

NARBO's 9TH IWRM TRAINING
12-19 May 2014 • Philippines



Building on IWRM Good Practices

The Laguna Lake Basin Experience

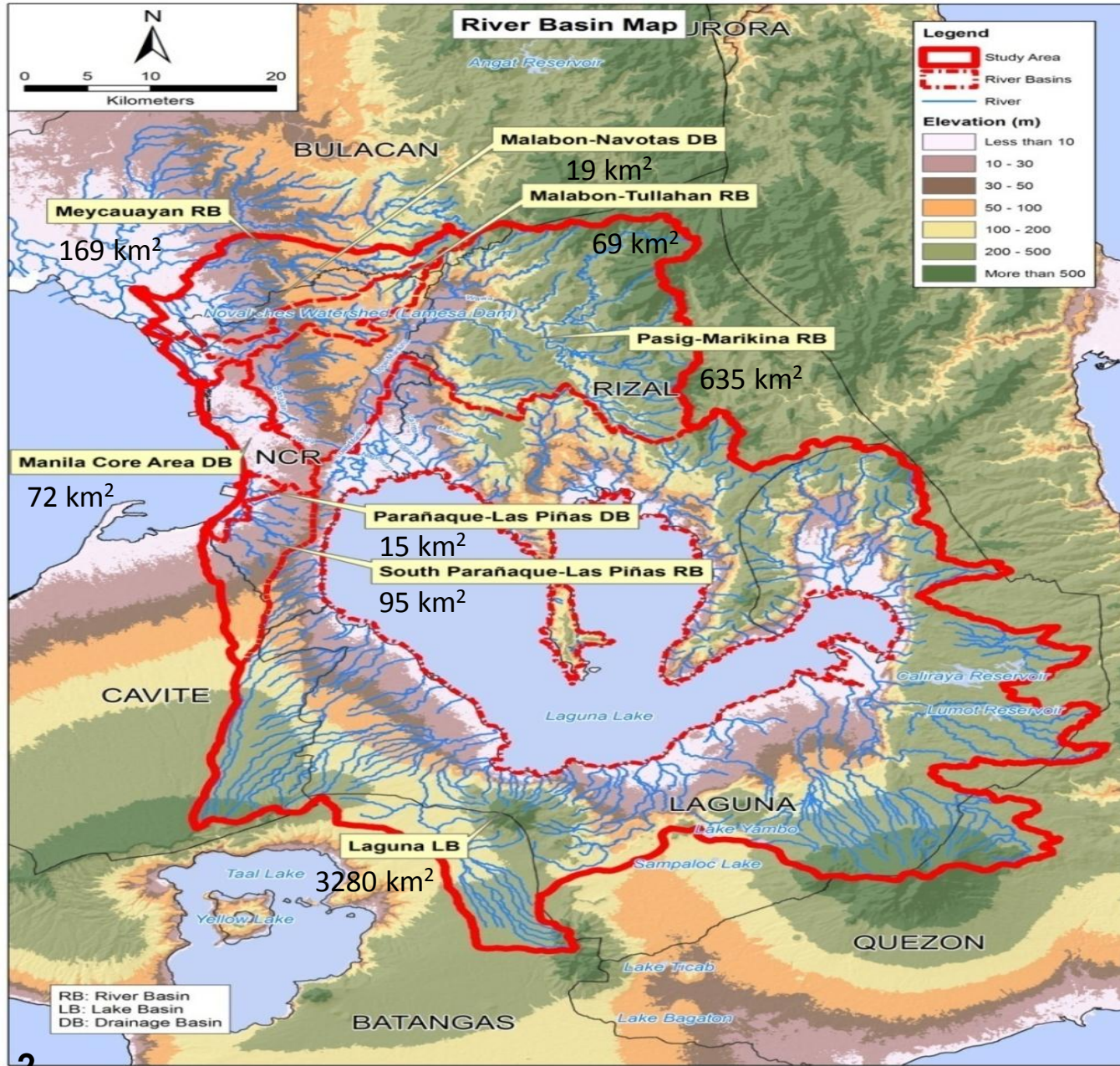
Master Plan for Flood Management in Metro Manila and Surrounding Areas

Director PATRICK B. GATAN

Department of Public Works and Highways (DPWH)



Master Plan for Flood Management in Metro Manila and Surrounding Areas



Based on river basins:
Pasig-Marikina River Basin and Laguna Lake Basin.

Total area: 4,354 km²

Total Population: 17.1 M

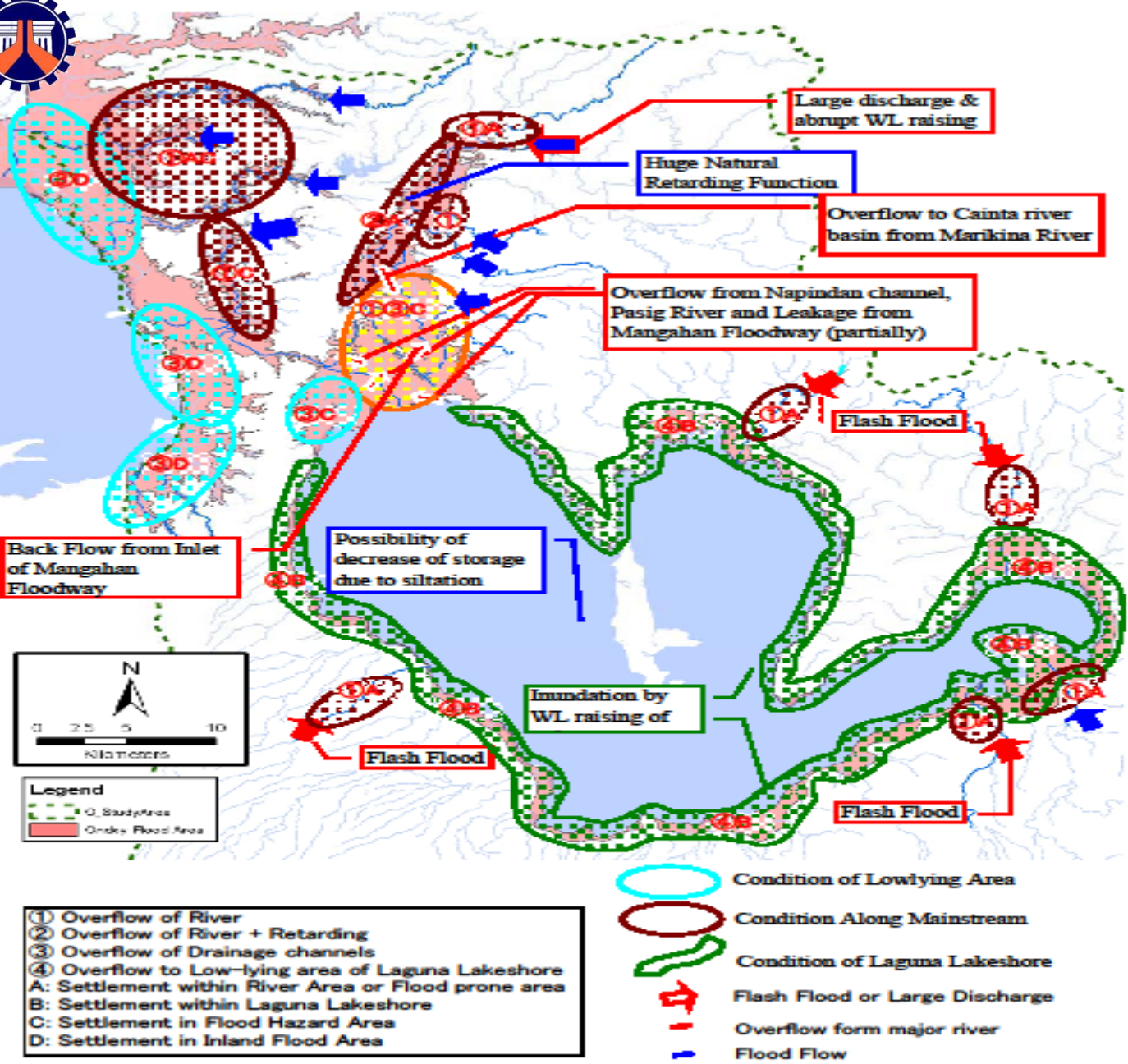
Boundary of Study Area and the River Basins





Three Major Flooding Occurrences:

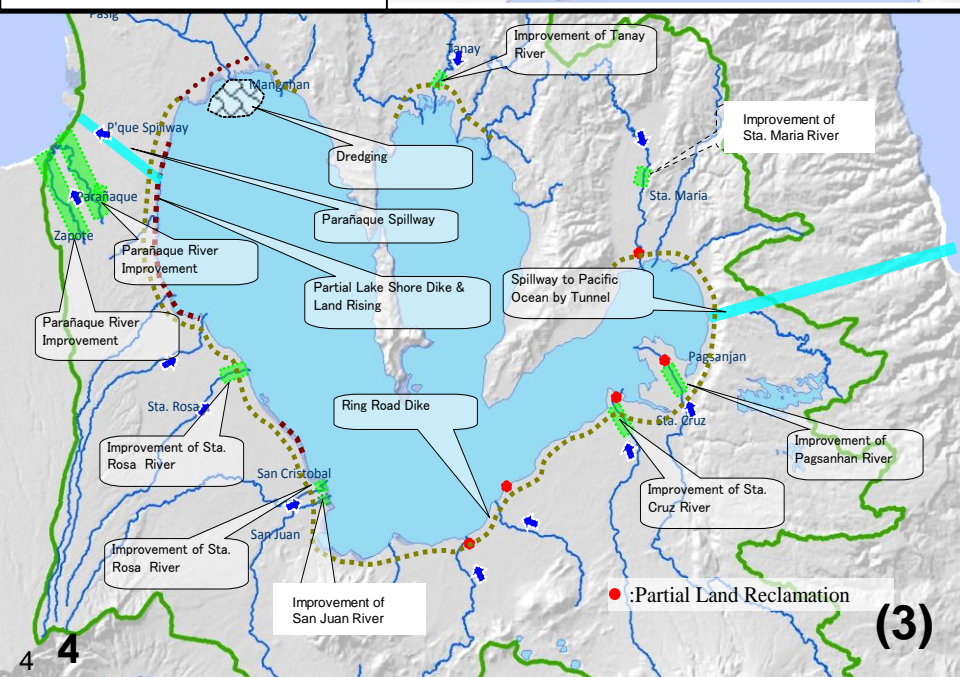
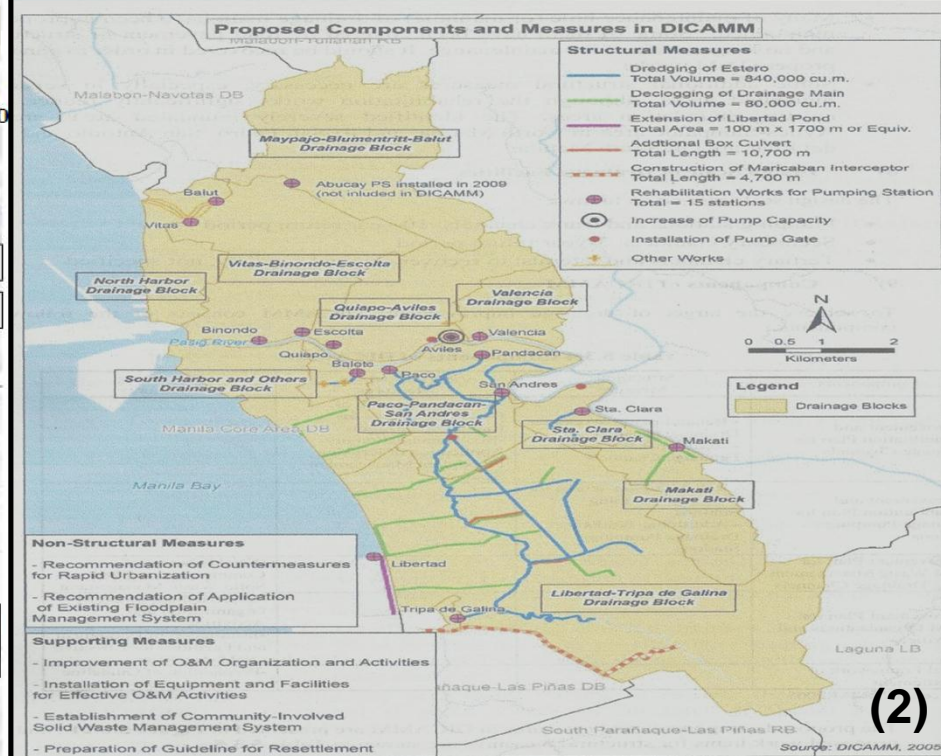
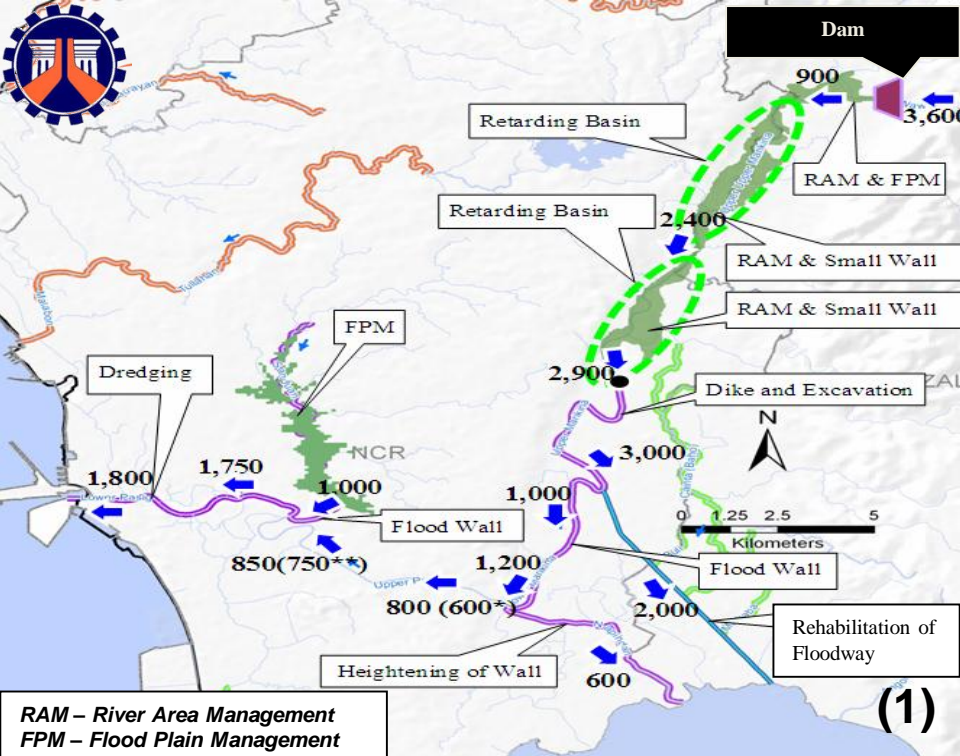
- (1) Huge volume of water coming from Sierra Madre
- (2) Drainage capacity constraints in core area of Metro Manila
- (3) Low lying communities around Manila Bay & Laguna Lake



Source: Study Team

Figure 3.2.1 Mechanism of Flood Occurrence





Long-Term Solution:

- (1) Dam, Retarding Basin & River Improvements
- (2) Rehabilitation of Pumping Stations & Drainage Channel & Additional Drainage Mains/Box Culverts
- (3) Road Dike, Lakeshore Land Raising, Dredging Works and River Improvements



Eleven (11) Structural Mitigation Measures under the “Flood Management Master Plan for Metro Manila and Surrounding Areas”

Name of Project	Est. Cost (P'B)
Pasig-Marikina River Improvement and Dam Construction	198.435 B
Meycauayan River Improvement	14.040 B
Malabon-Tullahan River Improvement	21.635 B
South Parañaque-Las Piñas River Improvement	17.335 B
East Mangahan Floodway (Cainta & Taytay River Improvement)	25.901 B
West Laguna Lakeshore Land Raising	25.185 B
Land Raising for Small Cities around Laguna Lakeshore	7.158 B
Improvement of the Inflow Rivers to Laguna Lake	0.637 B
Manila Core Area Drainage Improvement	27.257 B
West Mangahan Area Drainage Improvement	5.522 B
Valenzuela-Obando-Meycauayan (VOM) Improvement (to be studied further)	8.613 B
Total:	351.718 B





Proposed Non-Structural Measures

- 1. Strengthening of the Flood Information and Warning System (FIWS)**
 - Effective Flood Control Operation and Warning System (EFCOS) improvement
 - New telemetric rainfall and water level gauging stations
- 2. Capacity Building for Strengthening Community-based FRM**
 - Update and implement Information and Education Campaign (IEC) programs
 - Rainfall and water level monitoring by Barangay Disaster Risk Reduction and Management Councils (BDRRMCs)
 - Construction of evacuation routes and temporary evacuation centers
- 3. Improvement of Management Information System (MIS) for Disaster Risk Management**
 - Improvement and development of MIS
 - Capacity building
- 4. Reforestation and Watershed Management**





Department of Public Works and Highways


MAJOR FLOOD CONTROL PROJECTS (Locally-Funded) (P5 Billion Priority High-Impact Flood Control Projects)

Name of Project / Description	Total Cost	Status
<p>Valenzuela-Obando-Meycauayan (VOM) Project</p> <ul style="list-style-type: none">• Const. of flood control wall at elevation 13.5m for approximately 3.2 km stretch along Meycauayan River in Valenzuela City.• Const. of flood control wall at elevation 13.5m for approximately 9 km stretch along Palasan and Meycauayan Rivers in Obando, Bulacan.• Desilting of Meycauayan River in Obando, Bulacan to improve conveyance capacity/hasten flow.• Improvement of riverwall along Meycauayan River, Meycauayan City (L-512.0m).• Installation of two (2) submersible pumps, 1 cu.m. cap. in Polo River, Valenzuela City. <div data-bbox="123 819 566 1146"></div> <div data-bbox="600 819 1045 1146"></div>	<p>P 1.531 B</p>	<p>Completed: 21 Projs. On-going: 23 Projs. (ave. accomp. = 63.48% and targeted to be completed by Jul. 2014) Total: 44 Projs.</p>



MAJOR FLOOD CONTROL PROJECTS (Locally-Funded)

(P5 Billion Priority High-Impact Flood Control Projects)

Name of Project / Description	Total Cost	Status
<p>KAMANAVA Project, Phase I (Kalookan-Malabon-Navotas Area)</p> <ul style="list-style-type: none">• Drainage rehabilitation of Catmon Creek, rehabilitation of riverwall along Malabon-Tullahan River and construction of pumping stations and floodgates.  	P 600.0 M	Completed: 7 Projs. On-going: 11 Projs. (ave. accomp. = 52.34% and targeted to be completed by Jul. 2014) Total: 18 Projs.
<p>Manila Bay Seawall Project</p> <ul style="list-style-type: none">• Strengthening of existing seawall along Roxas Boulevard and Restoration of Seawall (L-2.0 km).  	P 211.05 M	Completed: 2 Projs.



MAJOR FLOOD CONTROL PROJECTS (Locally-Funded)



(P5 Billion Priority High-Impact Flood Control Projects)

Name of Project / Description	Total Cost	Status
<p>Upper Marikina River Improvement Project (Nangka River)</p> <ul style="list-style-type: none">• Construction of reinforced concrete slope protection, parapet wall and/or gravity wall along Nangka River (L-2.7km) <div data-bbox="92 494 531 821"></div> <div data-bbox="568 494 1012 821"></div>	<p>P 222.50 M</p>	<p>Completed: 4 Projs. On-going: 2 Projs. (ave. accomp. = 97.29% and targeted to be completed by April 2014) Total: 6 Projs.</p>
<p>Marikina River Dredging</p> <ul style="list-style-type: none">• Dredging works to improve conveyance capacity/hasten flow <div data-bbox="86 986 531 1310"></div> <div data-bbox="560 986 1012 1310"></div>	<p>P 50.0 M</p>	<p>Completed (1 Proj.)</p>



MAJOR FLOOD CONTROL PROJECTS (Locally-Funded)

(P5 Billion Priority High-Impact Flood Control Projects)

Name of Project / Description	Total Cost	Status
<p><i>Mangahan Floodway Dredging</i></p> <ul style="list-style-type: none"><i>Dredging works to improve conveyance capacity/hasten flow</i> 	<p><i>P 100.0 M</i></p>	<p><i>Completed (2 Projs.)</i></p>
<p><i>East Side of Mangahan Floodway Project</i></p> <ul style="list-style-type: none"><i>Construction of slope protection along Cainta and Taytay Rivers (L-9.2km)</i> 	<p><i>P 190.0 M</i></p>	<p><i>Completed (4 Projs.)</i></p>



MAJOR FLOOD CONTROL PROJECTS (Locally-Funded)

(P5 Billion Priority High-Impact Flood Control Projects)

Name of Project / Description	Total Cost	Status
<p>Additional Projects:</p> <ul style="list-style-type: none">• <i>Restoration of damaged slope protection along Marikina River (Mouth of Rosario Weir), Pasig City (L-45.0.m); Rehabilitation/improv't. of Tullahan River at Brgy. Nagkaisang Nayon and Brgy. Sta. Lucia, Quezon City (L-387.0.m); Repair of damaged slope protection (boulder riprap) along Lakeshore Dike at intermittent section from Sta. 1+618 to Sta. 10+056 West Mangahan Floodway, Taguig City, Phase I, Gaps from Sta. 1+920 to Sta. 6+896, Taguig City; Construction and Repair of Revetment Wall with Steel Sheet Piles along Napindan River, Brgy. Napindan, Taguig City (L-136.0m).</i> <div data-bbox="92 731 537 1059"></div> <div data-bbox="568 731 1012 1059"></div>	<p>P 119.92 M</p>	<p>Completed: 5 Projs. Under Preconst.: 1 Proj. Total: 6 Projs.</p>



MAJOR FLOOD CONTROL PROJECTS (Locally-Funded)

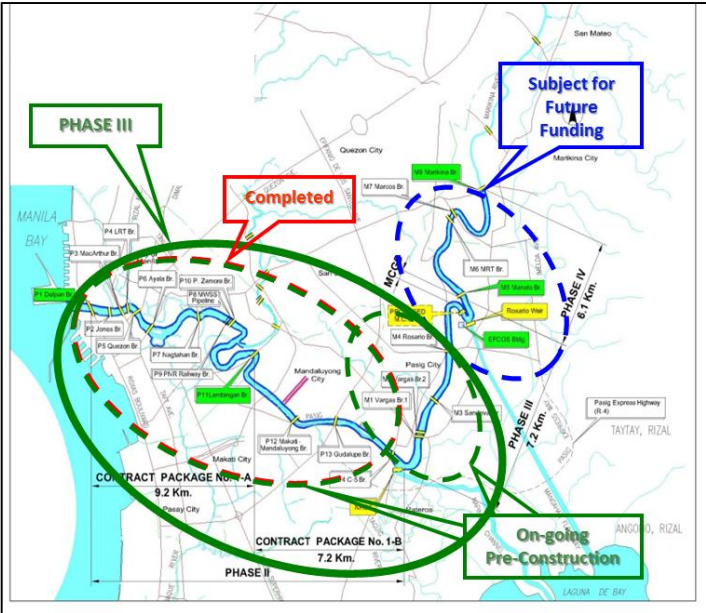
(P5 Billion Priority High-Impact Flood Control Projects)

Name of Project	Total Cost	Completion Date	Status
<u>Region III:</u>			
Dredging of Labangan Channel, Hagonoy, Bulacan	<i>P 100.0 M</i>	April 2014	70.50% accomplished
San Fernando-Sto. Tomas-Minalin Tail Dike	<i>P 139.0 M</i>	April 2014	78.20% accomplished
Mitigation Measures for Breaches in the San Fernando-Sto. Tomas-Minalin Tail Dike	<i>P 637.0 M</i>	April 2015	31.19% accomplished
Del Carmen-Balimbing Creek, City of San Fernando, Pampanga	<i>P 30.0 M</i>	Sep. 2013	Completed
Orani Channel, Bataan	<i>P 50.0 M</i>	Feb. 2014	95.00% accomplished
<u>Region IV-A:</u>			
DPWH-LLDA Flood Control and River Protection Converge Project:: Construction of River Control Structures at Sta. Maria-Mabitac River and Sta. Cruz-San Pedro-Biñan Rivers	<i>P 780.0 M</i>	May 2014	89.07% accomplished
<u>Nationwide:</u>			
Thirteen (13) Amphibious Excavator and One (1) Set of Floating Platform with 2 x 2 cu.m. sediment bin	<i>P 136.5 M</i>	Contract Agreement already approved. Notice to Proceed (NTP) already issued on 27 Feb 2014. Awaiting delivery of units.	
<u>Consulting Services:</u>			
Study, Preliminary Engineering and DED of the Roxas Blv'd Seawall	<i>P 11.5 M</i>	The project started 15 Feb 2014	

* Purchase 10 water dredging equipment worth P375 Million and for deployment in 2014 major rivers.

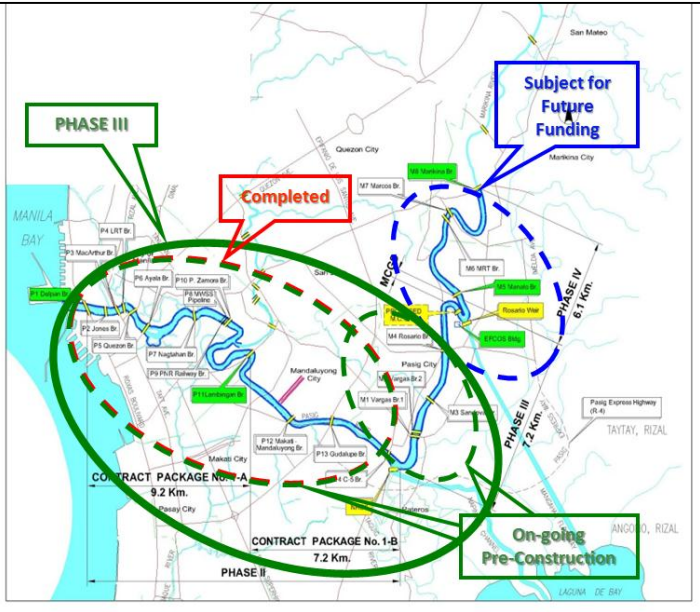


MAJOR FLOOD CONTROL PROJECTS (Foreign-Assisted)

Name of Project / Description	Total Cost	Status
<p><i>Pasig-Marikina River Channel Improvement Project (PMRCIP), Phase II, JICA PH-P239</i></p> <ul style="list-style-type: none"> Package 1-A: Lower Pasig River Improvement, from Delpan Bridge to Lambingan Bridge (L = 9.20 km, Parapet Wall = 5.15 km, Revetment = 3.84 km) Package 1-B: Upper Pasig River Improvement, from Lambingan Bridge to immediate vicinity of Napindan Hydraulic Control Structure (NHCS) (L = 7.20 km, Parapet Wall = 2.50 km, Revetment = 3.80 km) 	<p>P 5.411 B</p>	<ul style="list-style-type: none"> Package 1-A completed in May 30, 2013. Package 1-B completed in June 29, 2012



MAJOR FLOOD CONTROL PROJECTS (Foreign-Assisted)

Name of Project / Description	Total Cost	Status
<p><i>Pasig-Marikina River Channel Improvement Project (PMRCIP), Phase III, JICA PH-P252</i></p> <ul style="list-style-type: none"> • Pasig River Improvement, from Delpan Bridge to immediate vicinity of Napindan Hydraulic Control Structure (NHCS) (total length =9.80 km on both banks, revetment with river wall = 6.10 km, river wall only=3.70 km.) • Lower Marikina River Improvement, from confluence point with Napindan River Channel to diversion point of Mangahan Floodway (total length = 5.40 km: dredging works=approximately 889,100 cu.m., dike/revetment= 1.82 km, river wall = 1.82 km, boundary marker=70 pcs.). 	<p>P 7.545 B</p>	<ul style="list-style-type: none"> • Civil Works Contract for CP 2 approved on 21 April 2014 and concurred by JICA on 05 May 2014. Notice to Proceed for signature of the Secretary. • Civil Works Contract for CP 1 under process.



OTHER FLOOD CONTROL PROJECTS:

Name of Project / Description	Total Cost	Status
<p>Construction / Rehabilitation of Drainage System, Blumentritt Interceptor Catchment Area from Estero De Sunog Apog to Piy Margal in Sampaloc.</p> <ul style="list-style-type: none">• Reinforced Concrete Box Culvert (RCBC), 3,306 meters <div data-bbox="88 548 529 876"></div> <div data-bbox="562 548 1074 876"></div>	<p>P 479.3 M</p>	<p>On-going, 38.80% and targeted to be completed by December 2014.</p>



Priority Waterways (No. of ISFs)

b. Estero de Maypajo (1,415)

a. Estero de Sunog Apog (170)

3. Tullahan River (3,683)

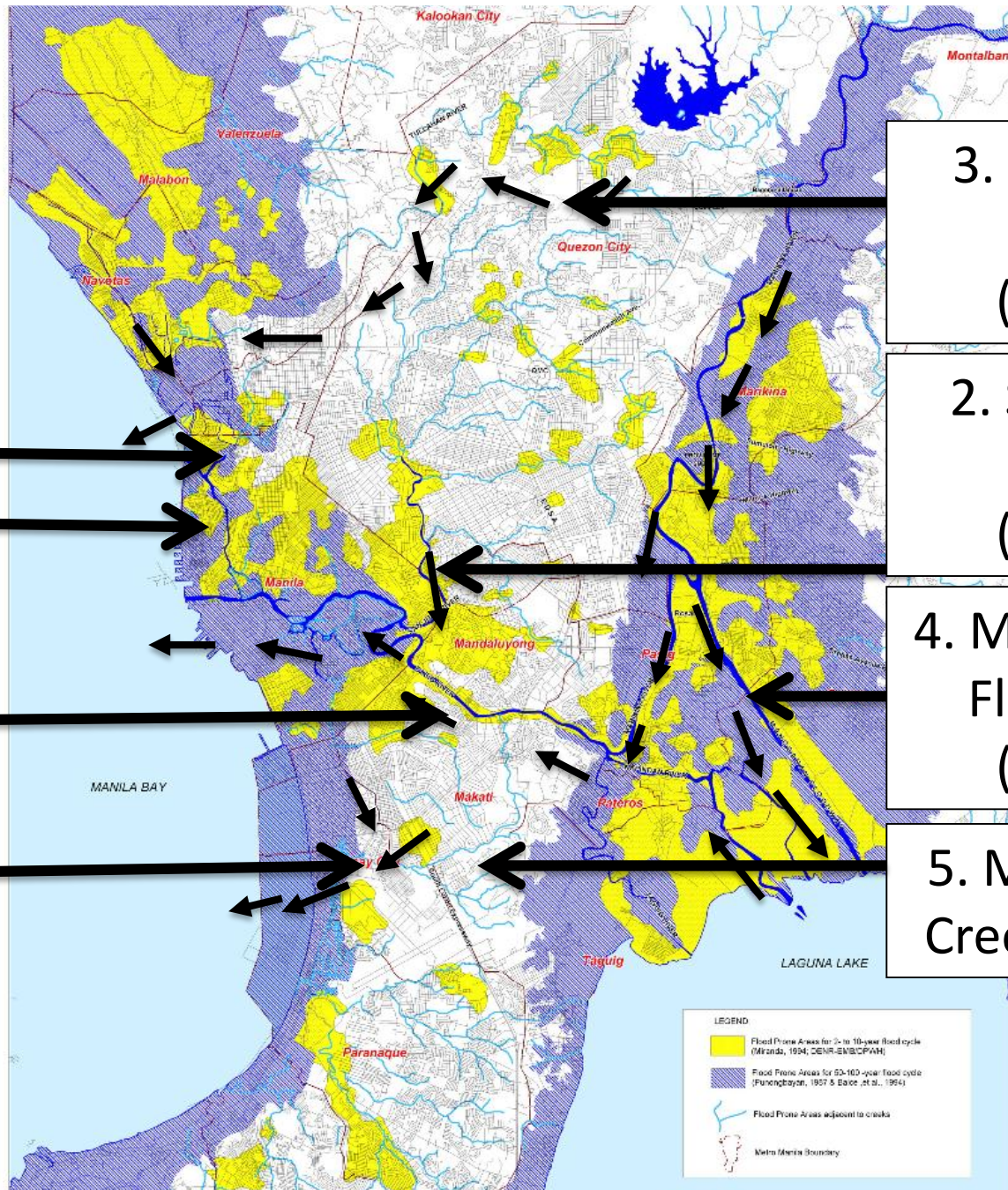
2. San Juan River (4,217)

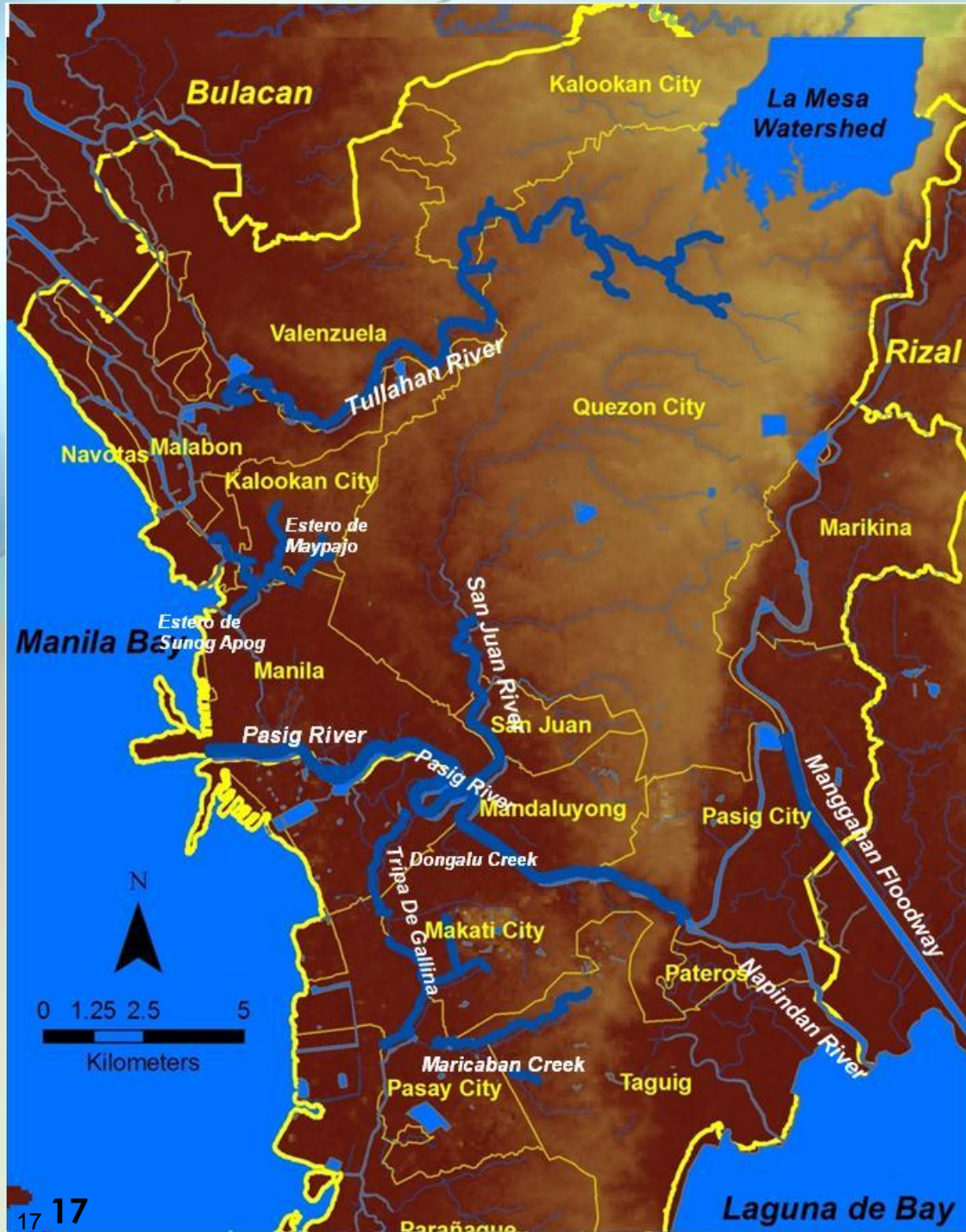
4. Manggahan Floodway (2,997)

5. Maricaban Creek (1,637)

1. Pasig River (1,434)

6. Estero Tripa de Gallina (3,887)



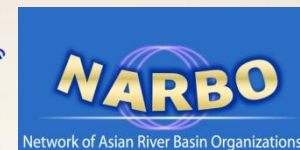


Priority Waterways



	NAME OF WATERWAY	NO. ISFS
1.	San Juan River	4,217
2.	Manggahan Floodway	2,997
3.	Estero Tripa de Gallina	3,887
4.	Maricaban Creek	1,637
5.	Tullahan River	3,683
6.	Pasig River	1,434
7.	Estero de Maypajo	1,415
8.	Estero de Sunog Apog	170
TOTAL		19,440

Note: ISFs-Informal Settler Families



THANK YOU!

