

**FLOOD INSURANCE**

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### Introduction

1. Floods pose one of the greatest overall and most widely distributed natural risks to life and property throughout the world. Flood disasters account for about a third of all natural disasters in terms of number and economic losses and are responsible for more than half of the fatalities. Moreover, trends analyses reveal that major flood disasters and the losses generated by them have increased significantly in recent decades and will continue to grow in frequency and severity in the future.

2. The floods in Europe which occurred in the summer of 2002, generating bodily injury and extensive property damages the exact amount of which is only now apparent, have reopened the debate on the insurability of flood losses and on the role of private actors and public authorities in the management of flood risks and claims.

### 1. The summer 2002 floods in Europe generated considerable economic losses...

3. Intense precipitation resulting from a combination of freak weather conditions caused devastating flooding over most of Europe in August 2002, affecting a large area stretching from Britain to the Black Sea coast. The resulting torrential rains and rush of water swept the main European rivers causing widespread overflows in surrounding low lying areas. The floods engulfed Austria, Bulgaria, the Czech Republic and in particular the Bohemia region, Eastern and Southern Germany, Hungary, northern and central Italy, Rumania, the Black Sea coast of Russia, Slovakia, the north-east of Spain and the United Kingdom. The heavy rainstorms that battered Southeast France in early September 2002 followed disastrous flooding in Central Europe, aggravating the consequences of the catastrophe.

4. The floods that swept through Europe during the summer of 2002 rank among the most devastating and costly flood catastrophes in this region over the past century in terms of property damage and the loss of human life. During the flooding, some 60.000 residents were evacuated in Austria, 200.000 in the Czech Republic and 100.000 in Germany. Some 4 million German and 1.6 million Czech residents have been affected, and at least 112 fatalities have been registered across the affected region.

5. The overall economic damage from weeks of large-scale flooding in the summer of 2002 is estimated at 18.5 billion Euro<sup>1</sup>. Germany, Austria and the Czech Republic are listed among the countries most affected by this natural catastrophe. In Germany the economic consequences of the flooding have been the most profound and the estimated losses amount to 9.2 billion Euro (sum including both physical damage and loss output). The worse destruction has been registered in the eastern state of Saxony where flood losses reached 6 billion Euro. Losses in Austria are estimated as high as 3 billion Euro. In the Czech Republic the overall economic damage from weeks of large-scale flooding was estimated at the end of 2002 at around 2.2 billion Euro (70 billion CZK)<sup>2</sup>. France has incurred 835 million Euro of economic

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<sup>1</sup> Annual Review : Natural Catastrophes 2002, Munich Re, 2003

<sup>2</sup> Source: Ministry of Finance of the Czech Republic, March 2003.

losses<sup>3</sup>. Italy, Switzerland, Hungary, Bulgaria, Romania, Slovakia and Russia have also encountered substantial economic losses. Notable losses were reported in Great Britain, the Netherlands, Spain, Poland, Moldova and Ukraine.

6. The impact of the floods on the various sectors of the European economy has been widespread. Important direct property and commercial/enterprise losses were reported throughout the region. Among the economic sectors the most affected by the floods were infrastructure, agriculture, supply and tourist industries. In addition to direct losses, much of the damage resulting from business interruption and power failure, cost of assistance, transportation and cleaning up constituted a large part of the overall cost.

## **2. ... of which only a limited part has been passed on to the insurance industry.**

7. Although the damage costs for the floods in Europe account for billions of Euro, insured losses are much lower as only a relatively small part of the material damage and the resulting economic losses was insured. It is mainly due to the fact that flood damage does not form part of standard insurance cover in the affected regions. Because of the low market penetration and strict limits on flood covers in certain regions, the insurance industry faced up to 3 billion Euro<sup>4</sup> of claims representing about 10-20% of overall economic losses. Reinsurers will pay for as much as two thirds of the insurance claims. Expected losses stem primarily from reinsurance contracts written in Germany and the Czech Republic followed by Austria and Italy.

8. As a result, the German insurance market counted total insured losses of around 1.8 billion Euro, the Czech Republic approximately 1.2 billion Euro<sup>5</sup>, Austria around 400 million Euro. The French insurance association estimated the damage stemming from heavy flooding in Southeast France at around 700 million Euro<sup>6</sup>. Slovakian and Hungarian insurers faced more moderate losses.

9. Among insurance companies, the German insurer Allianz, operating throughout the flood-ravaged region sustained the biggest loss of any industry payer. It met claims in Germany due to the flood damage in excess of 770 million Euro<sup>7</sup>. At present, Allianz has already settled claims of an amount of 635 million Euro. However, with reinsurance coverage, net cost of flood losses will represent 300 million Euro for the German group. Next would be the Italian's Assicurazioni Generali SpA, with losses of 79 million Euro; and the Czech insurance company Pojistovna Ceske Sportelny with 69 million Euro. The analysts anticipated that in reaction to the floods, most insurers were likely to raise the price of property insurance, particularly in the flood-prone areas in 2003. This evaluation is currently being confirmed with the escalation of premiums for contracts including flood risk coverage.

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<sup>3</sup> Rapport 154: Prévention des risques technologiques et naturels et réparation des dommages, Commission des Affaires Économiques, 2002-2003.

<sup>4</sup> Annual Review : Natural Catastrophes 2002, Munich Re, 2003

<sup>5</sup> Source: Ministry of Finance of the Czech Republic, March 2003.

<sup>6</sup> Source: Les Echos, 24/01/03. Alternative source quoted 400 million Euro.

<sup>7</sup> Source: Les Echos, 18/02/03

**Box 1: Estimated losses of re/insurance companies resulting from the floods.**

<i>Company</i>	<i>Gross Losses in million Euro</i>
Munich Re	217 - 500 <sup>8</sup>
Swiss Re	170 - 250 <sup>9</sup>
Partner Re	100 - 120 <sup>10</sup>
Hannover Re	64 - 150 <sup>11</sup>
General&Cologne Re	50 <sup>12</sup>
Allianz	770 <sup>13</sup>
Assicurazioni Generali SpA	79 <sup>14</sup>
Pojistovna Ceske Sporitelny (CZ)	69 -260 <sup>15</sup>
Converium	36 - 50 <sup>16</sup>
AMB Generali Holding	30 <sup>17</sup>
Gema	150 <sup>18</sup>
Axa	75 <sup>19</sup>
AGF	58 <sup>20</sup>

10. Facing these considerable losses, the European insurers had however repeatedly emphasised that the financial strength of the insurance industry was not jeopardised by the floods. The financial impact of the floods was reported by the insurance industry to remain within the bounds of “normal” catastrophe loss activity supported by the industry every year. Nevertheless, the impact on insurers’ financial health of the floods that devastated Europe is all the greater in that they cap difficult years for the industry. The insurance industry has seen its profits eroded by the steep decline of stock markets occurring since the spring of 2000 and recorded losses from the September 11th terrorist attacks on the United States estimated at around \$50 billion. Besides, the reinsurance industry had to face a growing bill for claims made against top management executives and companies themselves following a series of big bankruptcies and corporate scandals involving firms such as Enron and WorldCom. Losses have caused more than 100 billion of capital to leave the reinsurance industry over the past couple of years. With excessively low interest rates and low anticipated equity returns, the reinsurers have few investment cushions to fall back on during a decline of their capital.

<sup>8</sup> Estimate source: Merrill Lynch / Munich Re

<sup>9</sup> Estimate source: Swiss Re / Best Wire

<sup>10</sup> Estimate source: Partner Re / Crawfords

<sup>11</sup> Estimate source: Merrill Lynch/ BestWire

<sup>12</sup> Estimate source: General & Cologne Re

<sup>13</sup> Estimate source: Les Echos

<sup>14</sup> Estimate source: Merrill Lynch

<sup>15</sup> Estimate source: Czech News Digest/ Guy Carpenter

<sup>16</sup> Estimate source: Merrill Lynch/ Business Wire

<sup>17</sup> Estimate source: Merrill Lynch

<sup>18</sup> Estimate source: Les echos

<sup>19</sup> idem

<sup>20</sup> idem

### 3. The issue of insurability and the reaction of insurance markets

#### 3.1 Current insurance coverage of flood risks

11. Around the world, two main types of private residential property flood insurance exist: the optional system and the bundle (package) systems.

12. Under the optional system, insurers agree to extend their policy to include flood damage cover on payment of additional premiums. Table 1 contains the information on the countries applying optional flood insurance. Adverse selection is one of the main problems of the optional system. Insurance cover is particularly demanded in the areas which are repeatedly affected by the floods. Consequently, the coverage, when available at all, is expensive due to repeated losses and has very low market penetration.

13. Throughout Europe flood coverage is generally not comprised under standard household and commercial policies, but offered as a supplementary coverage. The penetration rate is low, representing between 5% to 10% of uptake. For instance, only 10% of private and commercial policyholders in Germany and Austria have cover against floods in contrast with almost total insurance against fire.

**Table 1: Countries with Optional Flood Insurance**

<i>Country</i>	<i>Insurance penetration rate</i>
Australia*	60% <sup>21</sup>
	< 5% <sup>22</sup>
Austria	< 10%
Belgium	< 10% increasing slowly
Canada	Commercial and industrial risks only
Germany	< 10% Contents cover is rising
Italy	< 10% Cover is limited Compulsory insurance is being considered
Mexico <sup>23</sup>	< 5%
The Netherlands	< 5%
Slovakia	low

\* Source: information for Australia, Mexico, the Netherlands and Slovakia is provided by relevant OECD authorities, 2003 and for other countries see Swiss Re, 1998, Published in *Water International*, Volume 27, Number 1, page 122, International Water Resources Association

<sup>21</sup> Data referring to the penetration rate of “Flash flooding” insurance. Flash flooding occurs after intense bursts of rainfall in a local area over a short period of time. It causes rivers, creeks and other watercourses to quickly overflow and then subside.

<sup>22</sup> Data referring to the penetration rate of “Mainstream flooding” insurance. Mainstream or riverine flooding occurs when the rain falls or melts causing rivers, creeks or other watercourses affecting potentially large areas.

<sup>23</sup> In Mexico, two systems are available, although bundled system is more frequently used.

14. In the bundle system, the flood damage coverage is available in combination with other risks, like fire, hurricanes, storm surges, typhoons, earthquake, etc. Table 2 lists the countries where the bundle system is being used. The bundle system is characterised by much higher market penetration, ranging from 35/49 percent<sup>24</sup> in Japan to 95 percent in the United Kingdom, owing to the mechanism of spreading the risk over the bigger part of population as well as across perils and rating areas.

**Table 2: Countries that adopted the “Bundled system”**

<i>Country</i>	<i>Insurance Penetration Rate</i>
Czech Republic*	Low (demand for flood insurance is increasing)
Israel	95%
Japan	49.2% (fire insurance for dwellings) 35.4% (fire insurance for household property)
Mexico	Low (package with fire and earthquake coverage)
Portugal	High (package with earthquake)
Spain	Very high
Switzerland	High
Turkey	< 5%
UK	95%

\* Source: information for the Czech Republic, Japan, Mexico, Switzerland and Turkey is provided by relevant OECD authorities, 2003 and for other countries see Swiss Re, 1998, published in *Water International*, Volume 27, Number 1, page 122, International Water Resources Association

15. The United States has adopted a unique system. A National Flood Insurance Program (NFIP), established in 1968 and later significantly amended, is administrated by the Federal Emergency Management Agency (FEMA), which is a governmental body. It provides federally-backed basic insurance coverage against floods for residential and commercial areas. Federal insurance applies only to eligible communities where the flood risk has been assessed and floodplain management measures have been enforced to reduce future flood damage. Taking into consideration that coverage delivered by the NFIP is limited, additional coverage may be purchased from private insurers. Much of commercial and business property is insured against flood risk by the private sector. The penetration rate of flood insurance has been increased significantly over the past few years (from approximately 13% in 1990 to an estimated 22-25% in 2002) due mainly to increased awareness of the flood peril and more aggressive marketing companies conducted by the NFIP and private insurers (for more information, see the note in annex on flood insurance in the United States).

16. In order to be able to pay out damage in the event of natural catastrophes provoking extraordinarily high burdens (case of the summer 2002 floods in Europe), losses have to be shared by many players of insurance industry. This could be achieved primarily by having recourse to the international reinsurance markets or via pooling arrangements between direct insurers. In several countries national or regional pools dealing with one or more of these natural hazards are being used or their creation is being considered in order to redistribute the risk related to natural perils among the insurance industry, based on the principle of solidarity among insurers. (Example: In Switzerland, the Swiss Natural Hazards

<sup>24</sup> Source: Survey conducted by the General Insurance Association of Japan, November 2000. The figure represents the percentage of households covered by fire insurance for household properties and dwellings respectively. Although fire insurance does not necessary flood damage, mainstream fire insurance products (such as “all risk dwelling insurance” which is categorized a part of fire insurance) provide coverage for flood risks.

Pool provides extensive coverage for natural perils, which includes, among others, flooding (this cover is integrated into fire insurance). Turkish Catastrophe Insurance Pool (TCIP), which is currently providing only compulsory earthquake insurance coverage for dwelling, is considering offering basic flood coverage in a few years time.

### ***3.2 Increased scope and frequency of losses, which raise the question of insurability of flood risk***

17. High population density in areas exposed to unfavourable natural conditions constitutes one of the reasons of increase of insurance losses. Population growth will persist and the concentration of inhabitants in flood exposed areas will continue to rise. More than 40 per cent of the world population lives in conglomerates which appear to be extremely exposed to natural disasters. These highly vulnerable mega-cities carry tremendous loss potential.

18. Besides, the continued urban and industrial development in flood risk areas resulting in increased concentration of values is likely also to aggravate the extent of losses in the threatened areas.

19. Moreover, increase in the vulnerability of structures, goods and infrastructures in flood-prone areas due to inappropriate land use and lack or failure of flood protection measures will tend to escalate the loss risk.

20. Finally, the losses associated with floods are likely to further increase due to the global climate change. It is feared that the negative effects of climate change will become more and more pronounced, manifesting in the form of extreme weather conditions. The scientific community is now broadly in agreement of the evidence of an unbroken trend of global warming. Global warming, resulting in the continuing rise in the world's average temperature will tend to increase the severity and frequency of floods throughout the world. The warming of the atmosphere has hastened dramatically in the past 25 years. If the temperature continues to rise, the atmosphere could absorb more water vapour, which will result in larger and more intensive rainfall. Rising global temperatures are also expected to raise sea level, jeopardizing cost dwelling areas. The climate of Central Europe, for instance, is thought to be getting warmer and dryer overall during summer time and much warmer and more humid in winter. Besides, climatic studies undertaken in different countries foresee an increase in storm risk in northern Europe resulting in high precipitation which could affect large areas. The combined effect of storms and tides may well result in more intensive floods in Europe, notably in the Netherlands, northern Germany and United Kingdom<sup>25</sup>.

21. This conjunction of factors mainly explains that insured losses from natural disasters have increased 15-fold since 1960. In 2002, the total economic losses resulting from natural catastrophes came close to 55 billion US, with insured losses accounting for almost 13 billion US<sup>26</sup>. Among all the natural hazards encountered in world, floods are the most frequent, they cause the largest number of fatalities and they provoke the largest economic losses. The increasing magnitude of expected insurance losses and the disparity between size of annual premiums and size of expected losses put into question the ability of the industry to deal with such risks in the long run. Besides, other characteristics of flood risks also raise the issue of their very insurability: flood hazards have a fairly low level of predictability, and the often low level of insurance penetration, coupled with strong adverse selection effects in case of optional flood insurance, lowers the ability of insurers to pool risk across society.

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<sup>25</sup> Risques climatiques majeurs: quelle indemnisation?, Problème économiques, 22 January 2003, p.9

<sup>26</sup> Annual Review : Natural Catastrophes 2002, Munich Re, 2003

### ***3.3 Industry reaction to increasing flood risk***

22. Given the challenge the flood risk presents for industry, the insurance industry has shown great reserve and caution when providing coverage for flood damage. Re/insurers have been tempted to adopt a defensive position, i.e. to rise premiums significantly while reducing their coverage or have refrained entirely from offering this type of cover. This trend has been observed in particular in areas repeatedly affected by floods that are most subject to adverse selection. Restrictions such as incorporation of significant deductible in the insurance terms and conditions and low liability or loss limits are consequently being adopted by insurers.

23. Meanwhile, the industry is also working on the development of new techniques in an attempt to cope with increased flood risks. Increased exposure and growing demand are establishing a need with insurance companies for a more sophisticated and equitable premium rating based on risk proportion. In addition to pricing, capacity and loss reserves, the insurance industry needs to focus on the assessment of insured liabilities and efficient claims settlement practices.

24. In recent years, the frequent occurrence of floods in industrial and residential areas urged the flood risk assessment process to be further developed. As the flood risk is increasing, it becomes increasingly important to assess and analyse the resulting losses which provides the basis for long term management decisions. The assessment of flood risks can be approached at different levels of complexity from basic risk mapping techniques to more sophisticated flood catastrophe modelling methods. Several major components compile the risk assessment, and mainly: hazard referring to frequency of inundation at varying depth and severity of the event, and exposure and vulnerability of the property exposed to flooding. The gathering of earth-science data helps in the calculation of severity. These data are overlaid with estimates of exposure. Frequency remains much harder to evaluate.

25. However, to fully understand the impacts of these factors requests considerable collection of historical environmental data, the availability and quality of which are currently very inconsistent across territories. Historical data on catastrophe events are understandably rare and difficult to establish, and, with climate change, appear to be a less reliable guide to the future. Modern analysis methods developed in hydrology and geo-information science allow a more correct assessment of flood risk. To facilitate the assessment of risk locations more precisely and the control or optimisation of exposures, detailed spatial observation appears to be indispensable. Already today spatial geographical data on risk situation is being collected by insurance companies, stored in databases and actively used in the underwriting process (pricing, budget and accumulation control). Geographical underwriting primarily supports the underwriting process and risk management in non-life and accident insurance. For optimal risk analysis, partnership between private and public sectors (insurance industry, academic community and government) entailing the sharing of research results, data and resources emerges as crucial.

26. Facing the vulnerability of the insurance industry to anticipate natural disasters, the Comité Européen des Assurances (CEA) called for a Europe-wide preventative approach to flood risk management and for an in-depth analysis of a “systemic European action” on the causes and consequences of climate change, in view of the increase in natural catastrophes over the last few years. Moreover, an agreement on the measures to be taken on a global level as regarding the Kyoto protocol provisions is needed to protect the environment effectively. The insurance industry, especially those companies that have signed up to a Statement of Environment Commitment through the United Nations Environment Program (UNEP) Insurance initiative, is ready to put effort into the elaboration of measures which would have the objective to impede or at least curb global warming. The implementation of the Kyoto protocol would be the first important step.



## **4. Role of the State in the flood management**

### ***4.1 Rationale for State intervention***

27. Because most countries in the world have to face natural disasters that result in increasing levels of social and financial losses, many governments have attempted to create specific systems, depending on national circumstances, for managing such major risks through a public-private partnership. As a matter of fact, the severity and increased frequency of the floods generating wide-spread losses of a large part of the population represent a major social problem which calls for government intervention. Among its most visible components is the design of mitigation and aid programs.

28. Decision process for flood mitigation and control measures as well as government subsidies depends on the availability of public funds, of which the resource allocation may involve competition with other society needs. Decisions for flood protection also depend on society value system, notably the solidarity of the non-flood endangered citizens with those living in flood hazard zones.

### ***4.2 Governmental intervention tools***

29. If the private insurance industry remains the main provider of flood coverage, it is essential for the State to provide the appropriate conditions for managing flood risk. Key decisions on flood defence and flood mitigation strategy rest with the government. Public authorities are responsible for preparing for and the basic protection against such natural events.

30. Government actions might include: 1) efficiently protecting the population at risk and reducing damage by means of mitigation regulations; 2) highlighting the threat and enhancing risk awareness among the population; 3) considering the introduction of mandatory insurance; 4) being involved in subsidising the cost of insurance to the beneficiaries and/or being a reinsurer of last resort and in compensating for flood victims through direct governmental aid on ex post basis.

#### *1) Protection measures*

31. The public responsibility under floods mitigation programs includes a) establishment of an infrastructure for flood defence, b) adoption of land-use regulations and buildings codes and c) observation and warning systems.

32. Government can allocate funds to be spent on flood defence (example: the construction and restoration of flood defences: reservoirs, dams, embankments and flood barriers) and other mitigation projects to prevent flood hazard and to minimise the damage caused by heavy river flows. As part of a comprehensive flood management program, the state must ensure that the flood hazard areas are registered and, where possible, avoided for residential, industrial and infrastructure development. In the areas constantly endangered by floods, the government and the local authorities might envisage the relocation of structures out of some floodplains and to make high flood evacuation preparations including boats and rescue equipment. Furthermore, input into risk-reducing building regulations in order to ensure that new buildings in high exposure zones use more resilient design and materials (water resistant materials, waterproof seals, strong foundation, etc.) is of high relevance due to increasing vulnerability of structures and goods in flood hazard areas. Governmental measures may also include investment in scientific multidisciplinary research projects to quantify the hazard from floods and development of flood mapping, notably from Space, of regions highly exposed to risk. Greater results might be achieved by means of intra-governmental research co-operation, for example the European Commission funded research IMPACT

program on the investigation of extreme flood process aiming to improve knowledge and understanding in key areas affecting the reliability of extreme flood estimation and to aid the validation and development of real modelling tools. The provision of a better early warning system is an important step in improving an existing flood protection system. The basis for a warning system has to be an efficient forecasting system, using modern communication technology, which allows the early detection of an imminent flood to which the population is exposed.

33. State monitoring over the enforcement of both land-use restrictions and building codes should be an important part of governmental risk mitigation programs.

#### *2) Promote risk awareness among the population*

34. An important part of the losses are due to a lack of public awareness in the use of areas exposed to flooding. Protection measures, while reducing the frequency of dangerous events, have one unfavourable aspect: they also reduce the awareness that disaster may strike. Trusting the protection measures, inhabitants of the flood hazard zones may neglect or deny the threat and consequently be unprepared when “nature strikes back”. Therefore, the State is called upon to highlight the threat and promote risk awareness among the population living in flood hazard zones. It could be achieved by the means of education, training, information collection and dissemination of accurate flood data publicly and in particular funding of research programs and studies which could be used to gain a broader knowledge of flood risks and wider community awareness. (For more information on Australia public awareness programs see the annex entitled “Flood insurance in Australia”.)

#### *3) Consideration for introduction of mandatory insurance*

35. Experience around the world testifies that flood insurance works best if it is provided in a bundle system. Where several natural hazards together constitute a threat, a comprehensive package covering different types of hazards increases the balance of portfolio. The role of the State will therefore be to incorporate flood cover in private property insurance, together with other perils. Where flooding represents the outstanding danger, the State may render flood and storm insurance compulsory or combine flood and fire insurance, in mandatory manner in many countries. France, Iceland, Norway, Spain and Switzerland<sup>27</sup> have all introduced compulsory insurance against natural perils. In Poland, compulsory insurance has been set up for damages to farm buildings caused by perils such as fire, hurricane, floods, etc.

#### *4) Government compensation mechanisms*

36. Government compensation mechanisms to victims of flood damage and flood hazard mitigation strategies vary considerably from one country to another as a result of differing national priorities and local cultures. The national flood relief programmes include systems with no state compensation for citizens (Germany, Japan, Portugal, UK); government procedures providing compensation in hardship cases (Australia, Canada, Mexico, Slovak Republic, Turkey); government catastrophe programs applied to the floods when declared a national disaster (Belgium, France, Italy, Iceland, Norway, Netherlands, Poland, Switzerland, Spain, US). The United States has adopted a unique system. (see paragraph 15).

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<sup>27</sup> Focus rapport: Floods are insurable!, Swiss Re, 2002

37. A Central part in governmental operational risk management is disaster relief, i.e. a set of actions to be undertaken on an ex-post basis when disaster has struck. The process includes the organisation of financial and humanitarian aid to the victims which could be channelled through various ministries, including military authorities, e.g. Army and Navy Ministries in Mexico, and later the reconstruction of damaged buildings and lifelines.

38. Finally, the government might decide to alleviate flood losses using the following financial instruments: preferential credits, tax refunds, amortisation write-offs, supplement to credit interest, etc.

#### ***4.3 The case of recent European floods: National initiatives***

39. In the countries most affected by the devastating floods during the summer of 2002, there are no state solutions for the coverage of flood losses (insurance against flood hazards is provided only on free-market conditions by the private sector). Only in France, following the violent flooding of 1981, the natural disaster compensation system has been established, based on both private insurance and an ultimate state-guaranteed public reinsurance (Caisse Centrale de Réassurance). The French government has created a uniform surcharge on all private insurance contracts to pay for natural disasters. However, the increased coverage is available only if the disaster is declared by inter-ministerial decree. The premium rate for natural disaster coverage is fixed by law (it is the same for all policyholders).

40. In Austria, the Czech Republic and Germany, flood insurance coverage is provided exclusively by private insurance companies. As already discussed above, due to the low penetration level of insurance coverage (less than 10%), much of the damages caused by last summer's floods in Europe is being covered by States through direct government aid and extensively alleviated by the financial assistance from the European Union.

41. The French Prime-Minister has released the package of state aid amounting to around 400 million Euro for the victims of the region hit by the floods. In order to help contribute to national flood emergency relief programs, Germany and Austria decided to postpone an income-tax cut planned for the next year. Some countries financed the flood recovery by cutting military spending. Austria will reduce the order for Eurofighter aircraft and the Czech Republic cancelled a 2 billion USD plan to purchase 24 Anglo-Swedish Gripen fighter planes. On an exceptional basis, the European Commission may approve the state aid to repair up to 100% of the flood damage.

### **5. Building regional solidarity scheme: the example of the European Union**

#### ***5.1 Implementation of a European Union Solidarity Fund***

42. Taking into consideration the extremely destructive character of summer floods that hit Europe in 2002, the European Commission proposed regulation laying down the implementation of a European Union Solidarity Fund, an initiative strongly supported by the European Parliament and the Council. This permanent emergency fund consists of a swift instrument to react to recent floods and to meet challenges of future major natural, technical and environmental disasters. Help from the fund would be available to current EU Member States as well as to prospective members negotiating accession. The fund is complementary to the structural funds. The Commission submitted a proposal for an inter-institutional agreement (between the European Parliament, the Council and the Commission) under which a maximum annual amount of 1 billion Euro is to be available for emergency aid.

43. The scope of the fund is therefore limited. It considers as a major disaster any event that causes damages of over 3 billion Euro or which represents more than 0,6% of the GDP of the state concerned. Besides this, under exceptional circumstances, a disaster that affects a substantial part of the region's or the state's population shall also be considered as eligible to the fund. The fund will be focused on providing immediate financial assistance to the countries and the regions such as: restoration of important infrastructures and plants in the fields of energy supply, water supply and sewage treatment, communication, transport, health and education; provision of emergency shelters and mobilisation of emergency services to meet the needs of the affected population; safeguarding of protective installations and measures for immediate protection of the cultural heritage and clean-up of the damaged areas. The long-term reconstruction of the affected sectors of economy and business will be left to other instruments.

44. Following the flood disaster in the summer of 2002, four countries were eligible to receive aid packages from the European Solidarity Fund: Austria, the Czech Republic, Germany and France. The sum allocated varied according to the amount of damage caused by floods to a particular country. Accordingly, 444 million Euro were allocated to Germany, 134 million Euro were assigned to Austria; 129 million Euro were transferred to the Czech Republic and France received 21 million Euro.

## ***5.2 Other help channelled through European Union programs***

45. Besides the aid that was channelled through the Solidarity Fund, the Union provided financial assistance under the EU Structural Funds, as well as programmes for rural development. The Commission has confirmed that Austria, Germany and France may reallocate part of the Structural Funds earmarked for them for the period of 2000-2006. In the applicant countries, the Czech Republic and Slovakia, technical and financial assistance will be reallocated from the pre-accession not assigned funds.

46. Moreover, the European Commission has adopted a number of measures for emergency assistance to destroyed agricultural and rural areas in EU member countries. Concerning the candidate countries, in particular the Czech Republic and Slovakia, the European Commission has identified possible financial support to restore agricultural areas under the scope of the SAPARD regulation.

47. Finally, the European Investment Bank (EIB) has launched a Central European Flood Relief Programme for financing flood relief in affected countries. The Bank has earmarked 5 billion Euro for investment under this programme, of which 1 billion Euro should be distributed immediately to answer the emergency needs of the affected region. EIB's special support terms for loans directed to reconstruction projects of public and private entities and actions immediately benefiting the flood stricken areas could cover up to 100% of external funding requirements whilst having very advantageous interest rates, as well as particularly long repayment periods of up to 30 years.

## **6. Conclusion**

48. Thus far, the private insurance industry has successfully tackled the insured losses resulting from the floods, in particular through the mechanisms of spreading the risk around the world using global reinsurance. The payment of claims arising from the damage caused by the floods which occurred in Europe during the summer of 2002, although substantial, will not jeopardise the financing of insurance companies.

49. However, the increased frequency and severity of floods throughout the world constitutes a real challenge for the insurance industry and forces it to react to quite new loss dimensions as the loss trends continue to deteriorate. In response, insurance underwriters have had to raise the premiums and limit certain types of property cover in various areas.

50. In the long-run, the prospect of widespread losses both in human life and economic goods calls for new approaches to flood prevention and management on the part of the insurance industry and national governments. Insurers are expected to take a proactive approach to use their expertise to handle the growing risks and to work in closer partnership with the research community and government to understand, quantify, minimise and prevent as far as possible and manage these risks. Besides, there is a growing pressure on governments around the world to take more effective preventive and alleviation measures in order to reducing flood impacts.

<i>Country name</i>	<i>Governmental compensation scheme of flood risk</i>	<i>Main characteristics of the scheme</i>
Australia	Federal Flood Recovery Fund	<p>The Federal Government announced this \$10 million fund in November 2000 to provide extra support to the rural and regional communities in the severely flood affected areas of central and northern New South Wales and southern Queensland.</p> <p>Approved projects help voluntary community sports organisations repair their grounds and facilities, assist financial counselling organisations meet the extra demand for services from farmers and other business owners and assist the rebuilding of damaged water and sewage services.</p> <p>This Fund is separate from the Commonwealth Flood Assistance Package and additional to Federal assistance under the Natural Disaster Relief Arrangements. Access to the Fund was extended to the communities on the New South Wales north coast that were severely flooded in January to March 2001. Applications for funding closed on 30 June 2001</p>
	Commonwealth Flood Assistance Package for Central and Northern NSW and Southern Queensland	<p>This assistance was in addition to the existing Natural Disaster Relief Arrangements for activities such as repairing roads and public facilities, and ensuring people's emergency household needs are met. The Government provided \$151.7 million in funding over 2000-01 for flood assistance.</p>

Australia cont.		<p>The package, targeted at cotton, cereal and horticulture enterprises that suffered from excessive rainfall and floods, was funded through two government departments: Agriculture, Forestry and Fisheries; and Transport and Regional Services. It provided four different assistance packages depending on the specific assistance requirements of the enterprise: income support, crop planting grants, interest rate subsidies and grants to small and medium-sized business</p>
	Natural Disaster Relief Arrangements	<p>Under this on-going program, the Commonwealth provides funding assistance to States and Territories aimed at alleviating the financial burden associated with the provision of natural disaster relief payments and infrastructure restoration. The financial assistance is provided only after a natural disaster has occurred. Relief measures include: grants for relief of ‘personal hardship and distress’; concessional interest rate loans to farmers, small business operators and voluntary non-profit bodies to replace damaged assets; payment to restore or replace essential public assets; payments for providing financial and psychological counselling to persons affected by natural disaster.</p>
France	National Disaster Compensation Scheme (CAT NAT)	<p>The CAT NAT based on both private insurance and an ultimate state-guaranteed public reinsurance (Caisse Centrale de Réassurance (CCR)) covers losses on both individual and commercial property when the state of disaster is declared by inter-ministerial decree. The scheme provide with a compulsory natural disaster</p>

France cont.		extension on all property damage policies bought on insurance market. A uniform surcharge on all private insurance contracts, which is fixed by the law, is paid for natural disasters. Federal reinsurance is available from CCR to cover unusually large losses, backed by government guarantee.
Iceland	Icelandic Emergency Insurance Organisation	Statutory compensation scheme that covers damages from volcanic eruptions, earthquakes, earth slides, avalanches and floods. All insurance companies that insure property against fire are required to collect a tariff along their premiums and return the tariff to the Icelandic Emergency Insurance Organisation.
Mexico	National Fund for Natural Disasters (FONDEN)	Provides relief in a complementary way in the cases of natural catastrophes, although its resources are generally limited.
Netherlands	The Calamities Compensation Act (WTS)	Under certain circumstances, the State pays compensation for loss or damage which can not be (commercially) insured up to a maximum of 450 million Euro per year.
New Zealand	Earthquake Commission (EQC) Natural Disaster Fund	The scheme covers losses ensuing from earthquake, volcanic and hydrothermal activity, tsunami, natural landslip and in the case of residential land, also storm and floods. EQ cover is available if fire insurance is bought through an insurance company. Dwellings are insured up to maximum of NZD 100.000 and personal effects up to NZD 20.000. EQC administrates the Natural Disaster Fund, comprising capital and reserves, backed by the government guarantee.

Norway	National Fund for Natural Disaster Assistance  (Statens Naturskadefond)	The fund was established with the aim to compensate damage caused by natural perils (floods, landslide, storms, earthquake, etc.) and to contribute to protective measures against such perils. The Fund compensates damage on property that is not possible to insure against fire, such as roads, bridges, farmland and crops.
Poland	National Programme for Restoration and Modernisation	The programme covers damages caused by flood to individual, commercial and local community property. This is a governmental compensation scheme (financed by State budget, local community budget, PHARE – “Restoration programme”).
Spain	Consortio de Compensacion de Seguros (C.C.S.)	C.C.S. plays a subsidiary role to the insurance market under two circumstances:  <ul style="list-style-type: none"> <li>- direct insurer : if the flood risk in not covered by insurance industry;</li> <li>- guarantee fund: if the flood risk is covered, but the private insurer is unable to meet his commitments due to bankruptcy or insolvency</li> </ul>
United States	National Flood Insurance Program (NFIP)	The NFIP provides federally-backed basic insurance coverage against the floods only to eligible communities where the flood risk has been assessed and floodplain management measures have been enforced to reduce future flood damage. The NFIP is government funded. The coverage provided by the NFIP is limited for residential property to a structure value of 250.000 US dollars.



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## ANNEX

### FLOOD INSURANCE IN AUSTRALIA

#### **Background to Flooding in Australia**

Australia's historic settlement patterns of developing along our rivers have resulted in many towns and cities located close to rivers, with significant development on floodplains. This causes a loss of the natural flood storage areas on river floodplains. Further, urbanisation causes increased run-off from roads, roofs and other sealed surfaces. Consequently, many cities, towns and other urban areas are prone to flooding and could therefore benefit from flood mitigation. Having said this, according to Environment Australia, Australia's urban flood risk is quite small, with only about 1% of our population at risk from mainstream, or riverine, flooding.

Recent drought conditions in Australia have led to serious soil absorption problems in many outback and even urban areas. Consequently, even the smallest amount of rain is not able to be absorbed into the soil and may cause run-off and possible flooding.

Flood mitigation and floodplain mapping techniques employed by different jurisdictions vary quite substantially, as would be expected. In some of Australia's more remote areas, such as in the Northern Territory and Western Australia, communities have quite serious access issues in terms of a lack of alternative hospitals, business services and road transport. As such, mitigation plans have taken into account the remoteness of these communities. Other jurisdictions, despite being located in flood prone areas, have not been affected by flooding for many years and therefore have little knowledge or community awareness of the impact of flooding on their community.

#### **Australia's Flood awareness, Mitigation and Assistance**

There are many measures, as examined below, indicating Australia's commitment to public awareness, flood mitigation and Government assistance to citizens affected by flooding.

Recent reports and studies have been used to gain broader knowledge of flood risks and wider community awareness. These include the FloodAUS risk rating model and the report released by the Department of Transport and Regional Services (DoTARS), Report 106: The Benefits of Flood Mitigation in Australia.

#### ***FloodAUS***

The FloodAUS risk rating model was developed in 2000 by the Natural Hazards Research Centre (NHRC) at Macquarie University under a contract with Royal and Sun Alliance. The FloodAUS risk rating model is used to estimate the mainstream flood risk in urban areas on a per-address basis. This data will be particularly useful to the insurance industry, enabling them to set more accurate premiums based on individual flood risk. As there can be significant variations in risk within a small area, it is important that risk data is represented on a per-property basis. Consequently, FloodAUS data is both comprehensive and valuable.

The NHRC has recently supplied data on 24 urban areas in Eastern Australia in a report released in March 2002. This study, the first large-scale application of the FloodAUS model, reported that over 1 million urban addresses have been assigned a flood risk rating, and this figure is rising.

### ***Insurance Disaster Response Organisation***

The Insurance Disaster Response Organisation (IDRO) was formed in March 2000. A National Committee which reports to the Insurance Council of Australia (ICA) Board, it comprises representatives from insurers, reinsurers, brokers, loss adjusters and Insurance Enquiries and Complaints Ltd. The IDRO aims to provide a single point of contact in each State and Territory, providing not only affected policyholders, but also media and other interested parties, with relevant information and advice.

### ***DoTARS Report 106: Benefits of Flood Mitigation in Australia***

Released in 2001, Report 106: the Benefits of Flood Mitigation in Australia, is the third publication contributing to the regional theme of natural disaster research identified in the Bureau of Transport & Regional Economics' research programme. The Bureau of Transport & Regional Economics operates within DoTARS to provide information and analysis for the Government and the community, by conducting and disseminating the results of relevant, high quality applied economic research and a range of information products. Report 106 follows on from Report 103: Economic Costs of Natural Disasters in Australia, which examined natural disasters with an individual cost of more than \$10 million. Report 103 found that floods are Australia's most costly disaster type and, on average, cost the Australian community over \$300 million each year.

The Disaster Mitigation Research Working Group (DMRWG), chaired by DoTARS, oversaw the research. The DMRWG represents a collaborative effort among Commonwealth and State and Territory Governments, Local Government, the ICA and the New Zealand Government.

Australian governments allocate resources to reduce the impact of floods through various forms of mitigation. However, little work has been done to assess the effectiveness of mitigation that has been tested by subsequent flooding. Report 106 aims to build on current levels of understanding by investigating the costs avoided by Australian flood mitigation projects. It captures much of the available Australian information on the benefits of flood mitigation through a literature survey, consultations and case studies.

### ***Regional Flood Mitigation Programme***

The Regional Flood Mitigation Programme (RFMP) is a Federal Government initiative to assist State and Territory Governments and local agencies in the implementation of priority, cost effective flood mitigation works and measures in rural, regional and outer metropolitan Australia.

The Programme is designed to integrate with the Federal Government's approach to natural disaster mitigation throughout Australia. That is, to continue to provide support to the States and Territories with the development of emergency preparedness and mitigation activities. In particular the Commonwealth facilitates education, training, research, public awareness, and information collection and dissemination activities. It also provides specialised warning and monitoring services for meteorological and geological hazards as appropriate.

The Commonwealth Government, through Emergency Management Australia (EMA), supports a comprehensive approach to emergency management. EMA pursues a cooperative and collaborative relationship with Commonwealth agencies such as the Department of Finance and Administration, Geoscience Australia and the Bureau of Meteorology. In doing so, EMA seeks to encourage an "all agencies", "all hazards" approach to the prevention or mitigation of disasters, preparedness for their impact, response to that impact and recovery from the consequences.

Projects funded by the RFMP are those which address flooding issues as part of regional floodplain management. Natural flood disasters are addressed from a risk management viewpoint. This involves identifying and analysing the risk, assessing the management options - including mitigation works and measures - and implementing effective solutions.

Mitigation is gaining more prominence on the emergency management agenda within all States and territories. Numerous mitigation projects have been implemented or are planned, and more government funding is being channelled into prevention activities. The main flood mitigation activities being conducted by EMA are:

- flood mapping;
- landuse management to limit the use of floodplains for the site of vulnerable elements (including infrastructure, residences, buildings etc);
- engineering of structures in some floodplains to withstand flood forces (levee banks, berms, flood walls with opening barriers, dams);
- relocation of structures out of some floodplains;
- flood resistant building materials (water resistant materials, waterproof seals, strong foundations);
- building design to elevate floor levels;
- storage and sleeping areas high off the ground;
- flood warnings;
- community awareness of floodplains;
- awareness of potential impact of deforestation on flood risk; and
- flood evacuation preparedness including boats and rescue equipment.

### ***Commonwealth Flood Assistance Package***

An excellent example of the commitment of the Australian Federal Government to assisting citizens affected by floods is the Commonwealth Flood Assistance Package for Central and Northern NSW and Southern Queensland, which was announced in December 2000. The package was initially targeted at cotton, cereal and horticultural enterprises which had suffered severe hardship as a result of the excessive rainfall and flooding during November 2000. However, the Business Grant component was extended to include areas on the northern coast of New South Wales that were flooded from January to March 2001.

The package was funded primarily through two government departments: Agriculture, Forestry and Fisheries, and Transport and Regional Services who contributed to the total government funding of \$151.7 million over 2000-01. It provided four different assistance packages depending on the specific assistance requirements of the enterprise: income support, crop planting grants, interest rate subsidies and grants to small and medium-sized businesses. In total, over 9700 claims were received, with more than 8200 granted.

In addition to the Commonwealth Flood Assistance Package, the Federal Government provided extra support in the form of a Federal Flood Recovery Fund. It too was extended to include the New South Wales north coast areas that were flooded in January through March 2001.

### **Insuring against Flood Risk in Australia**

There are two main types of flood insurance policies offered in Australia: flash flooding insurance and mainstream flooding insurance.

*Flash flooding* occurs after intense bursts of rainfall, often from thunderstorms, in a local area over a short period of time. It causes rivers, creeks and other watercourses to quickly overflow and then subside. Flash floods are common in Australia, and, due to the speed with which they occur, can cause significant property damage.

A number of large insurers include cover for flash flooding in a 24 hour period in their home and contents policies while excluding mainstream flooding. There may be some limits on the cover.

*Mainstream, or riverine, flooding* occurs when rain falls or snow melts (whether in the immediate region or elsewhere) causing rivers, creeks or other watercourses to overflow. This can occur over a wide area, often remote from the location where the rain fell, and some time after it occurred.

A very small number of insurers provide unrestricted flood cover that includes mainstream flooding, in their standard policies. Those that do may charge an additional loading for higher risks, as much as 45%, or may not offer cover in highly vulnerable areas.

A third variation adopted by one large insurer is to exclude all damage from ground water, no matter what its source, in its basic policy. The policyholder can then pay an additional premium for damage from water travelling over the ground. The policy does not make any differentiation based on the source of the water.

Although some insurance protection is provided for damage to residential properties from storm and flash flooding, insurance cover for other flood damage does not appear to be readily available. Having said that, it has been reported that Australian Alliance Insurance provides cover for flood in their standard policy wording.

### ***The Current Penetration Rate of Flood Insurance***

The penetration of flood risk insurance in Australia varies quite substantially between different types of flood insurance. Insurance for “flash flooding” has quite a high penetration rate in Australia, while insurance for “mainstream flooding” is much less widespread.

The high penetration rate of flash flooding insurance is due, in part, to the fact that flash flooding is covered under most building, contents and motor policies. While it is very difficult to quantify, the ICA has estimated that the penetration rate for this type of cover could be as high as 60% Australia wide. The exact penetration rate of flash flooding insurance varies amongst different insurers.

Conversely, insurance for mainstream flooding is rarely offered as part of a standard contract, but rather has to be obtained independently, leading to a low penetration rate for this type of insurance. This is further exacerbated by the fact that very few insurers offer this type of coverage. Requirements for obtaining mainstream flooding insurance seem to vary from automatic coverage on application to detailed site inspections. While emphasising the difficulty of providing accurate figures, the ICA has estimated that the penetration rate for this type of cover is probably less than 5%. The exact penetration rate of mainstream flooding insurance varies between different insurers. Flooding from storm surge is generally excluded from mainstream flooding insurance policies.

Flood cover is generally available for commercial property, although in flood-prone areas, the premium could be prohibitive.

### ***The Cost of Major Flood Disasters in Australia***

The following Tables outline the cost of the major flood disasters in Australia over the 10 year period, February 1992 to February 2002. Table 1 details these floods in chronological order, while Table 2 lists the floods in descending order of the cost of the flood.

These Tables include only those flood events that were declared a disaster by appropriate Government bodies and those that cost at least \$10 million.

**Table 1. Cost of Major Flood Disasters in Australia from 1992 – 2002 (by date)**

<i>Date</i>	<i>Location</i>	<i>Type of Disaster</i>	<i>Cost \$A<sup>#</sup> (million)</i>
Sep-93	Benalla & Shepparton, VIC	Flood	12
May-96	South East QLD	Flood	31
Nov-96	Coffs Harbour, NSW	Flood	20
Jan-98	Townsville, Thuringowa City, QLD	Flood, Storm	71
Jan-98	Katherine, NT	Flood	70
Aug-98	Woollongong, NSW	Flood, Storm	50
Dec-98	Melbourne, VIC*	Flood, Rain	10
Dec-99	VIC	Flood, Rain, Storm	10
Feb-00	Longreach, Central QLD	Flood, Storm	12
Mar-01	North Coast, Grafton, Kempsey, NSW	Flood, Storm	25
Mar-01	Brisbane, QLD*	Flood, Storm	37

Source: Insurance Disaster Response Organisation - Disaster List [Available Online: [www.idro.com.au/disaster\\_list/default.asp](http://www.idro.com.au/disaster_list/default.asp)]

# Costs have been calculated at 2002 prices.

**Table 2. Cost of Major Flood Disasters in Australia from 1992 – 2002 (by cost)**

<i>Date</i>	<i>Location</i>	<i>Type of Disaster</i>	<i>Cost \$A<sup>#</sup> (million)</i>
Jan-98	Townsville, Thuringowa City, QLD	Flood, Storm	71
Jan-98	Katherine, NT	Flood	70
Aug-98	Woollongong, NSW	Flood, Storm	50
Mar-01	Brisbane, QLD*	Flood, Storm	37
May-96	South East QLD	Flood	31
Mar-01	North Coast, Grafton, Kempsey, NSW	Flood, Storm	25
Nov-96	Coffs Harbour, NSW	Flood	20
Sep-93	Benalla & Shepparton, VIC	Flood	12
Feb-00	Longreach, Central QLD	Flood, Storm	12
Dec-98	Melbourne, VIC*	Flood, Rain	10
Dec-99	VIC	Flood, Rain, Storm	10

Source: Insurance Disaster Response Organisation - Disaster List [Available Online: [www.idro.com.au/disaster\\_list/default.asp](http://www.idro.com.au/disaster_list/default.asp)]

# Costs have been calculated at 2002 prices.

The majority of floods over the past 10 years have occurred in rural or regional areas. Only two floods, those in Melbourne in 1998 and Brisbane in 2001 (marked with an asterisk above, \*) have occurred in urban areas.

### ***Workshop on Residential Flood Insurance***

The Australian National University hosted a workshop in early 2001, 'The Implications for Urban Floodplain Management Policy in Australia'. Co-hosted by the Water Research Foundation of Australia and the ICA, the workshop addressed the issue of the provision of residential flood insurance. Among the attending parties were representatives from all levels of Government including local council, State and Federal Agencies and members of the insurance industry.

The parties reached a consensus that residential flood insurance should be offered in Australia, particularly as Australia is the only OECD member country that does not offer comprehensive flood insurance products. A bundled insurance policy was thought to be the most appropriate form of insurance to offer, as it allows the spreading of risk across all policyholders. Optional flood insurance, accessed through the payment of additional premiums, was not thought to be appropriate in Australia due to the necessity for very high premiums caused by adverse selection, resulting in low market penetration.

Addressing the low availability of flood insurance, many of the parties criticised the insurance industry for not doing enough to initiate viable flood insurance products. The lack of reliable flood risk data was raised by the insurance industry as a major contributing factor to the scarcity of flood insurance products in Australia. However, it was agreed that greater availability of flood insurance would only become an effective solution if coupled with risk reduction strategies like flood mitigation. While some Australian states may have a way to go in terms of implementing effective flood mitigation strategies, others like NSW have a very advanced flood mitigation programme. Their programme has reduced the risk of flooding in many areas through better residential planning.

*The Treasury*

*February 2003*



## **BRIEF OVERVIEW OF FLOOD INSURANCE IN THE UNITED STATES**

In the United States, the National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency (FEMA), an agency of the U.S. government, is the principal means of delivering residential flood insurance. However, to encourage the marketing, purchase, and penetration of residential flood insurance where it is needed, there is a significant public-private partnership between the federal government and private homeowners insurers called the Write-Your-Own (WYO) program. While NFIP-FEMA underwrites flood insurance, private insurers and agents have assumed significant responsibility for marketing, administering policies and settling claims under the flood insurance program. This allows private insurers selling a regular homeowners insurance policy covering most risks to provide flood insurance at the same time under the NFIP program. Because NFIP coverage is limited to a structure value of \$250,000, there is some private market coverage available for values in excess of that amount for high valued homes, however, no estimates are available on the size of that market.

Although the NFIP writes some commercial flood insurance in vulnerable areas where private commercial coverage is almost impossible to obtain, much of the commercial or business property flood insurance in the U.S. is written by private insurers. In many cases, this is written as an endorsement to standard commercial property insurance policies or as a separate commercial flood policy. In recent years, commercial insurers have begun to pay much closer attention to the marketing, underwriting and pricing of flood coverage. A substantial amount of flooding has been associated with major hurricanes and tropical storms in recent years, especially Tropical Storm Allison which inundated metropolitan Houston with up to 40 inches of rain during June 2001. The Mississippi River flood plain and other important American river systems have also experienced 250 or 500-year floods in the past decade which has brought increased focus to the flood risk.

### **Penetration**

With increased awareness of the flood peril and more aggressive marketing by the NFIP and private insurers participating in the WYO program, the past decade has seen a substantial rise in the total number of flood insurance policies written through the NFIP. The number of policies increased from about 2.3 million in 1990 to over 4.5 million in 2002, or nearly a 100% increase. Another major effort that has been successful in increasing the total number of policies and improving the spread of risk and reducing the problem of "adverse selection" in flood insurance is the Preferred Risk Program (PRP). PRP is an effort that began in the late 1980s to market flood coverage to homeowners who may be outside the 100-year flood or high hazard areas, but still at some risk for flooding. "Adverse selection" is a problem in insurance underwriting that occurs when only those properties most vulnerable to a risk purchase coverage. The cost of coverage is generally much less expensive for PFP flood policyholders due to the lower risk.

Estimates of penetration rates are impacted by how one defines the market and need for flood insurance. As mentioned, the PRP program has expanded demand and penetration somewhat outside of the traditional, high hazard, high need areas most vulnerable to flooding. As a result of more aggressive marketing, the WYO partnership and the PRP program, penetration of the market for flood insurance has increased from approximately 13% in 1990 to an estimated 22-25% in 2002. This range in the estimate is based on FEMA studies of how many U.S. properties are in high hazard (100-year expected flood areas). In 1990, FEMA estimated that there were about 12 million high hazard structures; the number has undoubtedly grown by over one million with rapid development in coastal areas of the U.S. vulnerable to flooding over the past decade.

Florida leads the U.S. by far in total number of flood insurance policies in force with approximately 1.8 million policies, or about 40% of the national total. Texas ranks second among states for total flood policies, with 450,663 policies, followed by Louisiana (367,111), California (281,224), and New Jersey with 182,318 flood policies.