



North Dakota Insurance Department

Adam Hamm, Commissioner

June 20, 2014

Honorable Scott Louser
State Representative
400 4th St WS
Minot, ND 58701

RE: Proposed Flood Insurance Program

Dear Representative Louser:

Attached are a series of exhibits that summarize my analysis of the potential North Dakota Flood Program.

As previously discussed, I had difficulty obtaining data from FEMA, and am now convinced that the level of detail I would need to develop rates for a North Dakota flood program is not available, save through a Freedom of Information Act-Request. In a series of emails between Thomas Hayes, the FEMA actuary and myself, I did obtain some high level premium and loss data by accident year for North Dakota. Over the past week, I've requested additional data from FEMA, but my queries have gone unanswered.

What information I do have, can shed some light on the feasibility of a North Dakota flood program. Exhibit I is a summary of the premium and loss data I received from the FEMA actuary. It shows North Dakota's NFIP experience over the 35 year period, 1978 through 2012. Note that over the 35 year period, FEMA has collected \$75 million of NFIP premium in North Dakota, and has paid out nearly \$265 million in losses and loss adjusting expense (LAE), amounting to a loss ratio of 354 percent.

In Exhibit II I brought loss and LAE up to current cost levels, using a combination of the Consumer Price Index (CPI) and an additional increment for years 2010 to current to reflect North Dakota costs increasing at a greater rate than the country-wide based CPI, due to the recent economic boom. I then projected average frequencies and severities by policy count. By comparing these figures to an estimated NFIP average current premium level of \$500, I estimate a projected loss ratio of 351%, which is comparable to the empirical 354 percent noted above.

In our phone conversation of May 1, you mentioned the possibility of two main funding mechanisms: \$50 million from a Legislature-created program, and \$50 million from the Bank of North Dakota, as part of the Rebuilder Loan Program. As I understand it, \$50 million of rebuilder loans were issued between November 2011 and September 2013. The borrower had a two year period in which no loan payments were due, but the loan was accruing 1 percent interest per year. Each loan was to be repaid over 20 years (including the first two in which no loan payments were required).

To simplify the expected revenue due from the Rebuilder Loan Program, let's assume that all \$50 million was loaned on December 1, 2012. With the two year grace period, principal and loan payments would begin on January 1, 2015. Exhibit III shows the timing of payments the Flood fund would receive via the Rebuilder Loan Program (assuming no default on loans). So in 2015, the amount of money available to the Flood program would be \$50 million from the legislature plus \$3 million in Rebuilder loan payments plus approximately \$8 million in premiums equals \$61 million. Note that the \$8 million in premiums ignores expenses (agents' commissions, overhead expense, etc.)

Exhibit IV summarizes the modeled aggregate distribution of losses that would be covered by the North Dakota Flood Program. The first column lists an aggregate amount of loss. The second column gives the probability that losses will be at or below the column 1 figure for a given calendar year. For example, this exhibit shows that 65 percent of the time, fund losses for a calendar year will be at or below \$25.2 million. In other words, 35 percent of the time losses will exceed \$25.2 million.

Without getting too technical, I should note that a large amount of judgment went into the parameter selections that modeled this distribution. One assumption in particular, the variation in loss severities, should be noted. As I did not have the necessary historical data to develop a good estimate of the variation of loss severity, I relied on a similar analysis I annually perform for the State Fire & Tornado (F&T) fund. Essentially I assumed that the coefficient of variation (CV) for the flood program claim severities was comparable to the CV I estimated for the F&T fund. This is quite a leap of faith, but if anything, I believe this assumption makes the model results more optimistic (i.e. I would expect flood losses to exhibit greater variation than F&T losses).

At a minimum, I would expect that we'd want funding of the program to be sufficiently large enough to withstand a worst-case year scenario. Exhibit IV suggests that approximately \$90 million would be needed to be at the 95 percentile (i.e. we would expect losses to exceed \$90 million one in every twenty years). At the 97.5 percentile (one in every 40 years), the loss amount is approximately \$124 million. Comparing these figures to the \$61 million available in 2015 would suggest that the fund balance would be inadequately funded from the start.

Moreover, even if the fund were to survive the first few years, Exhibit V page 1 demonstrates that expected fund expenditures (loss and LAE payments) would exceed fund income (premium & loan payments) each year. By year four, the program's assets will have been

exhausted. Keep in mind, this scenario ignores any kind of loan default rate, and any draws on funding due to operating expenses.

Exhibit V page 2 exhibits this erosion under the assumption that the program will insure 10,000 and 5,000 policyholders.

After reading through this write-up and reviewing the attached exhibits, please call me if you wish to further discuss any part of this analysis.

Sincerely,

Michael J. Andring
P&C Actuary
North Dakota Insurance Department

FOR : DIRECT & WYO DATA
 ZONE:
 FIRM: PRE AND POST
 ICC : ICC DATA EXCLUDED
 OCPY: ALL OCCUPANCIES
 BSMT: W/WO BASEMENT

ACCIDENT YEAR	Policy Count	EARNED PREMIUM	Losses Paid	Allocated Loss Exp	Total Pd Loss & ALAE	# of Closed Losses	# OF OPEN LOSSES	Total Claims
2012	15,933	7,699,221	399,705	44,514	444,219	10	11	21
2011	17,584	7,929,450	95543604	3463116	99,006,720	1564	15	1,579
2010	13,073	5,857,066	4523561	321688	4,845,249	310	1	311
2009	11,227	4,907,074	20838137	1315567	22,153,704	1102	4	1,106
2008	4,472	2,444,773	14849	1500	16,349	2	0	2
2007	4,765	2,438,200	35054	3525	38,579	5	0	5
2006	5,071	2,454,340	822258	78662	900,920	80	0	80
2005	5,023	2,297,588	218806	12785	231,591	14	0	14
2004	5,187	2,236,369	1399506	70252	1,469,758	55	0	55
2003	5,395	2,215,168	123130	5575	128,705	3	0	3
2002	5,976	2,348,768	529855	24774	554,629	11	0	11
2001	6,618	2,484,558	2834988	172247	3,007,235	209	0	209
2000	6,416	2,330,518	2427987	91053	2,519,040	42	0	42
1999	7,008	2,416,371	3218074	155944	3,374,018	77	0	77
1998	8,147	2,518,241	4941974	169459	5,111,433	90	0	90
1997	9,665	2,644,212	97450830	3251613	100,702,443	4197	0	4,197
1996	3,825	1,067,841	7952871	162322	8,115,193	238	0	238
1995	3,892	1,055,851	1005976	29769	1,035,745	76	0	76
1994	4,692	1,188,662	6566	1875	8,441	5	0	5
1993	4,713	1,144,819	299399	45341	344,740	136	0	136
1992	5,309	1,228,408	1865	475	2,340	1	0	1
1991	5,349	1,310,735	113686	11326	125,012	26	0	26
1990	5,419	1,319,173	0	280	280	0	0	0
1989	5,674	1,331,906	875105	94901	970,006	217	0	217
1988	5,224	1,197,389	0	320	320	0	0	0
1987	5,264	1,170,024	152466	12310	164,776	40	0	40
1986	5,304	972,258	21910	2292	24,202	6	0	6
1985	5,326	931,662	1138	410	1,548	2	0	2
1984	5,782	947,810	2193	1175	3,368	3	0	3
1983	6,414	968,680	43149	5511	48,660	13	0	13
1982	6,881	881,056	118310	17471	135,781	75	0	75
1981	6,839	639,474	11365	4658	16,023	22	0	22
1980	9,137	708,573	5025	1443	6,468	4	0	4
1979	11,094	804,104	7412427	389791	7,802,218	1652	0	1,652
1978	11,969	818,938	1578495	95875	1,674,370	450	0	450
	249,667	74,909,280	254,924,264	10,059,819	264,984,083	10,737	31	10,768

Empirical Loss Ratio:

354%

ACTUAL EXPERIENCE

ACCIDENT YEAR	Policy Count	Earned Premium	Average Premium	Paid Losses	Paid ALAE	Total Inc'd Claims	Trend to 2015	Loss & ALAE @ Curr Cost	Average Frequency	Average Severity
2012	15,933	7,699,221	483	399,705	44,514	21	1.191	529,072	0.13%	25,194
2011	17,584	7,929,450	451	95,543,604	3,463,116	1579	1.262	124,993,703	8.98%	79,160
2010	13,073	5,857,066	448	4,523,561	321,688	311	1.338	6,484,036	2.38%	20,849
2009	11,227	4,907,074	437	20,838,137	1,315,567	1106	1.357	30,069,422	9.85%	27,188
2008	4,472	2,444,773	547	14,849	1,500	2	1.350	22,074	0.04%	11,037
2007	4,765	2,438,200	512	35,054	3,525	5	1.406	54,250	0.10%	10,850
2006	5,071	2,454,340	484	822,258	78,662	80	1.448	1,304,492	1.58%	16,306
2005	5,023	2,297,588	457	218,806	12,785	14	1.489	344,725	0.28%	24,623
2004	5,187	2,236,369	431	1,399,506	70,252	55	1.543	2,268,384	1.06%	41,243
2003	5,395	2,215,168	411	123,130	5,575	3	1.595	205,241	0.06%	68,414
2002	5,976	2,348,768	393	529,855	24,774	11	1.638	908,259	0.18%	82,569
2001	6,618	2,484,558	375	2,834,988	172,247	209	1.653	4,971,267	3.16%	23,786
2000	6,416	2,330,518	363	2,427,987	91,053	42	1.716	4,323,469	0.65%	102,940
1999	7,008	2,416,371	345	3,218,074	155,944	77	1.775	5,988,069	1.10%	77,767
1998	8,147	2,518,241	309	4,941,974	169,459	90	1.814	9,272,746	1.10%	103,031
1997	9,665	2,644,212	274	97,450,830	3,251,613	4197	1.837	184,968,254	43.42%	44,072
1996	3,825	1,067,841	279	7,952,871	162,322	238	1.887	15,312,348	6.22%	64,338
1995	3,892	1,055,851	271	1,005,976	29,769	76	1.932	2,001,264	1.95%	26,332
1994	4,692	1,188,662	253	6,566	1,875	5	1.993	16,823	0.11%	3,365
1993	4,713	1,144,819	243	299,399	45,341	136	2.047	705,579	2.89%	5,188
1992	5,309	1,228,408	231	1,865	475	1	2.104	4,923	0.02%	4,923
1991	5,349	1,310,735	245	113,686	11,326	26	2.180	272,561	0.49%	10,483
1990	5,419	1,319,173	243	-	280	0	2.280	639	0.00%	
1989	5,674	1,331,906	235	875,105	94,901	217	2.382	2,310,409	3.82%	10,647
1988	5,224	1,197,389	229	-	320	0	2.580	826	0.00%	
1987	5,264	1,170,024	222	152,466	12,310	40	2.666	439,246	0.76%	10,981
1986	5,304	972,258	183	21,910	2,292	6	2.755	66,681	0.11%	11,113
1985	5,326	931,662	175	1,138	410	2	2.811	4,352	0.04%	2,176
1984	5,782	947,810	164	2,193	1,175	3	2.915	9,818	0.05%	3,273
1983	6,414	968,680	151	43,149	5,511	13	3.051	148,460	0.20%	11,420
1982	6,881	881,056	128	118,310	17,471	75	3.114	422,846	1.09%	5,638
1981	6,839	639,474	94	11,365	4,658	22	3.293	52,765	0.32%	2,398
1980	9,137	708,573	78	5,025	1,443	4	3.643	23,560	0.04%	5,890
1979	11,094	804,104	72	7,412,427	389,791	1652	4.114	32,095,766	14.89%	19,428
1978	11,969	818,938	68	1,578,495	95,875	450	4.630	7,752,530	3.76%	17,228
		74,909,280		254,924,264	10,059,819			438,348,856	4.31%	40,708

	Average Premium	Proj'd Total Premium	Expected # Claims	Expected Losses	Proj'd Loss Ratio	
Est'd # Policy holders:	16000	\$500	\$8,000,000	690	28,091,745	351%

**Funding of North Dakota Flood Program
via BND Rebuilder's Loan Program**

Year	Principal Payments	Interest Payments	Total Payments
2013	-	-	
2014	-	-	
2015	2,598,184	495,473	3,093,658
2016	2,624,166	469,492	3,093,658
2017	2,650,408	443,250	3,093,658
2018	2,676,912	416,746	3,093,658
2019	2,703,681	389,977	3,093,658
2020	2,730,718	362,940	3,093,658
2021	2,758,025	335,633	3,093,658
2022	2,785,605	308,053	3,093,658
2023	2,813,461	280,196	3,093,658
2024	2,841,596	252,062	3,093,658
2025	2,870,012	223,646	3,093,658
2026	2,898,712	194,946	3,093,658
2027	2,927,699	165,959	3,093,658
2028	2,956,976	136,682	3,093,658
2029	2,986,546	107,112	3,093,658
2030	3,016,411	77,246	3,093,658
2031	3,046,575	47,082	3,093,658
2032	3,077,041	16,617	3,093,658

MODELED AGGREGATE LOSSES FOR PROPOSED NORTH DAKOTA FLOOD PROGRAM

Exhibit IV

Estimated # Policyholders: 16000
 Estimated Aggregate Mean: \$27,960,977
 Estimated Aggregate Std Dev: \$40,509,936

Aggregate Loss Amount	Cumulative Probability
\$13,980,489	44.3%
\$19,572,684	56.1%
\$25,164,879	65.1%
\$30,757,075	71.8%
\$36,349,270	77.0%
\$41,941,466	81.1%
\$47,533,661	84.3%
\$53,125,857	86.8%
\$58,718,052	88.8%
\$64,310,247	90.5%
\$69,902,443	91.8%
\$75,494,638	92.9%
\$81,086,834	93.8%
\$86,679,029	94.6%
\$90,120,380	95.0%
\$92,271,225	95.3%
\$97,863,420	95.8%
\$103,455,615	96.3%
\$109,047,811	96.7%
\$114,640,006	97.0%
\$120,232,202	97.3%
\$123,546,095	97.5%
\$125,824,397	97.6%
\$131,416,592	97.8%
\$137,008,788	98.0%
\$142,600,983	98.2%

Erosion of Flood Program Fund (Assuming 16,000 policyholders)

Year	Initial Fund Balance	Rebuilder Loan Pymt	Premium Payments	Interest on Fund Balance	Expected Loss & LAE Payments	Ending Fund Balance	95 %ile	97.5 %ile
2015	50,000,000	3,093,658	8,000,000	0	28,091,745	33,001,913	90,000,000	124,000,000
2016	33,001,913	3,093,658	8,000,000	1,078,624	28,091,745	17,082,449		
2017	17,082,449	3,093,658	8,000,000	568,681	28,091,745	653,043		
2018	653,043	3,093,658	8,000,000	91,097	28,091,745	(16,253,948)		

Erosion of Flood Program Fund (assuming 10,000 policyholders)

Year	Initial Fund Balance	Rebuilder Loan Pymt	Premium Payments	Interest on Fund Balance	Expected Loss & LAE Payments	Ending Fund Balance	95 %ile	97.5 %ile
2015	50,000,000	3,093,658	5,000,000	0	17,557,341	40,536,317	57,000,000	78,000,000
2016	40,536,317	3,093,658	5,000,000	1,236,640	17,557,341	32,309,274		
2017	32,309,274	3,093,658	5,000,000	952,729	17,557,341	23,798,320		
2018	23,798,320	3,093,658	5,000,000	705,918	17,557,341	15,040,555		
2019	15,040,555	3,093,658	5,000,000	450,589	17,557,341	6,027,461		
2020	6,027,461	3,093,658	5,000,000	187,857	17,557,341	(3,248,365)		

Erosion of Flood Program Fund (assuming 5,000 policyholders)

Year	Initial Fund Balance	Rebuilder Loan Pymt	Premium Payments	Interest on Fund Balance	Expected Loss & LAE Payments	Ending Fund Balance	95 %ile	97.5 %ile
2015	50,000,000	3,093,658	2,500,000	0	8,778,670	46,814,987	28,000,000	39,000,000
2016	46,814,987	3,093,658	2,500,000	1,368,320	8,778,670	44,998,294		
2017	44,998,294	3,093,658	2,500,000	1,272,770	8,778,670	43,086,051		
2018	43,086,051	3,093,658	2,500,000	1,218,269	8,778,670	41,119,307		
2019	41,119,307	3,093,658	2,500,000	1,160,901	8,778,670	39,095,196		
2020	39,095,196	3,093,658	2,500,000	1,101,899	8,778,670	37,012,082		
2021	37,012,082	3,093,658	2,500,000	1,041,176	8,778,670	34,868,245		
2022	34,868,245	3,093,658	2,500,000	978,682	8,778,670	32,661,915		
2023	32,661,915	3,093,658	2,500,000	914,367	8,778,670	30,391,269		
2024	30,391,269	3,093,658	2,500,000	848,177	8,778,670	28,054,434		
2025	28,054,434	3,093,658	2,500,000	780,058	8,778,670	25,649,479		
2026	25,649,479	3,093,658	2,500,000	709,953	8,778,670	23,174,419		
2027	23,174,419	3,093,658	2,500,000	637,804	8,778,670	20,627,211		
2028	20,627,211	3,093,658	2,500,000	563,553	8,778,670	18,005,750		
2029	18,005,750	3,093,658	2,500,000	487,136	8,778,670	15,307,874		
2030	15,307,874	3,093,658	2,500,000	408,492	8,778,670	12,531,354		
2031	12,531,354	3,093,658	2,500,000	327,556	8,778,670	9,673,897		
2032	9,673,897	3,093,658	2,500,000	244,261	8,778,670	6,733,145		
2033	6,733,145	-	2,500,000	158,537	8,778,670	613,011		
2034	613,011	-	2,500,000	70,314	8,778,670	(5,595,345)		