES

PHASE A2: Update Planning Database

Community Features

Legend

- Municipal Building
- Library
- Post Office
- County Prison
- EMS
- Fire
- Police
- Medical Facility
- School
- Airport
- Bus Station

TRANSPORTATION

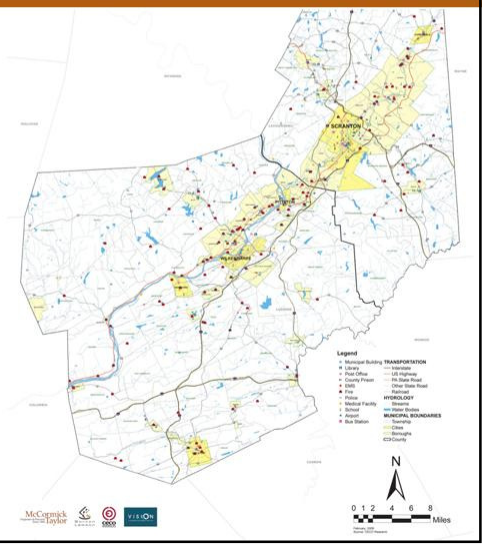
- Interstate
- US Highway
- PA State Road
- Other State Road
- Railroad

HYDROLOGY

- Streams
- Water Bodies

MUNICIPAL BOUNDARIES

- Township
- Cities
- Boroughs
- County



LACKAWANNA & LUZERNE COUNTIES

PHASE A3: DOCUMENT 1997-2007 CHANGE

A3

Document 1997-2007 Change

- land use change
- subdivision and land development
- public improvements
- pending and proposed developments

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LACKAWANNA & LUZERNE COUNTIES

PHASE A3: DOCUMENT 1997-2007 CHANGE

Recent Development, c. 1995-2008

- Approximately 14,000 housing units on 17,000 acres were developed between the mid-1990s and the present, for an average density of 1.2 acres per unit.
- Approximately 1,300 acres of the two counties have been developed for commercial and mixed uses.
- Recent industrial uses have reached an approximate total of 4,400 acres in the two-county area.

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LACKAWANNA & LUZERNE COUNTIES

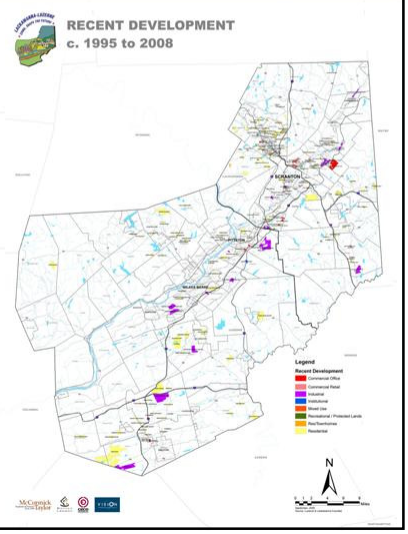
PHASE A3: DOCUMENT 1997-2007 CHANGE

Recent Development, c. 1995-2008

Legend

Recent Development

- Commercial Office
- Commercial Retail
- Industrial
- Institutional
- Mixed Use
- Recreational / Protected Lands
- Res/Townhomes
- Residential



LACKAWANNA & LUZERNE COUNTIES

PHASE A3: DOCUMENT 1997-2007 CHANGE

Recent Public Improvements, c. 1995-2008

- Roadway improvements
- Institutions
- Bridge rehabilitations
- New parkland and open space reservations
- Levees

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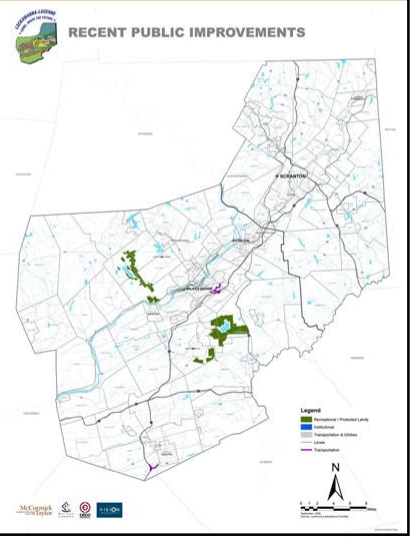
LACKAWANNA & LUZERNE COUNTIES

PHASE A3: DOCUMENT 1997-2007 CHANGE

Recent Public Improvements

Legend

- Recreational / Protected Lands
- Institutional
- Transportation & Utilities
- Levee
- Transportation



LACKAWANNA & LUZERNE COUNTIES

PHASE A3: DOCUMENT 1997-2007 CHANGE

Pending & Proposed Development

- 32 Proposed sites in Luzerne County which total 3,600 acres.
  - 21 residential
  - -3 commercial
  - 8 Industrial
- Total of 672 acres proposed in the 11-municipality Scranton-Abingtons Planning Association area.

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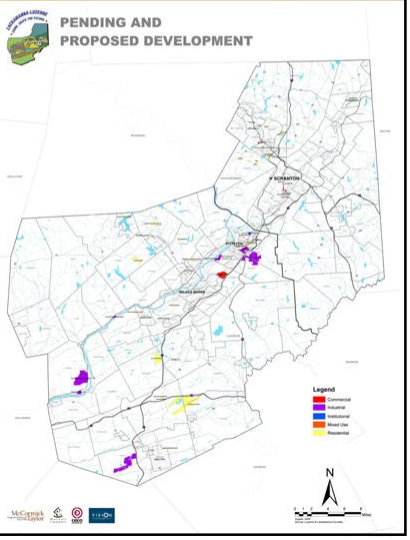
LACKAWANNA & LUZERNE COUNTIES

PHASE A3: DOCUMENT 1997-2007 CHANGE

Pending & Proposed Development

Legend

- Commercial
- Industrial
- Institutional
- Mixed Use
- Residential



LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

A4

Demographic & Housing Analyses

- population
- employment
- housing
- trends/projections

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LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Population Totals

- Lackawanna County total population was 213,295 in 2000.
- Luzerne County total population was 319,224 in 2000.
- Two-county area total for 2000 was 532,519.
- Of the 41 municipalities in Lackawanna County, the City of Scranton was the most populous in 2000 with 76,415 residents followed by the Borough of Dunmore with 14,018 residents. Other boroughs and townships had populations less than 10,000 residents.
- Of the 76 municipalities in Luzerne County, Wilkes-Barre was the most populous in 2000 with 43,123 residents followed by the City of Hazleton with 23,264 residents. Other boroughs and townships have populations less than 14,000 residents.

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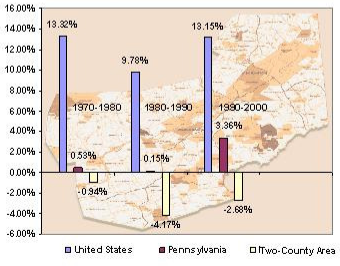
LACKAWANNA & LUZERNE COUNTIES

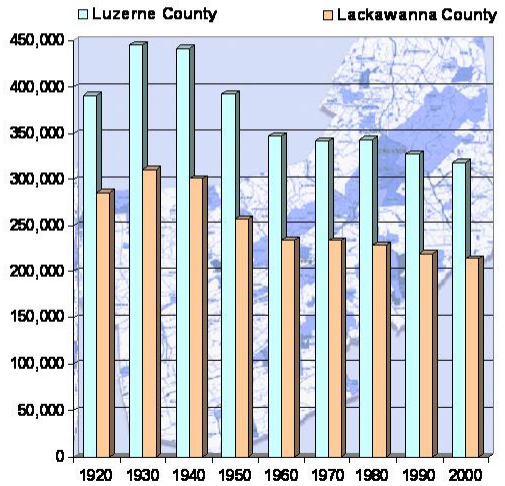
PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Population Trends, 1920-2000

Population Percentage Change, United States, Pennsylvania, and Two-County by Decade, 1970-2000



Source: U.S. Census Bureau (1990 & 2000 Decennial Census)



Source: U.S. Census Bureau (1990 & 2000 Decennial Census)

LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Population Change

- Between 1960 and 2000, the two-county area's population declined by 8.42%.
- Lackawanna County population decline is slowing as it was 3.89% between 1980 and 1990, and 2.62% between 1990 and 2000.
- Luzerne County population decline is slowing as it was 4.35% between 1980 and 1990, and 2.71% between 1990 and 2000.
- For the two-county area as a whole, a shift from -4.17% (1980 to 1990), to -2.68% (1990 to 2000) has occurred.

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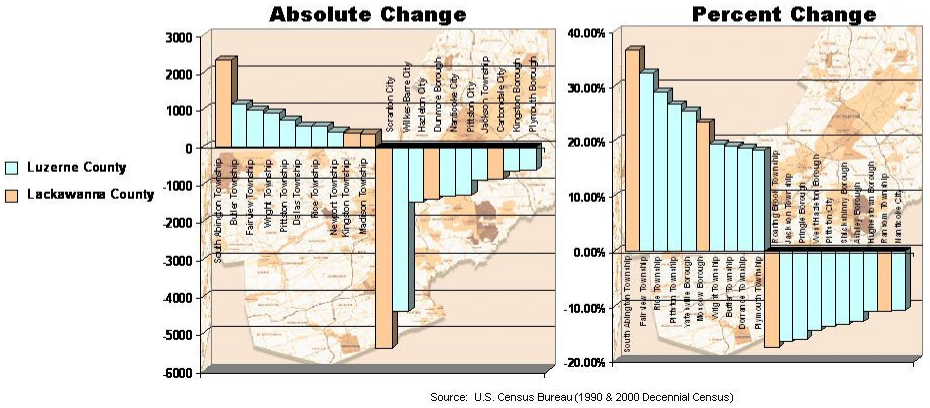
PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Ten Fastest Growing and Declining Municipalities, two-county area, 1990-2000



Source: U.S. Census Bureau (1990 & 2000 Decennial Census)

LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Population Density

- In Lackawanna County, Clarks Summit Borough had the highest density in 2000 with 3,331 persons per square mile, and West Abington Township the lowest at 54 persons per square mile.
- In Luzerne County, the City of Wilkes-Barre was Luzerne County's densest municipality with approximately 14,962 persons per square mile in 2000 and Buck Township with 24 persons per square mile was the least dense.

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LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Two-County Area Population by Age Group, Median Age 1980-2000

- The median age in Lackawanna County from the 2000 census is 40.3 and in Luzerne County 40.8.
- In the 2000 census, infants to age 4 bracket held the highest percent of the population in the two-county area with just over 25% of the population.
- Between 1980 and 2000 ages 25 to 44 in Lackawanna County (26.45%) was not only the largest age group but experienced the largest increase (4.0%). In Luzerne County, ages infants to 4 was the largest age group (34.26%) and also largest increase (28.69%).
- Age group 5-24 experienced the largest decrease in both counties between 1980 and 2000 at -4% in Lackawanna County and -12.93% in Luzerne County.

Luzerne County

	1980		1990		2000	
Age Groups	Number	Percent	Number	Percent	Number	Percent
0-4	19,066	5.56%	19,201	6.00%	158,111	34.26%
5-24	101,592	29.64%	92,567	25.82%	77,160	16.72%
25-44	81,972	23.92%	92,461	28.91%	86,903	18.83%
45-54	39,266	11.46%	33,468	10.46%	44,755	9.70%
55-64	44,704	13.04%	35,745	11.18%	31,890	6.91%
65-74	36,434	10.63%	36,677	11.47%	30,166	6.54%
75+	19,685	5.74%	19,685	6.16%	32,574	7.06%
TOTALS	342,719	100.00%	319,794	100.00%	461,550	100.00%
Median Age	35.9		38.2		40.8	

Lackawanna County

	1980		1990		2000	
Age Groups	Number	Percent	Number	Percent	Number	Percent
0-4	13,209	5.67%	13,229	6.04%	11,213	5.26%
5-24	69,380	29.77%	57,069	26.05%	54,111	25.37%
25-44	53,300	22.87%	60,751	27.74%	56,411	26.45%
45-54	25,308	10.86%	21,700	9.91%	29,424	13.79%
55-64	29,476	12.65%	23,097	10.54%	20,594	9.66%
65-74	23,642	10.14%	24,430	11.15%	19,747	9.26%
75+	18,763	8.05%	18,763	8.57%	21,795	10.22%
TOTALS	233,078	100.00%	219,039	100.00%	213,295	100.0%
Median Age	35.2		37.7		40.3	

Bi-County Area

	1980		1990		2000	
Age Groups	Number	Percent	Number	Percent	Number	Percent
0-4	32,275	11.23%	32,430	6.0%	169,324	25.1%
5-24	170,972	59.41%	139,636	25.9%	131,261	19.5%
25-44	135,272	46.79%	153,212	28.4%	143,314	21.2%
45-54	64,574	22.32%	55,168	10.2%	74,180	11.0%
55-64	74,180	25.69%	58,842	10.9%	52,484	7.8%
65-74	60,076	20.77%	61,107	11.3%	49,913	7.4%
75+	38,448	13.79%	38,448	7.1%	54,369	8.1%
TOTALS	575,797	100.00%	538,833	100.0%	674,845	100.0%
Median Age						

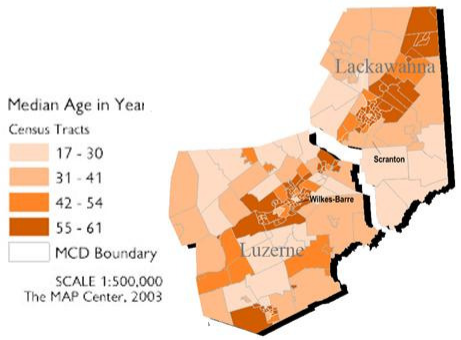
Source: U.S. Census Bureau (1990 & 2000 Decennial Census), PA State Data Center

LACKAWANNA & LUZERNE COUNTIES

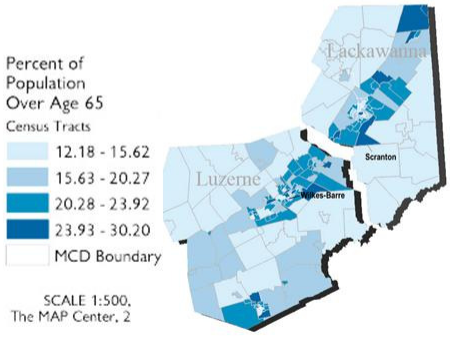
PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Population Age, Two-County Area, 2000

Median Age



Percent Over 65 Years



Source: U.S. Census Bureau (1990 & 2000 Decennial Census)

LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Change in Number of Vacant Housing Units, Scranton, Wilkes-Barre, Hazleton, & Two-County

	1990	2000	1990-2000 Change
Scranton:	2,720	4,033	1,313
Wilkes-Barre:	1,299	2,333	1,034
Hazleton:	769	1,275	506
Two-County:			5,000

Vacancy Rate, Two-County Area, 2000: 9.6%

LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Population in Household/Persons Per Households

- Household size in the two-county area has decreased from 3.0 persons in 1970 to 2.7 persons in 1980, to 2.5 persons in 1990, to 2.4 persons in 2000.
- Total population in households for the two-county area is 511,847 persons, a -3.3% change since 1990:
  - Lackawanna County Population in Households: 205,460 persons.
  - Luzerne County Population in Households: 306,387 persons.

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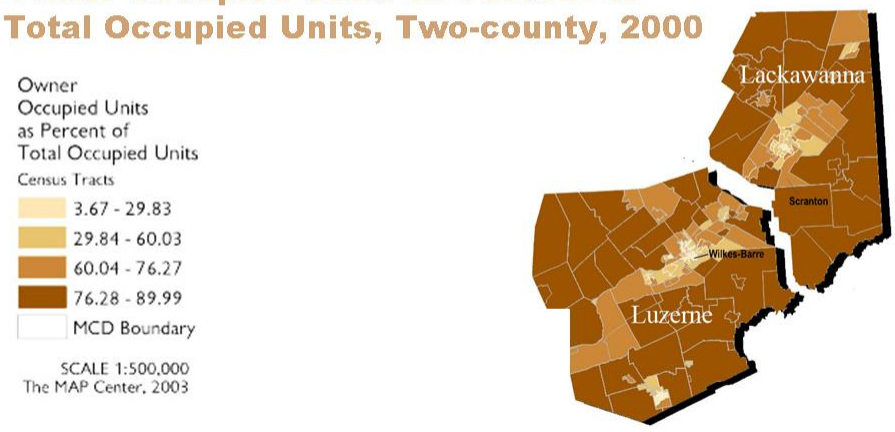
PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Owner Occupied Units as Percent of Total Occupied Units, Two-county, 2000



LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Housing Units by Units In Structure, Two-county, 1990-2000

Of the two-county's housing units by structure type:

- 60.7% are single-family detached.
- 8.9% are single-family attached.
- 26.8% are multi-family
- 3.6% are mobile home, boat, RV, van, etc

Housing Units, Luzerne County

Units in Structure	No. of Units 1990	No. of Units 2000	% of Units 1990	% of Units 2000	% Change
Total Housing Units	138,724	144,586	100.0%	100.0%	4.3%
1 - Unit Detached	79,866	88,406	57.6%	61.1%	10.7%
1 - Unit Attached	18,756	17,468	13.5%	12.1%	-6.9%
2-4 Units	20,090	20,693	14.5%	14.3%	3.0%
5+ Units	11,801	12,208	8.5%	8.4%	3.4%
Mobile Home, Boat, RV, Van, etc	8,211	5,924	5.9%	4.1%	-27.9%

Housing Units, Lackawanna County

Units in Structure	No. of Units 1990	No. of Units 2000	% of Units 1990	% of Units 2000	% Change
Total Housing Units	91,707	95,362	100.0%	100.0%	4.0%
1 - Unit Detached	52,008	57,277	56.7%	60.1%	10.1%
1 - Unit Attached	3,533	3,930	3.9%	4.1%	11.2%
2-4 Units	23,710	23,154	25.9%	24.3%	-2.3%
5+ Units	7,977	8,262	8.7%	8.7%	3.6%
Mobile Home, Boat, RV, Van, etc	4,479	2,739	4.9%	2.9%	-38.8%

Housing Units, Bi County

Units in Structure	No. of Units 1990	No. of Units 2000	% of Units 1990	% of Units 2000	% Change
Total Housing Units	230,431	240,048	100.0%	100.0%	4.2%
1 - Unit Detached	131,874	145,683	57.2%	60.7%	10.5%
1 - Unit Attached	22,289	21,398	9.7%	8.9%	-4.0%
2-4 Units	43,800	43,837	19.0%	18.3%	0.1%
5+ Units	19,778	20,470	8.6%	8.5%	3.5%
Mobile Home, Boat, RV, Van, etc	12,690	8,663	5.5%	3.6%	-31.7%

Source: U.S. Census Bureau (1990 & 2000 Decennial Census)

LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Alternative Population Forecasts

Alternative 1:

- Population forecast of 532,545 residents by year 2030.
- Assumes there is no change from 2000 census.

Alternative 2:

- Population forecast of 567,959 residents by year 2030.
- Halfway figure between Alternative 1 and Alternative 3.

Alternative 3:

- Population forecast of 603,373 residents by year 2030.
- Assumes the rate of population growth is consistent with average growth rate of the total ten-county region (DEP PA State Water Plan).

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PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Housing Units to Be Constructed, 2008-2030

- Based on these populations, Lackawanna and Luzerne Counties would need 12,000 new units for low forecast, 24,000 new units for medium forecast, and 37,000 new units for high forecast at vacancy rate of 9.6 percent.
- Medium rate translates to 1,100 units per year at 9.6 vacancy rate.

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PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Housing Units to be Constructed, 2000-2030 (9.6 Vacancy Rate)

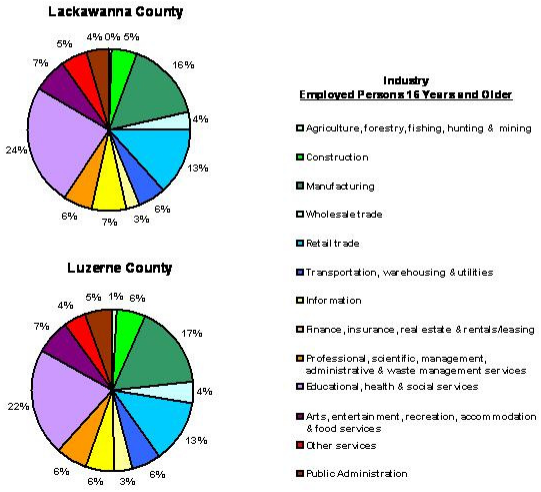
	Low	Medium	High
Population Projection, Year 2030	532,545	567,959	603,373
Population in Households (96.1%)	511,776	545,809	579,842
Persons per Household	2.25	2.25	2.25
Occupied Housing Units	227,456	242,582	257,708
Vacant Units (9.6% Vacancy Rate)	24,155	25,761	27,367
Total Housing Units Required (OHU / 0.904)	251,611	268,343	285,075
Existing Stock, Year-Round Housing Units, 2000	240,048	240,048	240,048
Net Additions to Housing Stock	11,563	28,295	45,027
Replacement of Existing Stock (3%)	7,201	7,201	7,201
Conversions (-1%)	-2,400	-2,400	-2,400
Total Housing Units to be Constructed, 2000-2030 (30 years)	16,364	33,096	49,828
Average Number of Housing Units to be Constructed per year (2000-2030)	**545**	**1,103**	**1,661**
Total Housing Units to be Constructed, 2008-2030 (22 years)	12,000	24,270	36,541

Source: U.S. Census Bureau (1990 & 2000 Decennial Census)

LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

Employment by Major Industry



LACKAWANNA & LUZERNE COUNTIES

PHASE A4: DEMOGRAPHIC & HOUSING ANALYSES

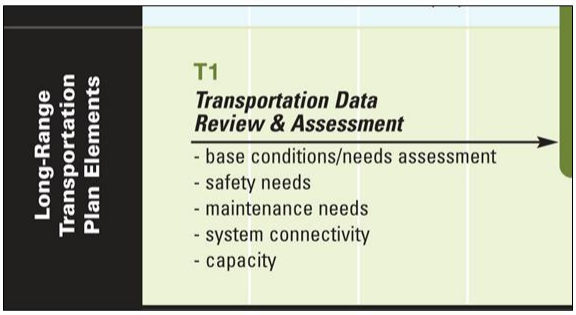
Employment by Major Industry

The top three largest categories of employment in the two-county area are as follows:

- Education, Health and Social Services
- Manufacturing
- Retail Trade

LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment



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PHASE T1: Transportation Data Review & Assessment

Two-county Overview

- Approximately 4,000 miles of roads in the two counties.
- 5 major thoroughfares:
  - I-81
  - I-80
  - I-476
  - I-380
  - I-84

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LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Roadway Functional Classification

- Principal Arterial: A street road that is used primarily for fast or heavy volumes of through traffic including freeways, expressways, and high-volume through-roadways carrying regional traffic.
- Minor Arterial: A street or road that is used primarily for through traffic. Minor arterials carry generally lower volumes of traffic than principal arterials.
- Major Collector: A street or road that carries traffic from minor borough streets and township roads to the arterial system.
- Local Road: All other borough streets or township roads, providing access to abutting properties in residential, commercial, industrial, and rural areas.

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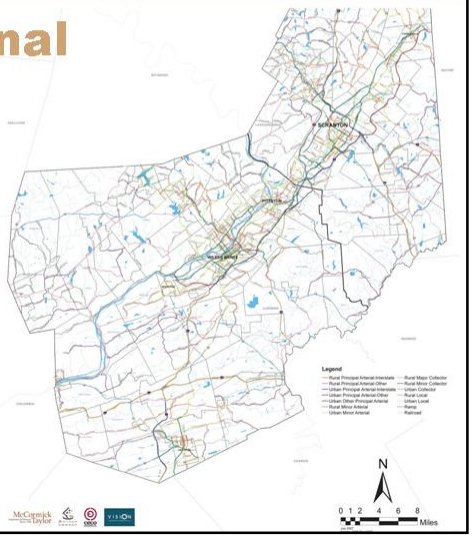
PHASE T1: Transportation Data Review & Assessment

Roadway Functional Classification

Legend

- Rural Principal Arterial-Interstate
- Rural Principal Arterial-Other
- Urban Principal Arterial-Interstate
- Urban Principal Arterial-Other
- Urban Other Principal Arterial
- Rural Minor Arterial
- Urban Minor Arterial
- Rural Major Collector
- Rural Minor Collector
- Urban Collector
- Rural Local
- Urban Local
- Ramp
- Railroad



LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Roadway Jurisdictional Classification

- Roadway classifications in the two-county area consist of:
  - US Interstate Routes
  - Pennsylvania Traffic Routes
  - County Roads
  - Township Roads
  - Other Roads

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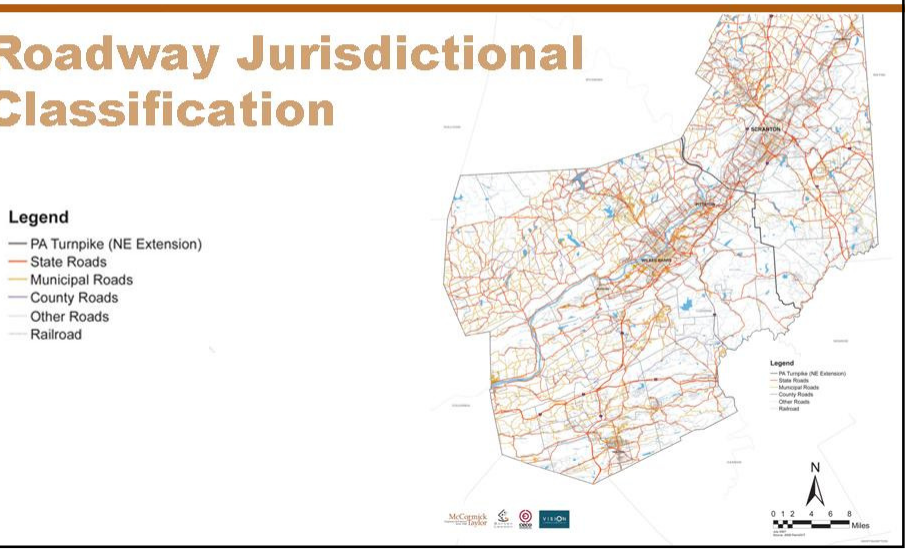
PHASE T1: Transportation Data Review & Assessment

Roadway Jurisdictional Classification



LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Traffic Volumes

- Highest volumes on Interstate 81 followed by Route 309 north of I-81, the Central Scranton Expressway into downtown Scranton, and US 11 from I-81 south into Scranton.
- Traffic volumes on I-81 at both ends of the county region, drop to less than 15,000 vehicles per day

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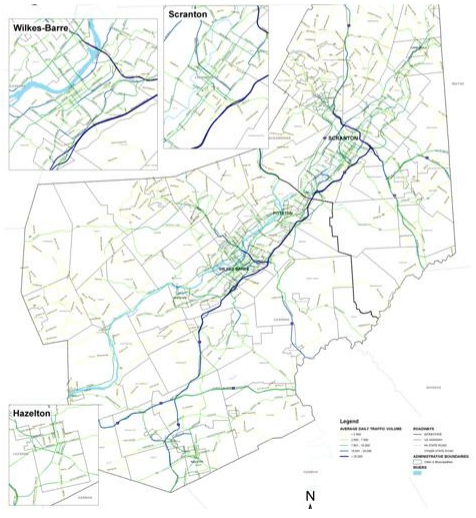
PHASE T1: Transportation Data Review & Assessment

Traffic Volumes



Legend

AVERAGE DAILY TRAFFIC VOLUME

- < 2,500
- 2,500 - 7,500
- 7,501 - 15,000
- 15,001 - 25,000
- > 25,000

LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Travel Patterns

- Approximately 90% of the population lives and works within the two county region.
- Another 6% lives and or work within an adjacent county
- The remainder travels beyond the two-county region

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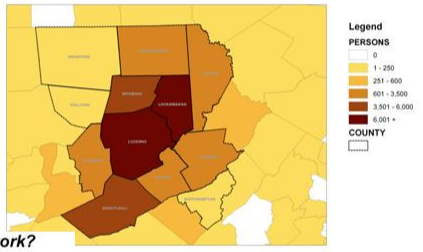
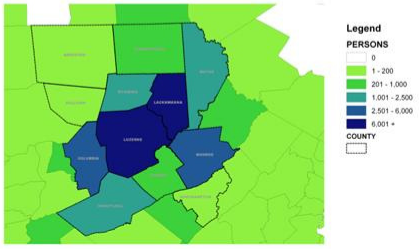
PHASE T1: Transportation Data Review & Assessment

Travel Patterns

Where do workers in Lackawanna and Luzerne Counties live?



Where do residents of Lackawanna and Luzerne Counties work?



LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Pavement and Bridges

- Several ramps at interchanges have older high volumes pavements
- Bridges which are a current priority for the Department will be refined based on current TIP funding and their role in creating connections in the future
- Route 309 north of I-81 is an older high volume pavement
- Several areas in downtown Scranton have older high volume pavements.

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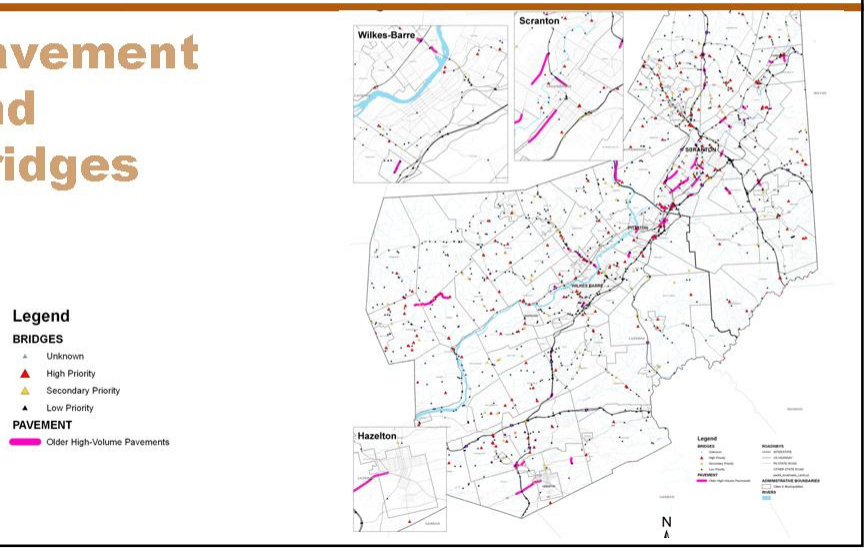
PHASE T1: Transportation Data Review & Assessment

Pavement and Bridges



Legend

BRIDGES
- Unknown
- High Priority
- Secondary Priority
- Low Priority

PAVEMENT
- Older High-Volume Pavements

LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Transportation Safety

- Worked with PennDOT to locate intersection and segments that were of most concern.
- Also surveyed stakeholders for critical intersections from a safety standpoint.
- This information will be combined with remainder of data in the prioritization of projects in future phases of work.

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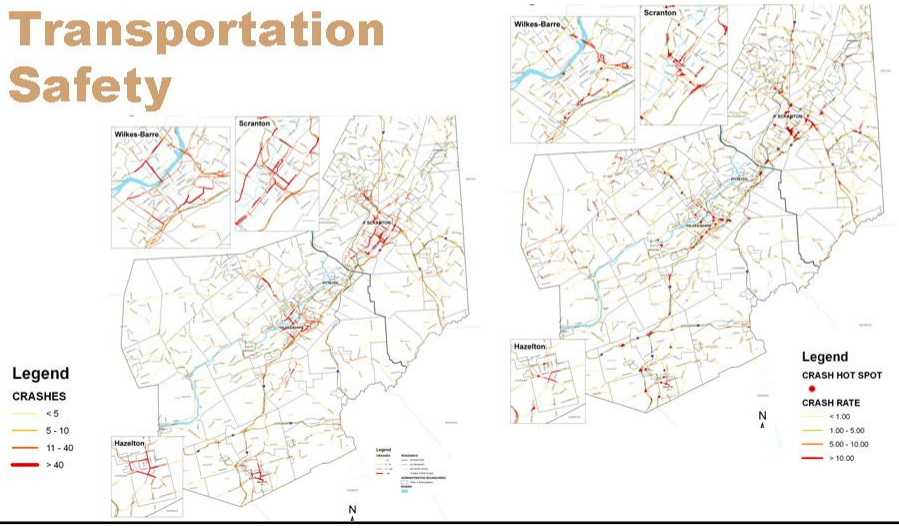
PHASE T1: Transportation Data Review & Assessment

Transportation Safety



LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Current LRTP/TIP Projects

- Current focus on maintenance and bridge rehabilitation
- Future prioritization will need to consider alternate funding strategies and innovative finance.
- New legislation and reauthorization could allow for more flexibility

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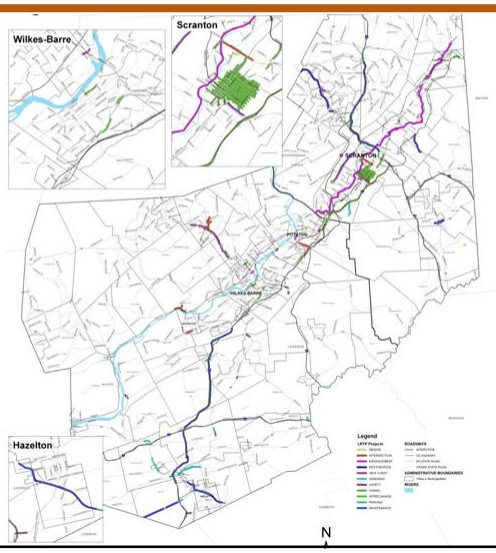
PHASE T1: Transportation Data Review & Assessment

Current LRTP TIP Projects



Legend

LRTP Projects

- BRIDGE
- INTERSECTION
- ENHANCEMENT
- RESTORATION
- NEW CONST
- WIDENING
- SAFETY
- SIGNAL
- INTERCHANGE
- PARKING
- MAINTENANCE

LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Passenger Transportation

- Focus on connections and intermodal connectivity.
- Must be coordinated and integrated with comprehensive plan goals and objectives.
- Connection of employment centers to population centers.
  - Could be as simple as sidewalks
  - Could be as complicated as new capacity (Funding implications)

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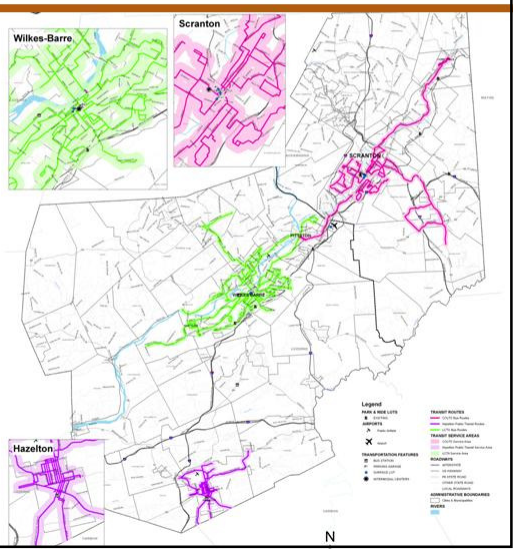
LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Passenger Transportation



Legend

PARK & RIDE LOTS
EXISTING

AIRPORTS
Public Airfield
Airport

TRANSPORTATION FEATURES
BUS STATION
PARKING GARAGE
SURFACE LOT
INTERMODAL CENTERS

TRANSIT ROUTES
COLTS Bus Routes
Hazelton Public Transit Routes
LCTS Bus Routes

TRANSIT SERVICE AREAS
COLTS Service Area
Hazelton Public Transit Service Area
LCTA Service Area

ROADWAYS
INTERSTATE
US HIGHWAY
PA STATE ROAD
OTHER STATE ROAD
LOCAL ROADWAYS

LACKAWANNA & LUZERNE COUNTIES

PHASE T1: Transportation Data Review & Assessment

Freight Transportation

- Focus on connections and intermodal connectivity.
- Must be coordinated and integrated with comprehensive plan goals and objectives.
- Encouraging business to make effective use of multiple freight transportation modes

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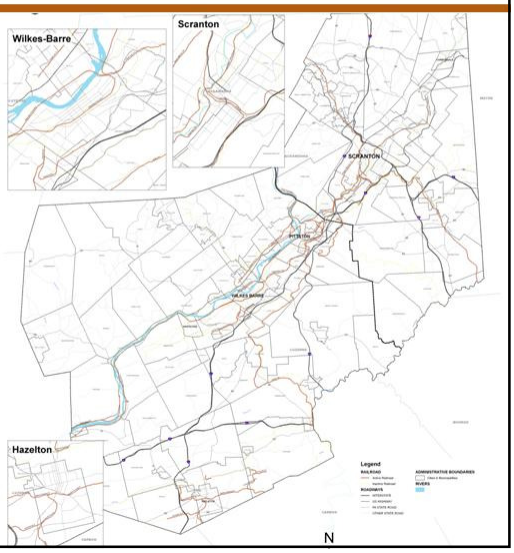
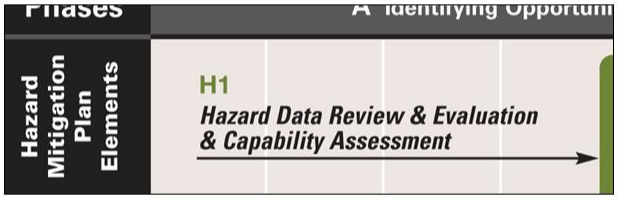
PHASE T1: Transportation Data Review & Assessment

Freight Transportation



LACKAWANNA & LUZERNE COUNTIES

PHASE H1: Hazard Data Review & Evaluation & Capability Assessment



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LACKAWANNA & LUZERNE COUNTIES

PHASE H1: Hazard Data Review & Evaluation & Capability Assessment

Six Natural Hazard Risks

- Flooding/Severe Storms
- Winter Storms
- High Wind/Tornados
- Wildfires
- Geologic Subsistence
- Drought

Three Manmade Hazard Risks

- Nuclear Failure
- Dam Breach
- Hazardous Material Release

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PHASE H1: Hazard Data Review & Evaluation & Capability Assessment

Critical Infrastructure

In the two-county area,

- 2,206 stream crossings including bridges, culverts and drainage pipes.
- Twenty-one (21) hospitals;
- Three (3) major airports

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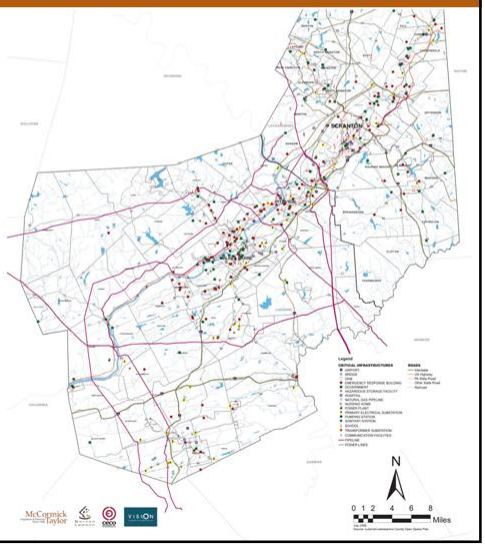
PHASE H1: Hazard Data Review & Evaluation & Capability Assessment

Critical Infrastructure

Legend

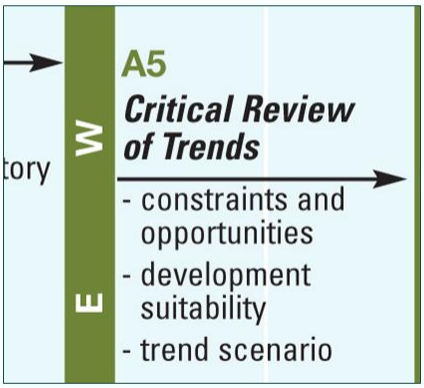
CRITICAL INFRASTRUCTURES
- AIRPORT
- BRIDGE
- DAM
- EMERGENCY RESPONSE BUILDING
- GOVERNMENT
- HAZARDOUS STORAGE FACILITY
- HOSPITAL
- NATURAL GAS PIPELINE
- NURSING HOME
- POWER PLANT
- PRIMARY ELECTRICAL SUBSTATION
- PUMPING STATION
- SANITARY STATION
- SCHOOL
- TRANSFORMER SUBSTATION
- COMMUNICATION FACILITIES
- PIPELINE
- POWER LINES

ROADS
- Interstate
- US Highway
- PA State Road
- Other State Road
- Railroad



LACKAWANNA & LUZERNE COUNTIES

PHASE A5: Critical Review of Trends



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LACKAWANNA & LUZERNE COUNTIES

PHASE A5: Critical Review of Trends

Composite Natural Constraints

Natural resource information on:

- floodplains,
- wetlands,
- slopes,
- woodlands,
- hydric soils,

was combined to illustrate various levels of development constraints affecting areas of the two-county region.

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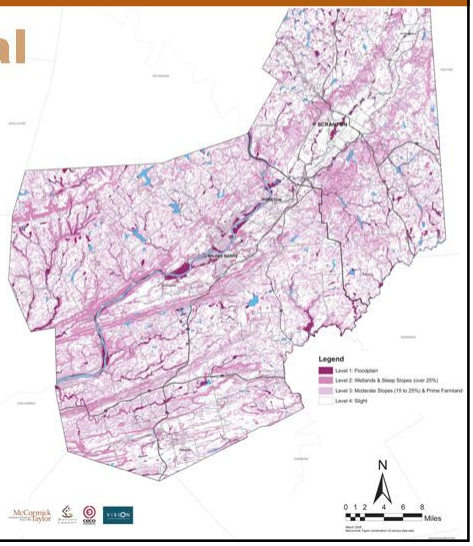
LACKAWANNA & LUZERNE COUNTIES

PHASE A5: Critical Review of Trends

Composite Natural Constraints

Legend

- Level 1: Floodplain
- Level 2: Wetlands & Steep Slopes (over 25%)
- Level 3: Moderate Slopes (15 to 25%) & Prime Farmland
- Level 4: Slight



LACKAWANNA & LUZERNE COUNTIES

PHASE A5: Critical Review of Trends

Suitability for Development

- An analysis of the two counties was undertaken to identify areas with better accessibility by virtue of being near interchanges, urban places, and highways.
- Places where these factors converge have superior accessibility.
- Features that positively influence relative suitability of land for development have been combined with composite constraints information.
- Areas may be considered more suitable for development in consideration of their relative advantages in accessibility and serviceability.

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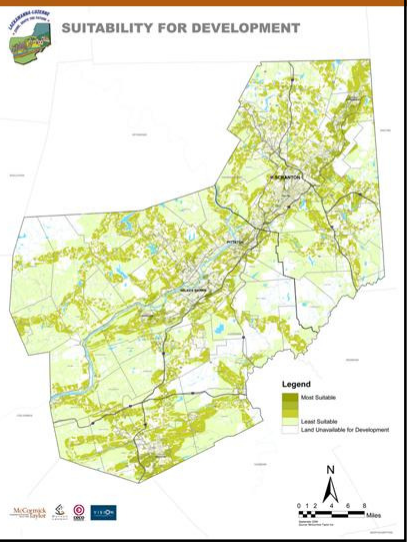
PHASE A5: Critical Review of Trends

Suitability for Development I

(Existing Development Excluded)

Legend

- Most Suitable
- Least Suitable
- Land Unavailable for Development



LACKAWANNA & LUZERNE COUNTIES

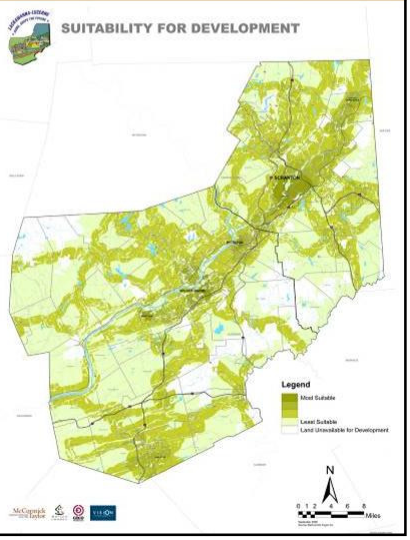
PHASE A5: Critical Review of Trends

Suitability for Development II

(Existing Development Included)

Legend

- Most Suitable
- Least Suitable
- Land Unavailable for Development



LACKAWANNA & LUZERNE COUNTIES

PHASE A5: Critical Review of Trends

Trend Scenario

- Based on if current development trends and current land development regulations and policies (or lack thereof) continue in force for the foreseeable future.
- A map using *chips* has been created to illustrate this hypothetical picture of Lackawanna and Luzerne Counties likely development pattern in the year 2030. Each chip symbol represents 100 acres.
- A total 240 yellow chips were used to represent new residential.
- A total of 16 blue chips were used to represent abandoned residential.
- A total of 21 red chips were used to represent new commercial and mixed use (combined).
- A total of 44 violet chips were used to represent new industrial.
- The Trend Scenario includes all known Pending & Proposed development.

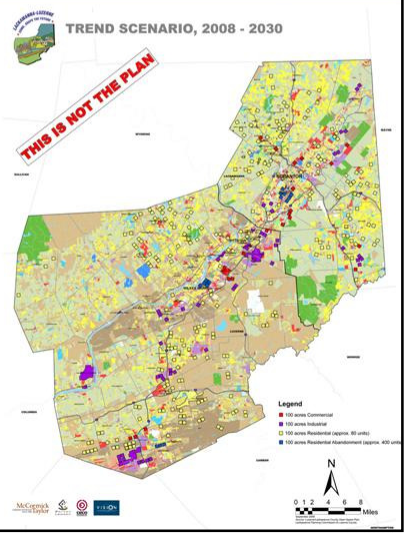
LACKAWANNA & LUZERNE COUNTIES

PHASE A5: Critical Review of Trends

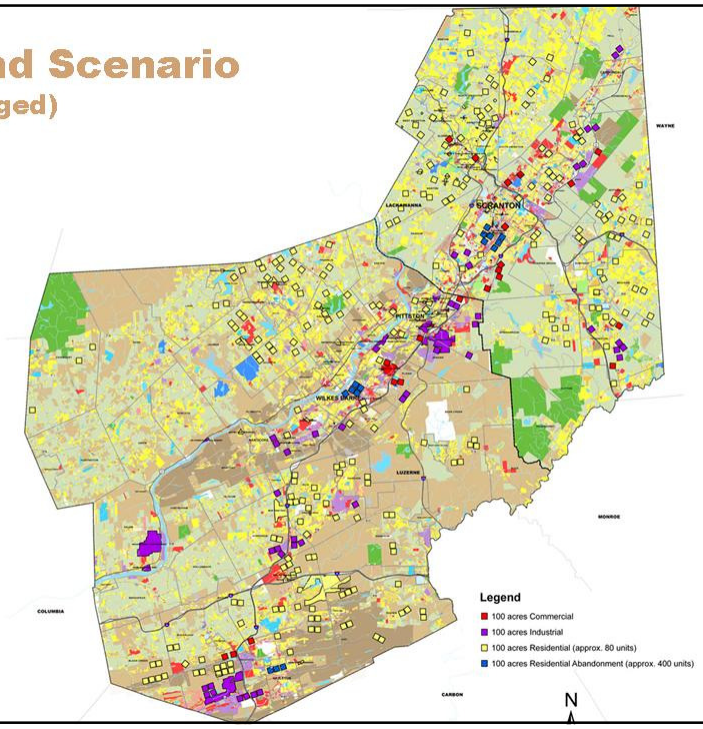
Trend Scenario

Legend

- 100 acres Commercial
- 100 acres Industrial
- 100 acres Residential (approx. 80 units)
- 100 acres Residential Abandonment (approx. 400 units)



Trend Scenario
(Enlarged)



LACKAWANNA-LUZERNE PARTNERS IN PLANNING

LACKAWANNA & LUZERNE COUNTIES

PHASE A6: Planning Issues & Goals

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LACKAWANNA & LUZERNE COUNTIES

PHASE A6: Planning Issues & Goals

Initial Planning Goals

- Economic stimulation required to retain population.
- Need to guide development to area with good access, utilities service, and community facilities.
- Need to improve some basic infrastructure systems
- Need to creatively manage future commercial development along roadway corridors.
- Need to recognize and capitalize on potential of scenic, historic, and cultural aspect of the two counties for creating economic opportunities.
- Need to put new planning tools, including updated Comprehensive, Long-Range Transportation, and Hazard Mitigation Plans and regulations into operation.

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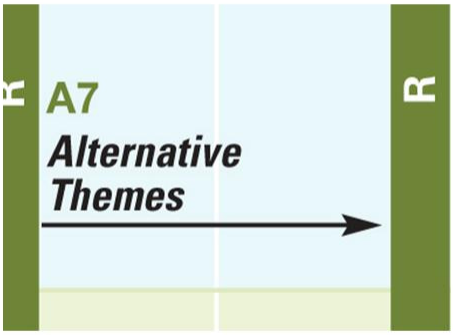
PHASE A7: Alternative Themes



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PHASE A7: Alternative Themes

Initial Alternative Themes

ALTERNATIVE I: URBAN CENTERS

- Reduced potential for sprawl, preserves rural settings, conserves farmland and environmentally sensitive areas.
- More housing choices than Trend – for single individuals, young couples and empty-nesters.

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PHASE A7: Alternative Themes

Initial Alternative Themes

ALTERNATIVE II: VALLEY NODES

- Similar to Alternative I, but provides additional opportunities for concentrated and mixed-use development through the river valleys.
- Opportunity to provide a spine for mobility with multi-modal transportation options.

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PHASE A7: Alternative Themes

Initial Alternative Themes

ALTERNATIVE III: Cross Valley Corridors

- Encourage mixed-use hubs of industrial/office park, residential and commercial uses adjacent to and including areas already receiving development.
- Combine with aggressive effort to preserve farmland/open space outside these corridors.

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LACKAWANNA & LUZERNE COUNTIES

WHAT'S NEXT?

- Public Information Meetings, October 14-16, 2008
  - Tuesday, Luzerne County Community College, Nanticoke
  - Wednesday, Hazleton Area High School, Hazleton
  - Thursday, Lackawanna County EMA, Jessup
- Exploration of Alternatives
- Review of Alternatives

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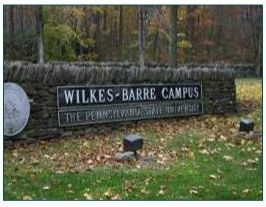
THANK YOU



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APPENDIX F: HAZARD MITIGATION QUESTIONNAIRE

Lackawanna-Luzerne Joint County Hazard Mitigation Plan
Hazard Mitigation Questionnaire – May 2008

We want you to help us make your community a safer place to live! Please respond to each of the following questions and return your responses by 28 May 2008 to your County point of contact:

Lackawanna County: Steve Pitoniak
Phone: 570 963 6400 Fax: 570 963 6364

Luzerne County: Nancy Snee
Phone: (570) 825-1564 Fax: 570-825-6362

Jurisdiction: _____

County: _____

Point of Contact:
Name: _____
Title: _____

Work Phone: _____ Email: _____

Hazard Events

1. What hazards has your municipality experienced since 1950? Check all that apply. Has your municipality experienced any damage from these events? Please describe (attach additional sheets if necessary).

Hazard	✓	Month/ year of Occurrence	Location / Address and Description of Damage (say "municipality wide" if no specific location)
Flooding			
Land Subsidence (sinkholes/mining)			
Landslide			
Tornado			
Mine Fire			
High Wind			
Wildfire			
Winter Storm			
Drought			
Dam Failure			
Hazardous Materials Release			
Mass Traffic Spill			

Continued on back

Critical Facilities

2. Critical facilities include: Water and wastewater treatment plants, airports, police stations, fire stations, schools, hospitals/care facilities, natural gas facilities, electric and communications facilities, nuclear power stations, and hazardous materials plants. Are there any critical facilities that have experienced past damage from hazards within your jurisdiction? If yes, please describe.

Facility	Address/Location	Hazard Event	Description of Damage

Mitigation Projects

3. Please identify any hazard mitigation projects for your community. Describe the project, the likely cost of the project, and the location of the project (by address, closest intersection, or other specific descriptor).

Project Description	Cost	Location

Examples of mitigation projects include:

- Retrofit projects for critical facility structures
- Acquisition and relocation of flood prone properties along a river or creek
- Informational brochure on how to prepare for a particular hazard, steps to take after a hazard event has occurred
- Survey of old mobile home parks to identify those that are in deteriorating condition
- Engineering study to determine repairs or replacement of floodwall
- Promotion of flood insurance sales within the community
- Replacement of existing culverts with larger structures
- Construction of a flood control reservoir
- Construction of a new emergency operations facility or fire station
- Upgrade to emergency radio system

Mitigation Capabilities

4. Are there any hazard-related or mitigation-related capabilities that you feel should be improved in your jurisdiction? Are there any capabilities that the jurisdiction doesn't have that you feel are needed? Please explain.

Needed Improvements	Explanation

Thank you for your time and valuable input and commitment to making your community safer!

APPENDIX G: ANNUAL REPORT FORMS

LACKAWANNA-LUZERNE JOINT HAZARD MITIGATION PLAN

County Annual Report Form

Project Title _____ Project ID # _____

Progress Report Period _____to_____ Next Plan Update _____

Responsible County Agency(ies) _____

Address _____

Contact Person_____Title_____

Phone_____email_____

Project description_____

Project Status – Circle one (If "completed" answer questions **a & b.** All others, please answer questions **1-3**):

- o Completed
  a. How many people were protected by this action?_____
  b. Were there any structures mitigated? If so, how many?_____
- o In Progress
- o Not started/delayed
- o Modified
- o Cancelled
- o Explain
  1. Obstacles/challenges/delays incurred _____
     _____
  2. Method to resolve obstacle/challenge/delay_____
     _____
  3. Next steps to accomplished over the next reporting period_____
     _____

Other comments:_____

_____

Name_____ Signature_____ Date_____

LACKAWANNA-LUZERNE JOINT HAZARD MITIGATION PLAN

Municipal Annual Report Form

Municipality _____

Address _____

Contact Person_____Title_____

Phone_____email_____

Progress Report Period _____to_____ Next Plan Update _____

Project	Status *	Obstacles/ Challenges	Method to resolve challenge

*Please indicate by filling in one of the following letters that coordinates with the project's status

A) Complete; B) In Progress; C) Not started/ delayed; D) Modified; E) Cancelled

Name_____Signature_____Date_____