

The Development of Disaster Management Information Systems in Taiwan

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Contents

- Missions
- Current DMIS
- Strategies
- Conclusions

MISSIONS:

to support

(1) response decision making

(2) hazard mitigation strategies

TASKS:

- Shaping IT policy for disaster management
- Facilitating Disaster Response DSS
- Promoting information sharing across organization boundaries
- Introducing and developing new information technologies

Current Disaster Management Information Systems in Taiwan



Disaster Management DSS (NCDR)

- A web-based decision support system for disaster management
- Utilizing and integrating GIS technology, hazards database and hazards model bases for disaster analysis
- Utilizing telecommunication systems to transmit real-time data
- A user friendly interface is designed for the information system.

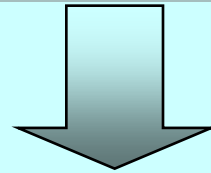
Hazards Database

Hazards Model Base

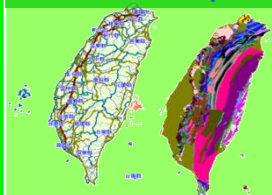
**Network
Technology**

GIS technology

User Interface on Web

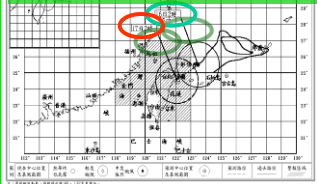


Basic Maps

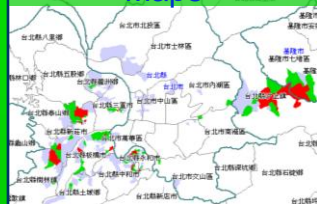


Decision Support System for Early Warning

Typhoon Path Prediction



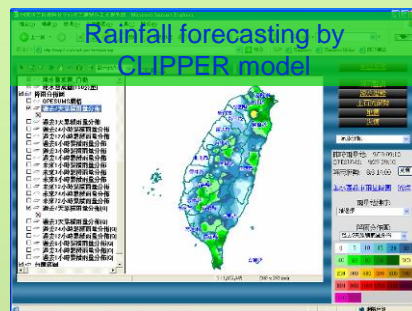
Inundation Potential Maps



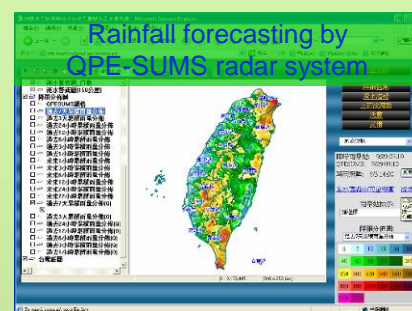
Debris Flow and Landslide information



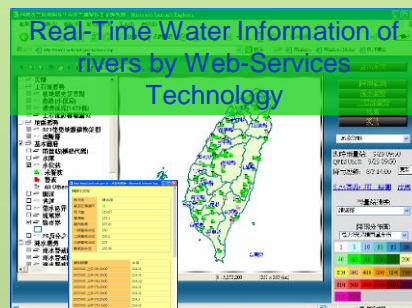
Rainfall forecasting by CLIPPER model



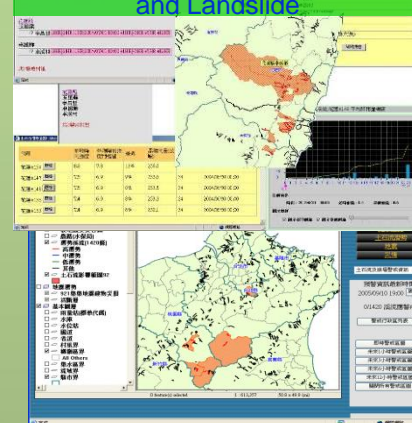
Rainfall forecasting by QPE-SUMS radar system



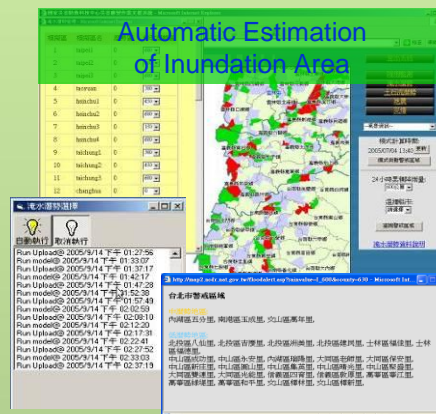
Real-Time Water Information of rivers by Web-Services Technology



Automatic Estimation of the potential areas of Debris Flows and Landslide



Automatic Estimation of Inundation Area



Management of Disaster Investigation



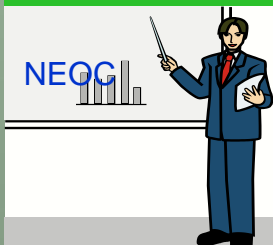
Warning Message Broadcasting

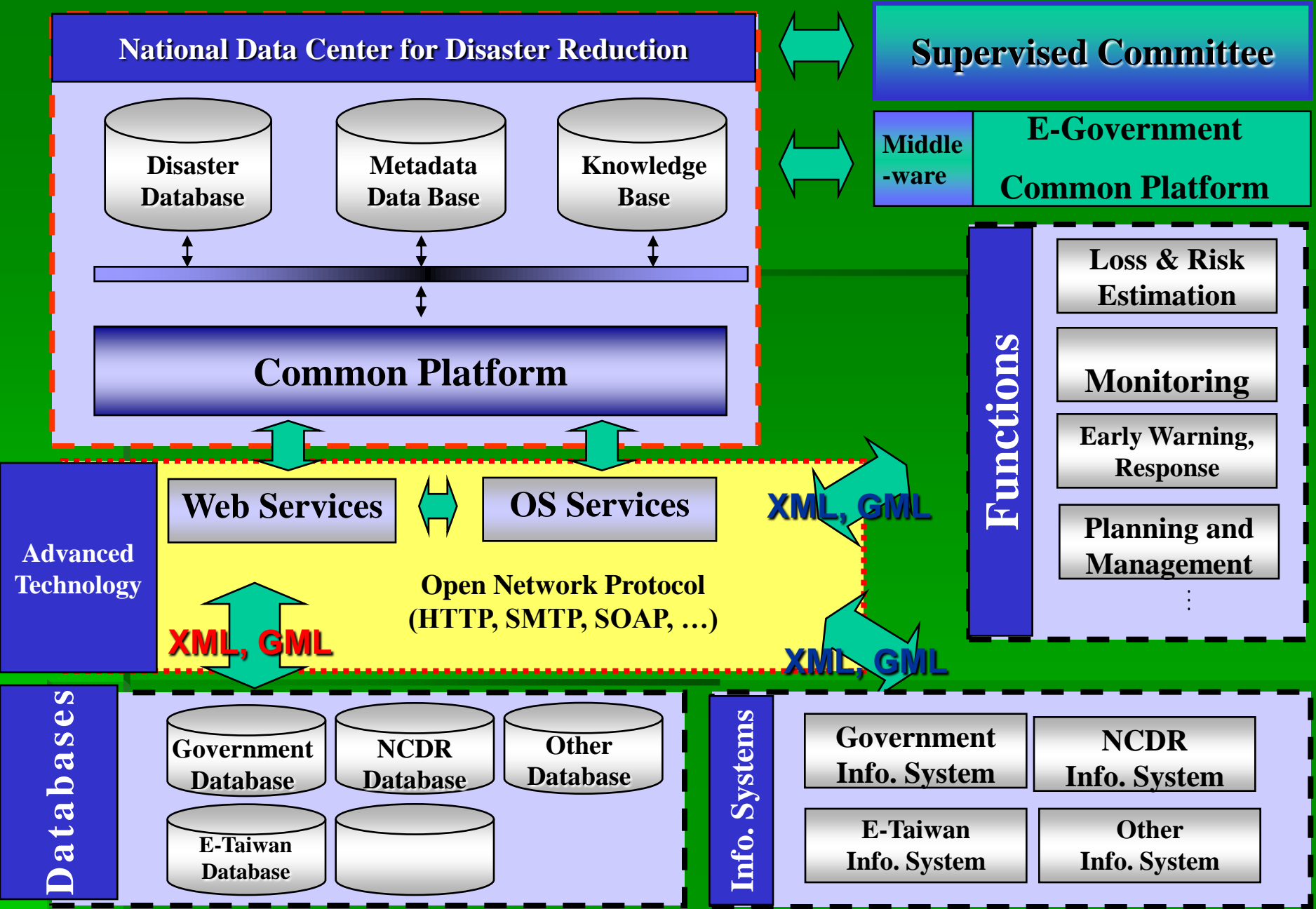


Analysis and Decision Making



Central Warning Declaration





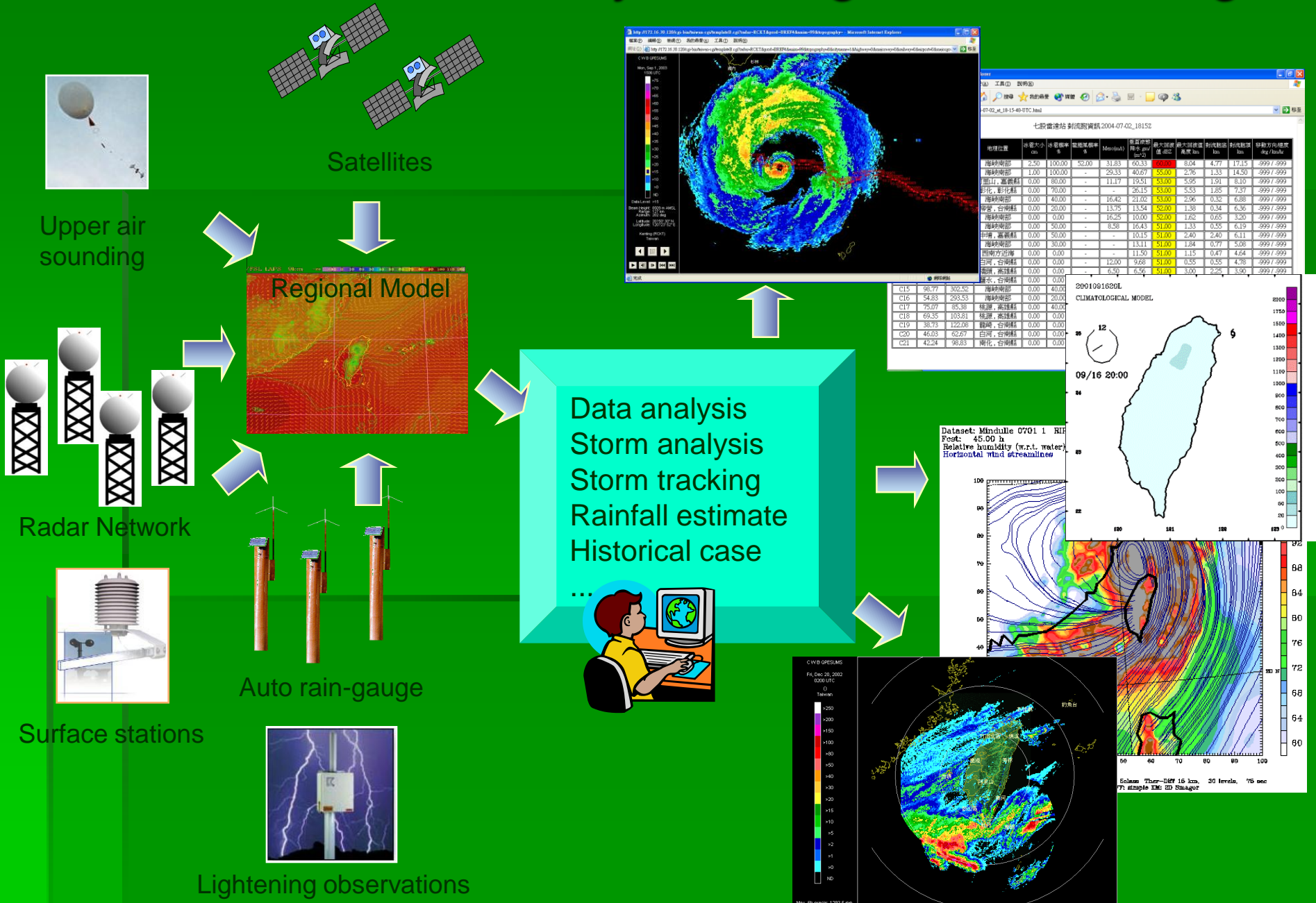
Common Platform for Disaster Information Exchange

Geo Data Base



Geo-database for Disaster Management Information Systems

Severe Weather Early Warning and Monitoring





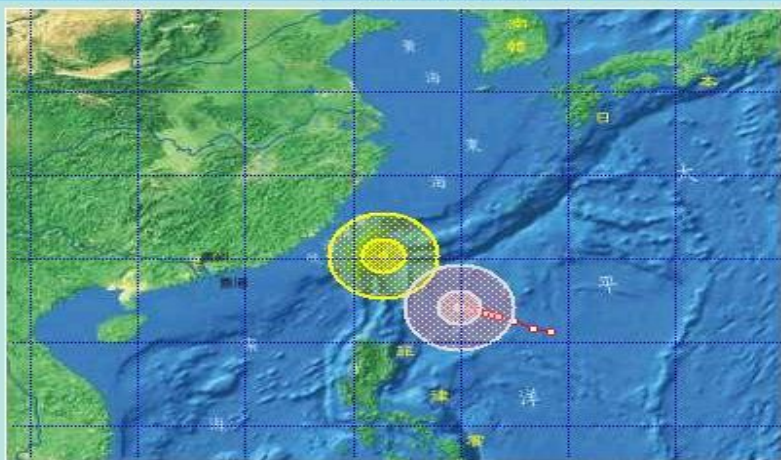
臺北市防災資訊網

[回首頁](#)

- 氣象資訊
- 水情資訊
- 雨量資訊
- 災害避難資訊
- 地震監測

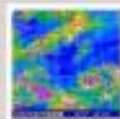
颱風名稱： 警報單編號：

衛星雲圖：





衛星雲圖



紅外線雲圖



可見光雲圖

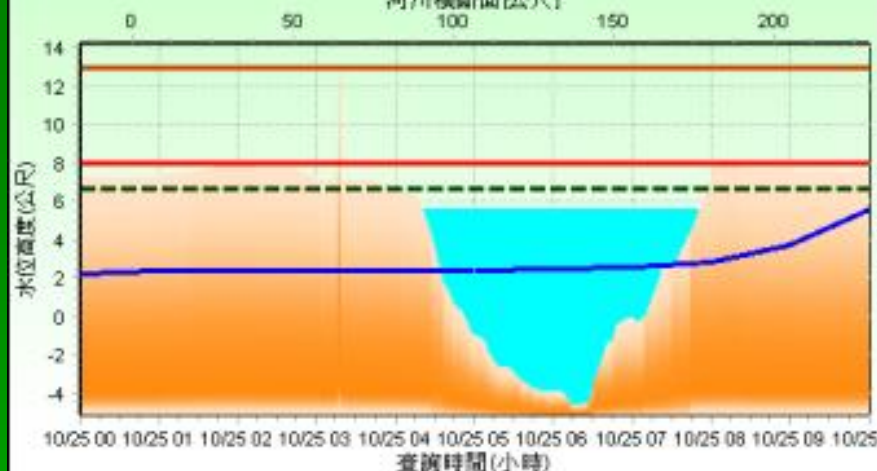


雷達回波圖

河川橫斷面及水位歷線圖 [南湖大橋]

目前水位: 5.55000019073486 警戒水位: 6.6 堤岸高程: 12.93

河川橫斷面(公尺)

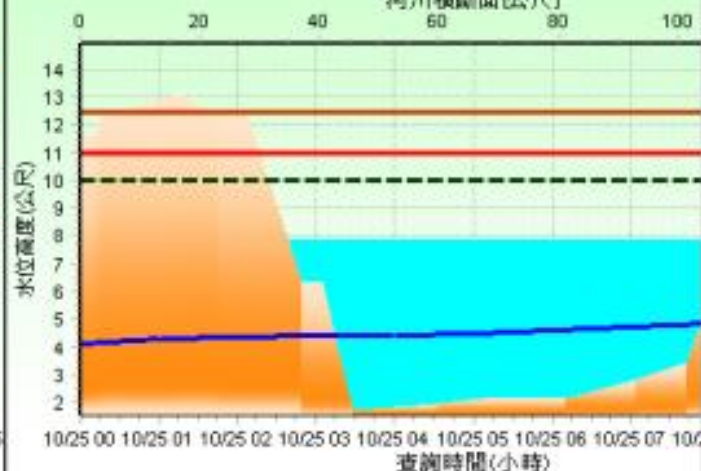


— 目前水位 — 橫斷面 — 計畫洪水水位 — 一級警戒
- - - 二級警戒 . . . 三級警戒 — 水位歷線

河川橫斷面及水位歷線圖 [長安橋]

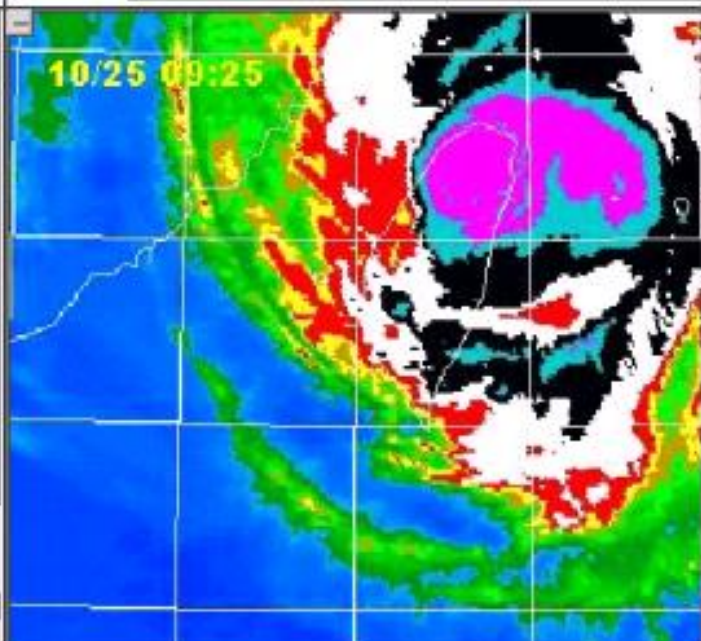
目前水位: 7.8600001385144 警戒水位: 10 堤岸高程:

河川橫斷面(公尺)

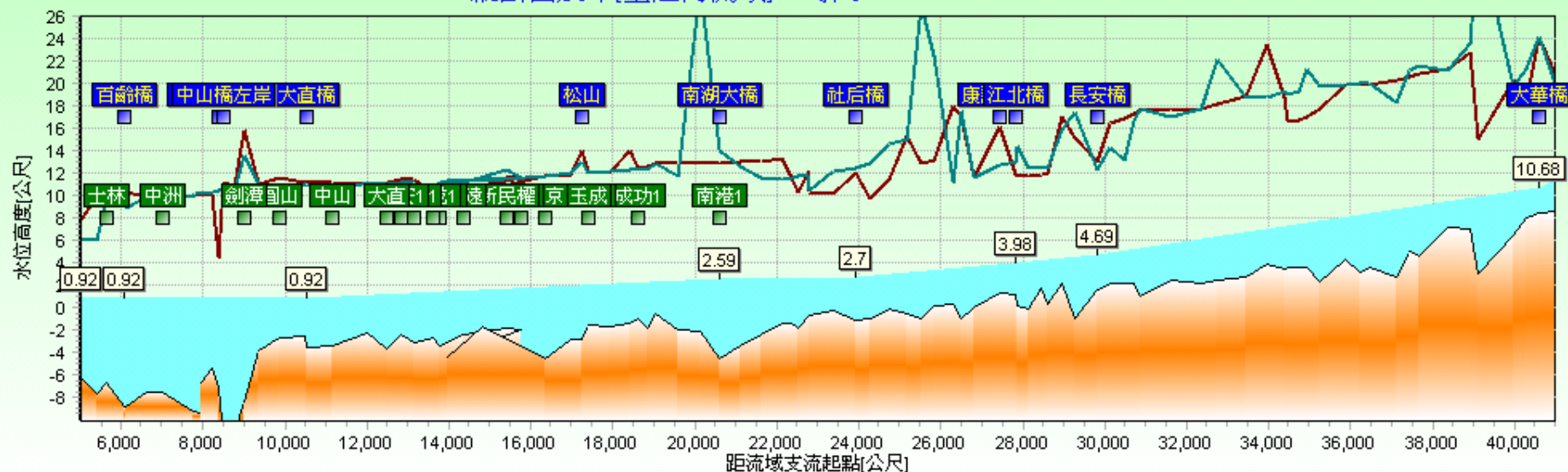


— 目前水位 — 橫斷面 — 計畫洪水水位 — 一級警戒
- - - 二級警戒 . . . 三級警戒 — 水位歷線

	湖田...	大屯...	桃源...	北投...	陽明...	太平...
雨量	300	300	300	300	300	300
雨量	40	40	40	40	40	40
10/25 00	5.0	4.5	2.0	2.0	7.0	12.5
	22.0	8.5	4.5	6.0	11.5	17.0
	5.0	3.5	2.5	2.0	1.5	1.0
	11.0	5.0	4.5	5.5	1.5	6.5
	8.5	3.5	3.0	3.0	2.5	7.0
	9.5	4.5	3.0	3.5	3.0	3.0
	10.0	4.5	2.5	2.5	4.0	5.0
	12.0	8.0	4.5	5.5	3.5	3.0
	16.0	14.0	8.5	11.0	10.5	9.0
	27.0	30.5	16.0	26.5	23.0	21.5
	22.5	41.5	22.0	33.5	32.5	22.0
	-----	8.5	2.5	5.0	8.0	9.5
雨量	27.0	41.5	22.0	33.5	32.5	22.0
雨量	5.0	3.5	2.0	2.0	1.5	1.0
雨量	12.2	11.2	6.2	9.9	9.9	9.7

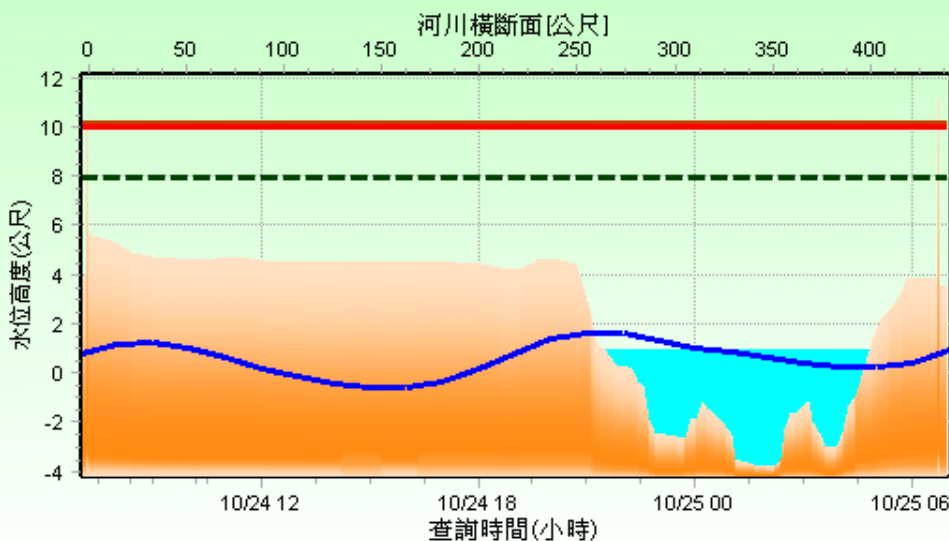


縱斷面展示[基隆河流域]，時間：2004/10/25 07:00



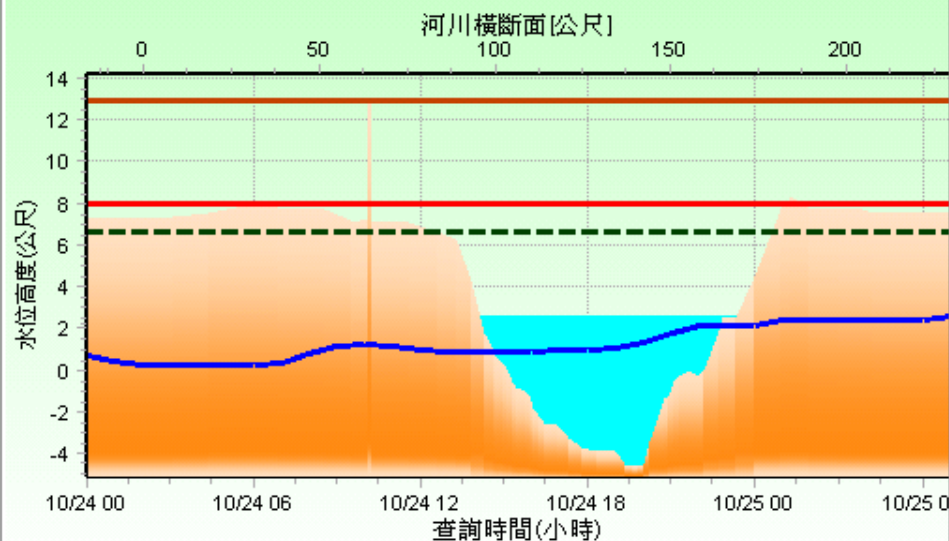
目前水位 最低河床高 左岸堤防高 右岸堤防高 水位站 抽水站

河川橫斷面及水位歷線圖 [大直橋]
目前水位：0.920000016689801 警戒水位：7.9 堤岸高程：10.15

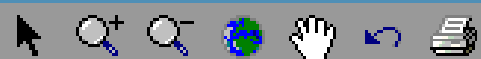


目前水位 橫斷面 計畫洪水水位 一級警戒
二級警戒 三級警戒 水位歷線

河川橫斷面及水位歷線圖 [南湖大橋]
目前水位：2.58999991416931 警戒水位：6.6 堤岸高程：12.93



目前水位 橫斷面 計畫洪水水位 一級警戒
二級警戒 三級警戒 水位歷線






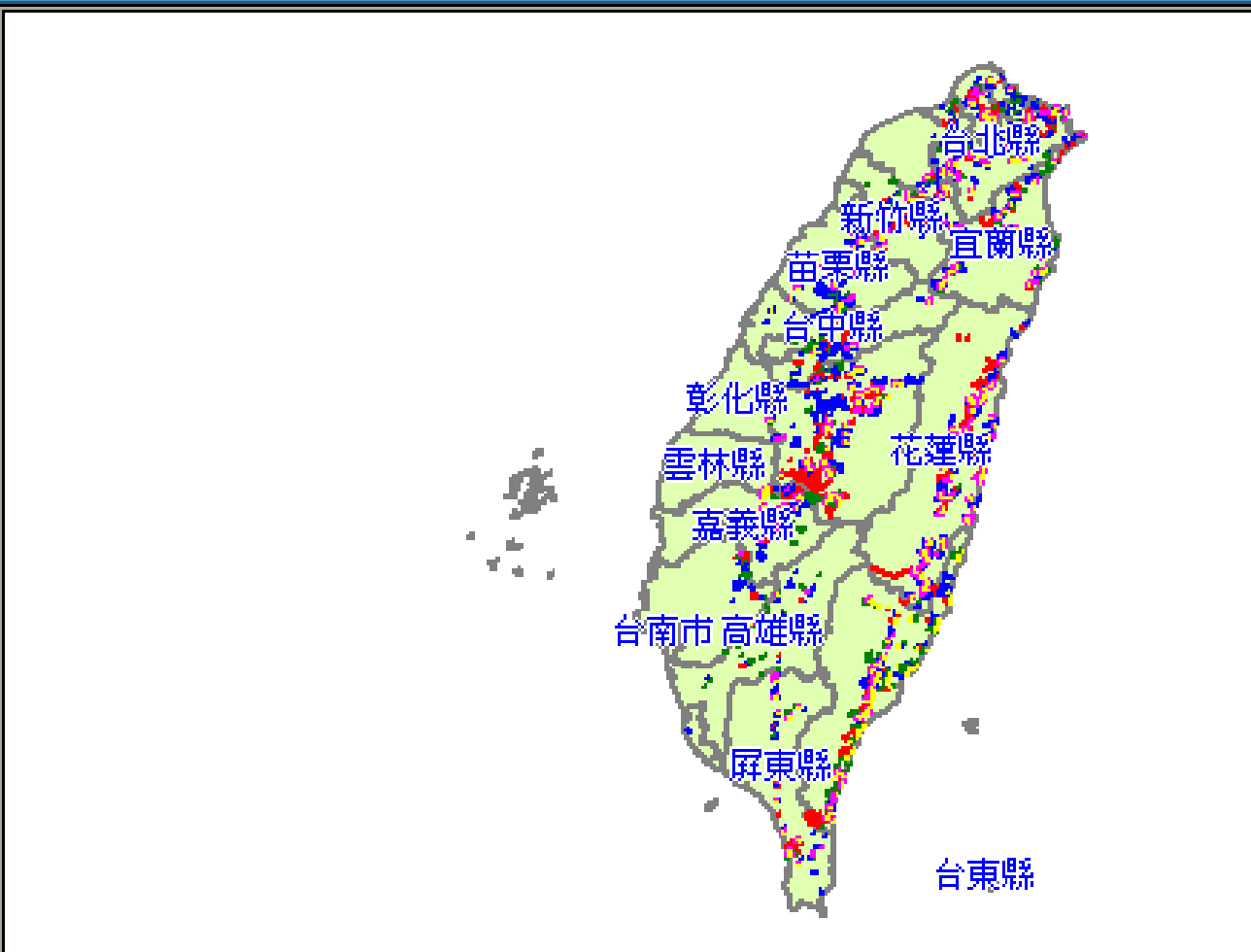
顯示比例尺



行政區定位



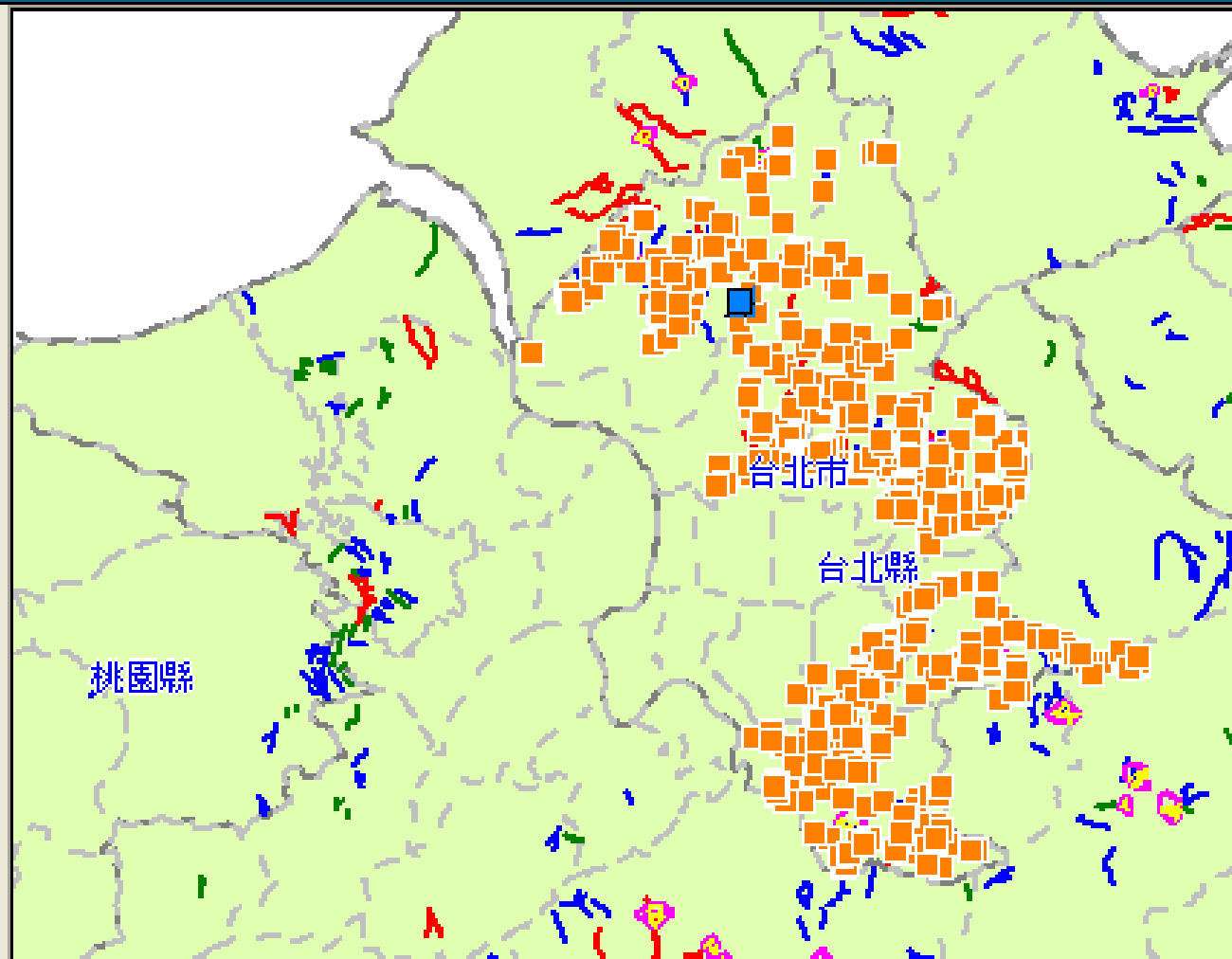
- ☒ 土石流潛勢
- ☐ 台北市崩塌歷史災
- ☐ 坡地歷史災害點
- ☐ 土石流歷史災害點
- ☐ 921危險村落
- ☐ 崩塌地
- ☐ 土石流潛勢區[285]
- ☐ 105度扇形[285條-7
- ☐ 潛勢溪流[285條-72
- ☒ 土石流潛勢區[485]
-  105度扇形[485條]
-  潛勢溪流[485條]
- ☐ 潛勢溪流[722條]
- ☒ 潛勢溪流[1420條]
-  高潛勢



1 : 4,797,932 443 x

GIS interface

- ☒ 土石流潛勢
- ☒ 台北市崩塌歷史災害點
- ☐ 坡地歷史災害點
- ☐ 土石流歷史災害點
- ☐ 921危險村落
- ☐ 崩塌地
- ☐ 土石流潛勢區[285條]
- ☐ 105度扇形[285條-72]
- ☐ 潛勢溪流[285條-72]
- ☒ 土石流潛勢區[485條]
- ☒ 105度扇形[485條]
- ☐ 潛勢溪流[485條]
- ☐ 潛勢溪流[722條]
- ☒ 潛勢溪流[1420條]



1 '台北市崩塌歷史災害點' selected

1 : 361,703

33

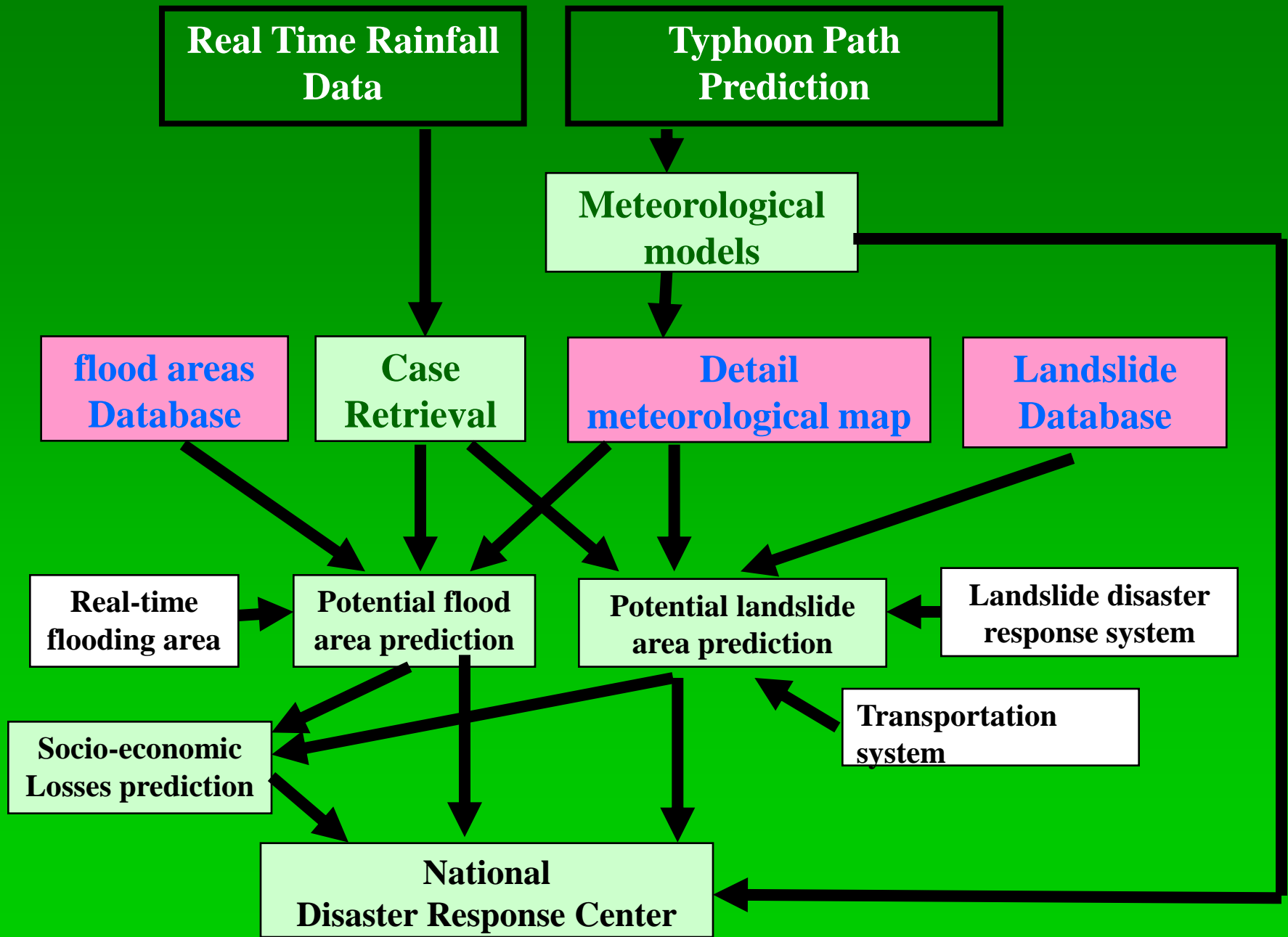
historical landslide spots in the Taipei area





PLUS potential flood areas !!

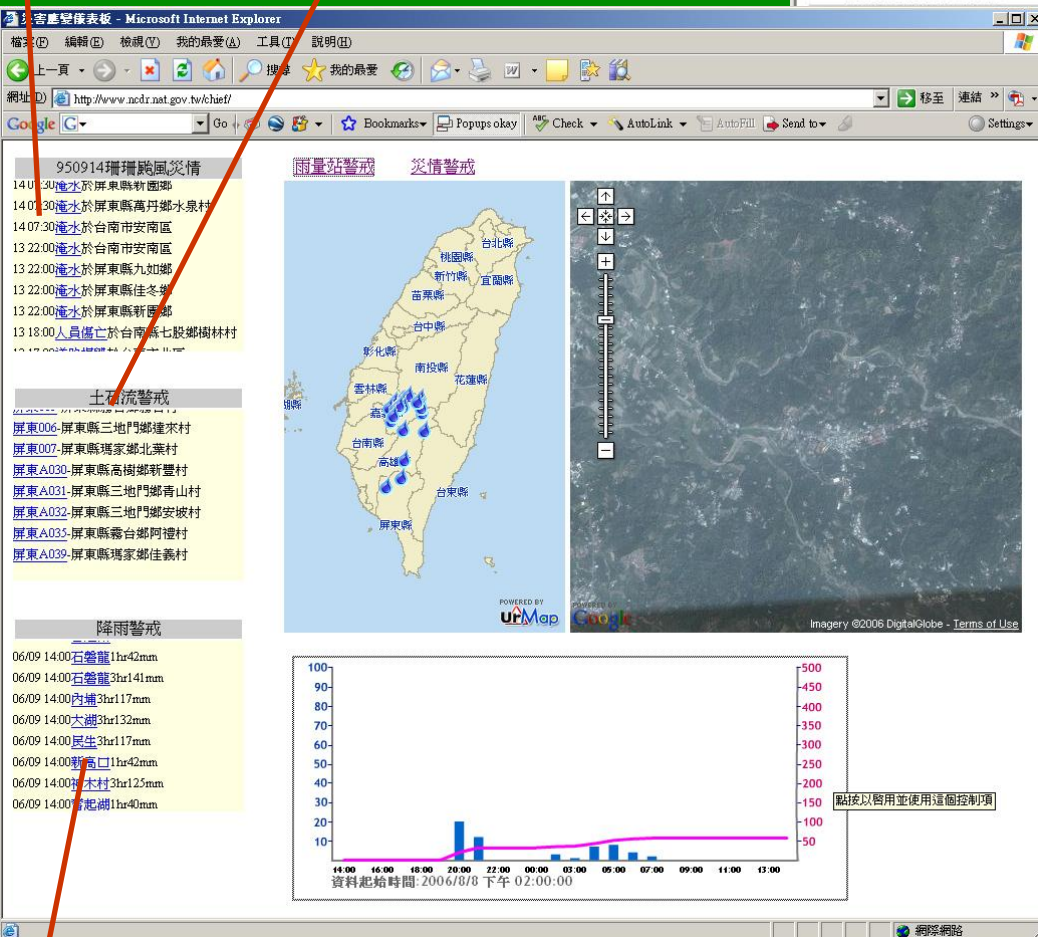
Typhoon Disaster Reduction Decision Support System



Disaster Information User Interface

Information of
Disaster Effects

Warning
Messages of
Debris Flows



Warning Messages from
Rainfall Monitoring

Locations of
Disaster Effects

Display of Disaster Information in 3D Google Earth



Comparison of Impacts of Recent Typhoon Events

Typhoon Event	Maximum hourly Rainfall (mm/hr)	Total Accumulated Rainfall (mm)	Landslide & Debris Flow Occurrence	Evacuation (Person)	Ceased and Missing (Person)
2001.7.28 Toraji	147	757	673	----	214
2001.9.17 Nari	142	1,462	475	24,000	104
2004.6.30 Mindulle	167	2,005	1,023	9,500	41
2005.7.18 Haitang	177	2,124	605	1,208	15
2005.9.1 Talim	119	766	37	1207	6
2005.10.2 LongWang	154	776	7	945	2

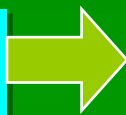
Decreasing of victims



UN EWC III, Bonn
2006.3.27-29

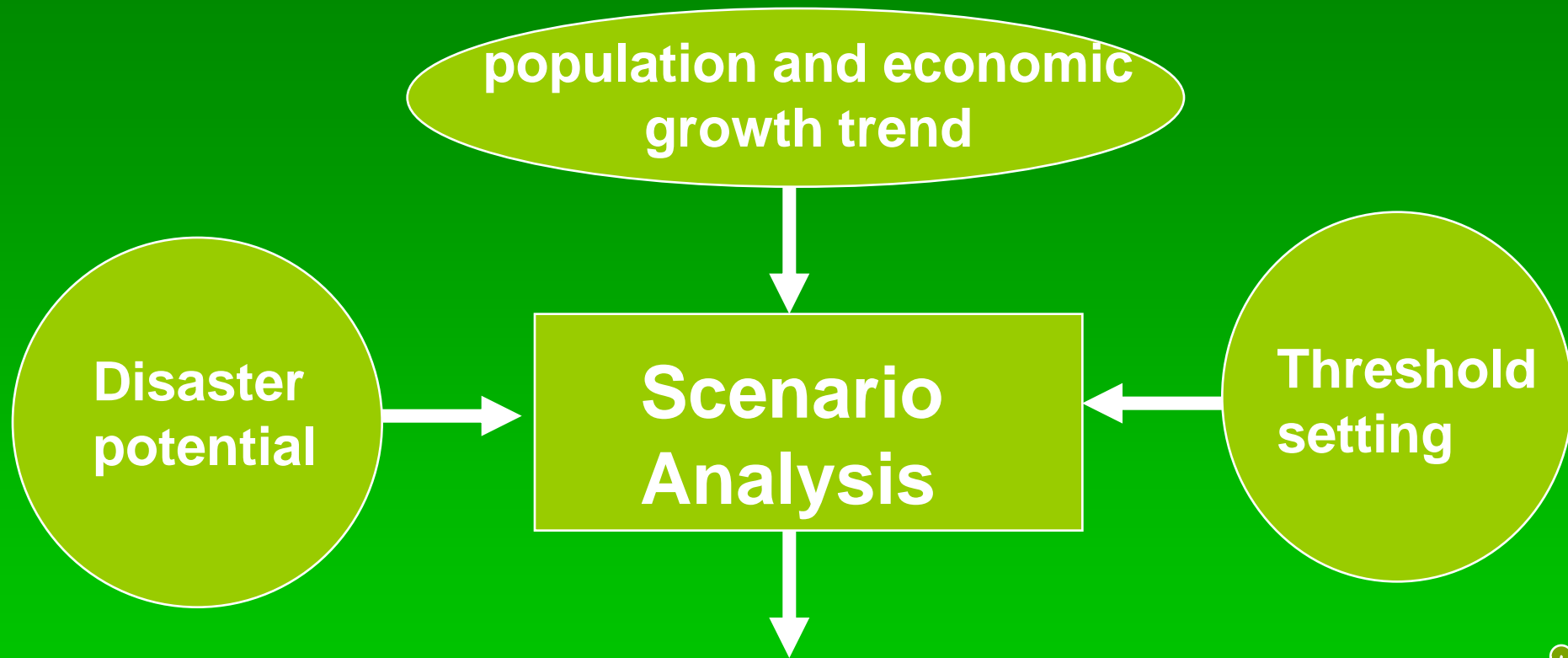


Passive Rescue
(Toraji)

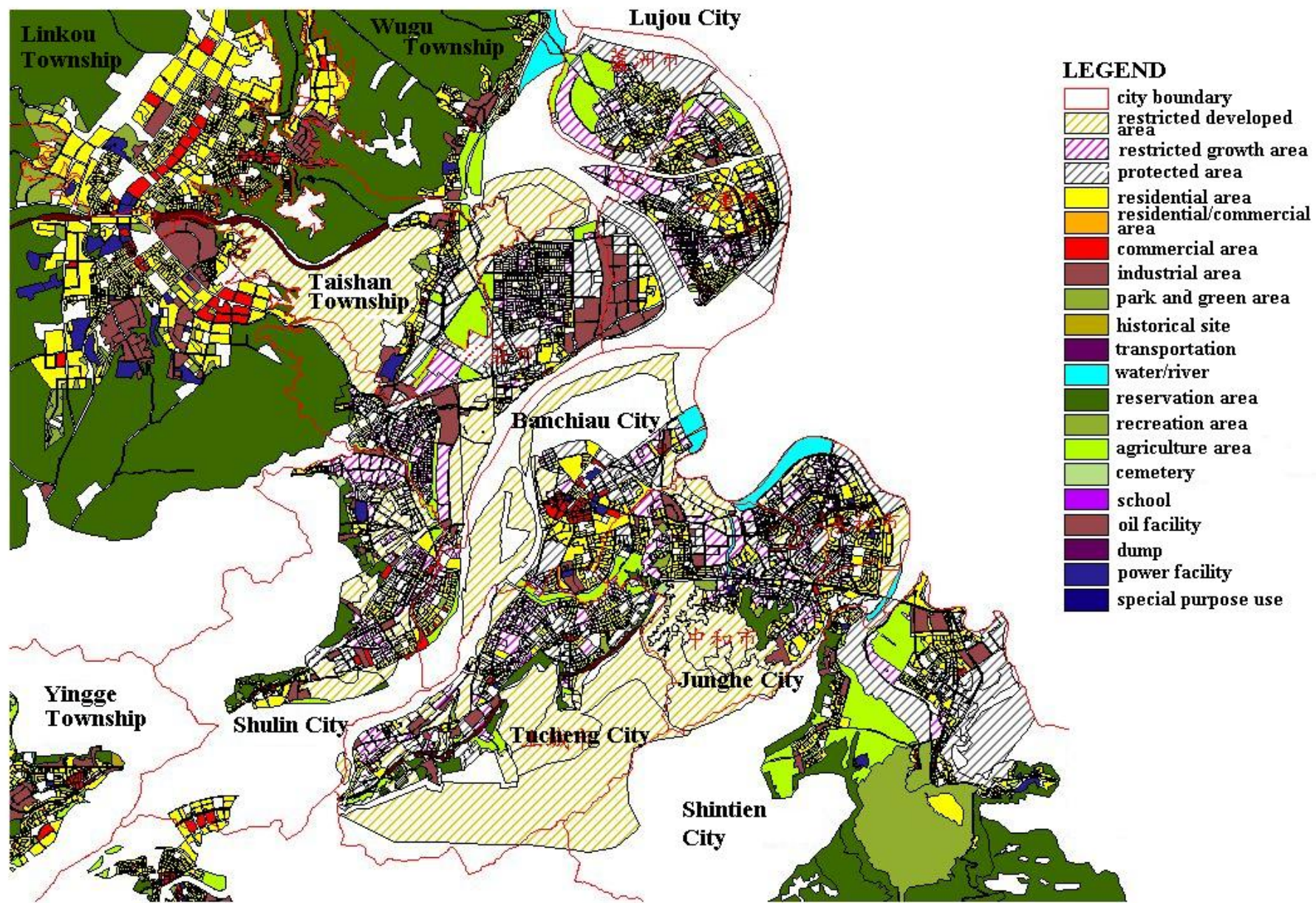


Active assessment and evacuation
(Nari, Midulle, Haitang, Talim and LongWang)

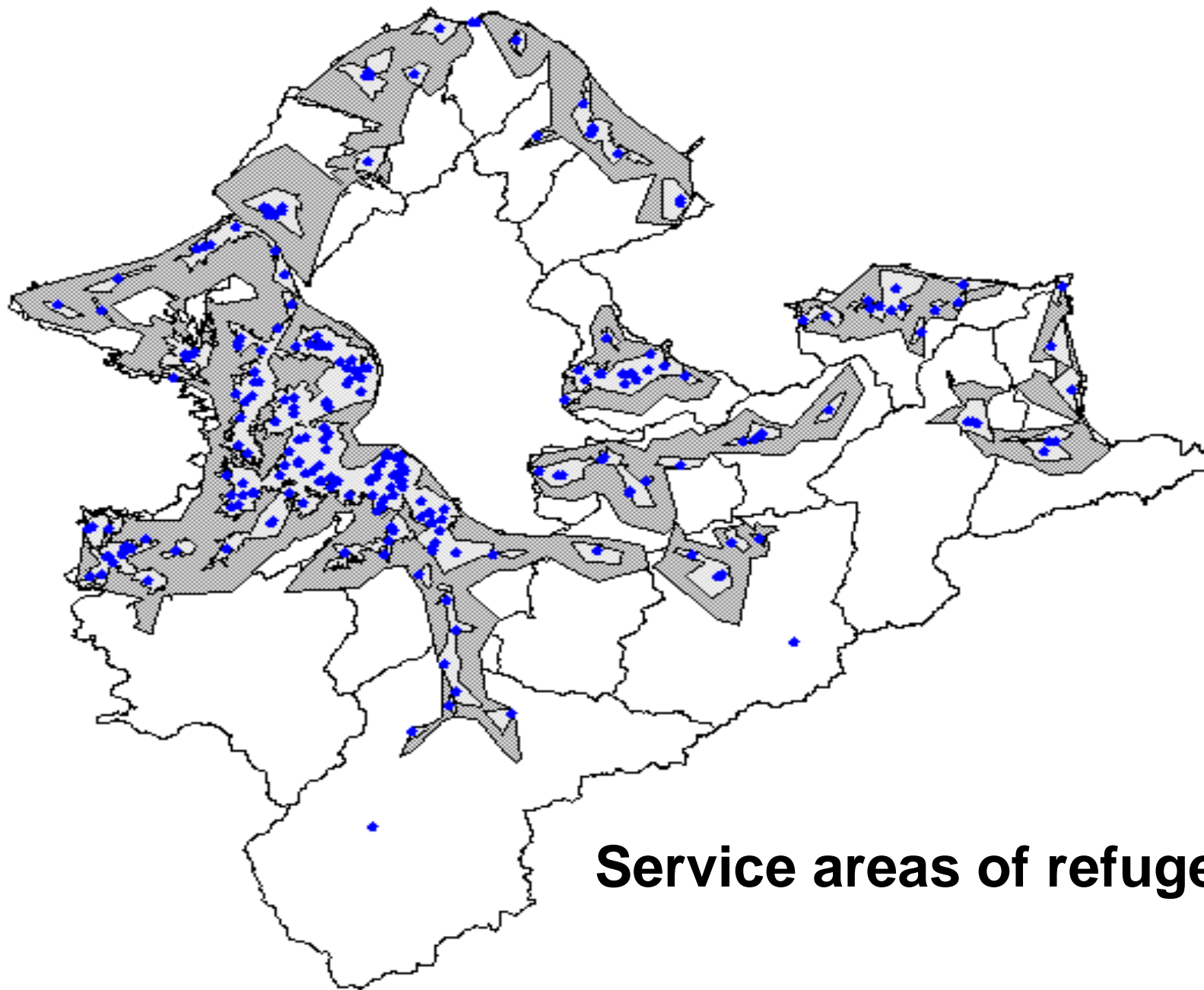
Spatial Policy Simulation for Hazard Mitigation



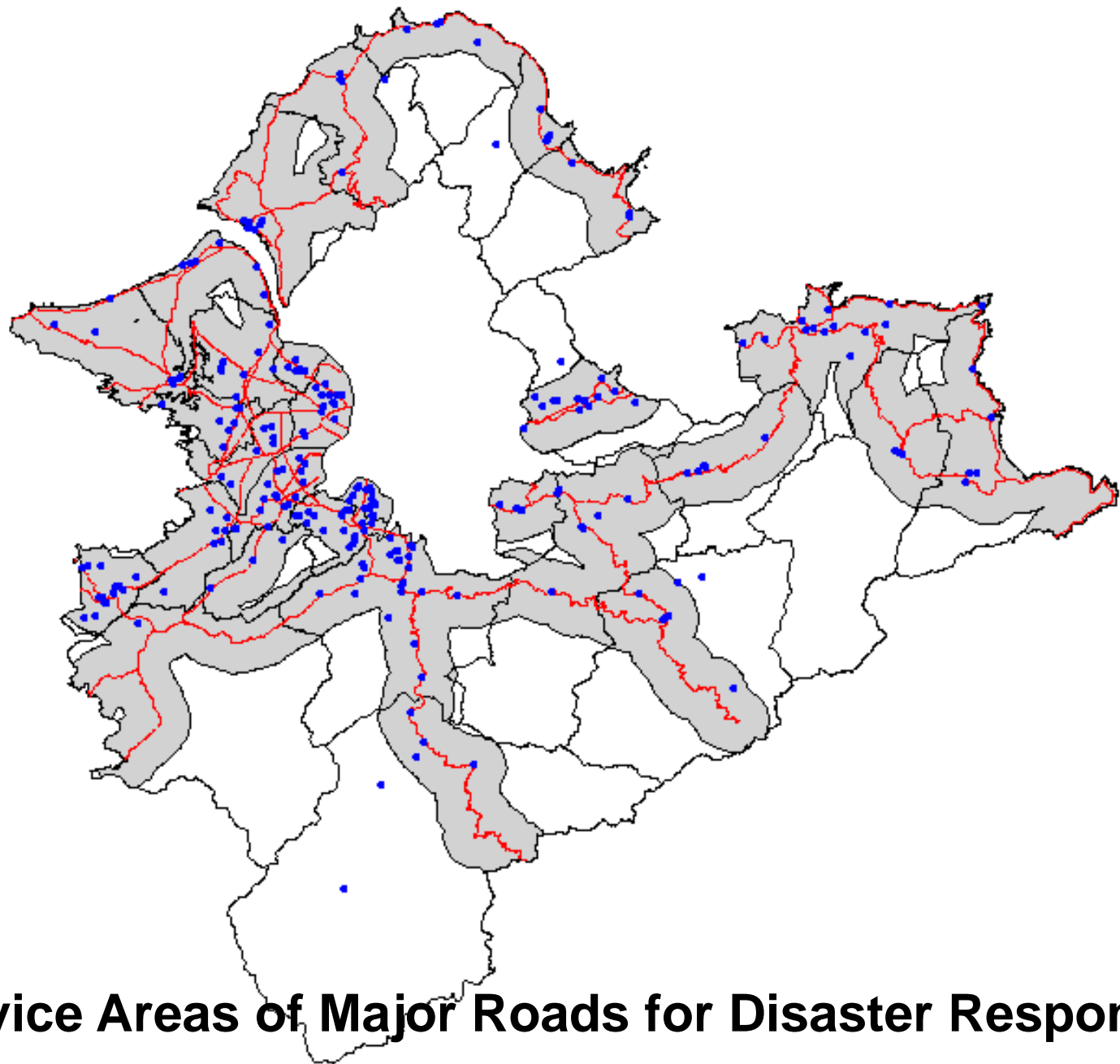
Policy: land use zoning and building management



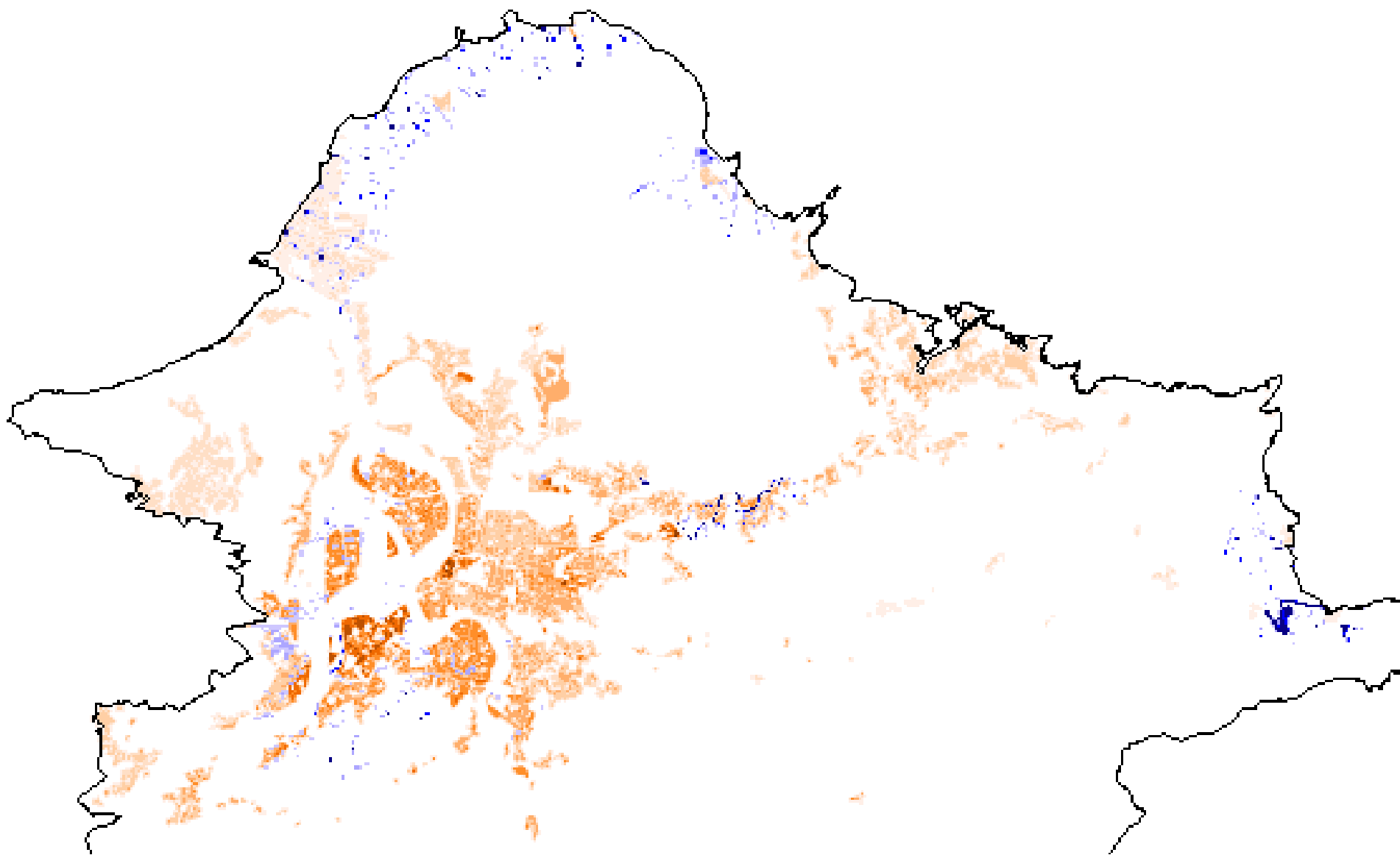
Land use zoning map



Service areas of refuges



Service Areas of Major Roads for Disaster Response



Scenario Analysis on Population Distribution

Strategies for DMIS (1/2)

- Establishing a common platform
- Establishing data exchange standard
- Adopting open system
- Providing data sharing and analysis function services
 - (Service Oriented Architecture)
- Maintaining a metadata concerning disaster management

Strategies for DMIS (2/2)

- Real time information collection
- More accurate data with higher precision
- Enrichment of historical databases
- Improvements on prediction models
- Taking the advantage of National GIS Program
- Teaming up the Information Divisions of Associate Centers of NCDR

Conclusions

- Information is a key factor to ensure success
- Advanced information technology should be employed
- Sustainable land use is the best strategy to prevent disasters