



Room for the Rivers Programme

Cost of Flood Protection Measures in The Netherlands

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Content

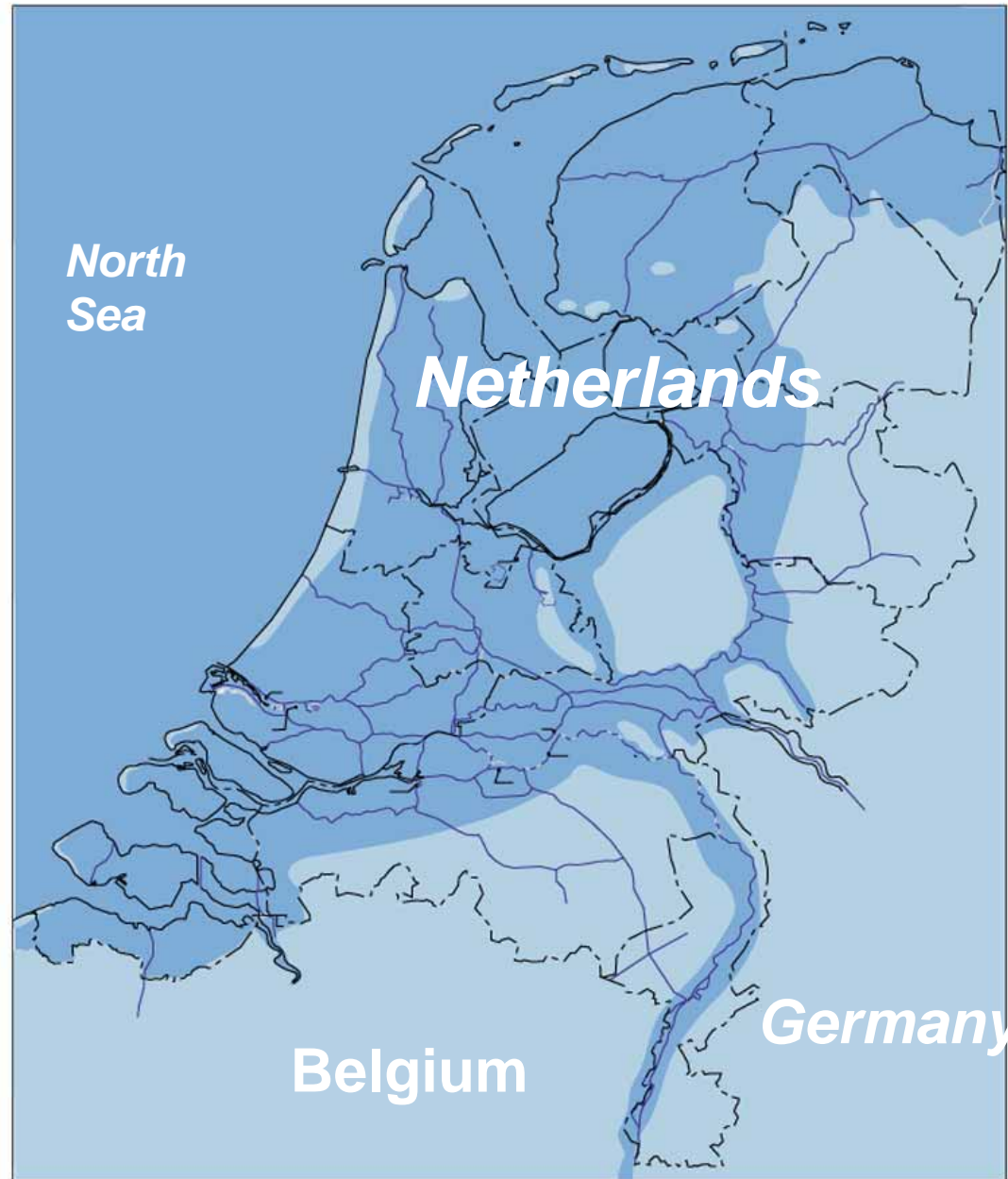
- **The Dutch delta**
- **Flood Protection in the Netherlands**
- **Room for the River**
- **Examples of measures and Costs**



Flood prone areas in the Netherlands

Netherlands

- ~ total surface area 36,000 km²
- ~ inhabitants 16 million

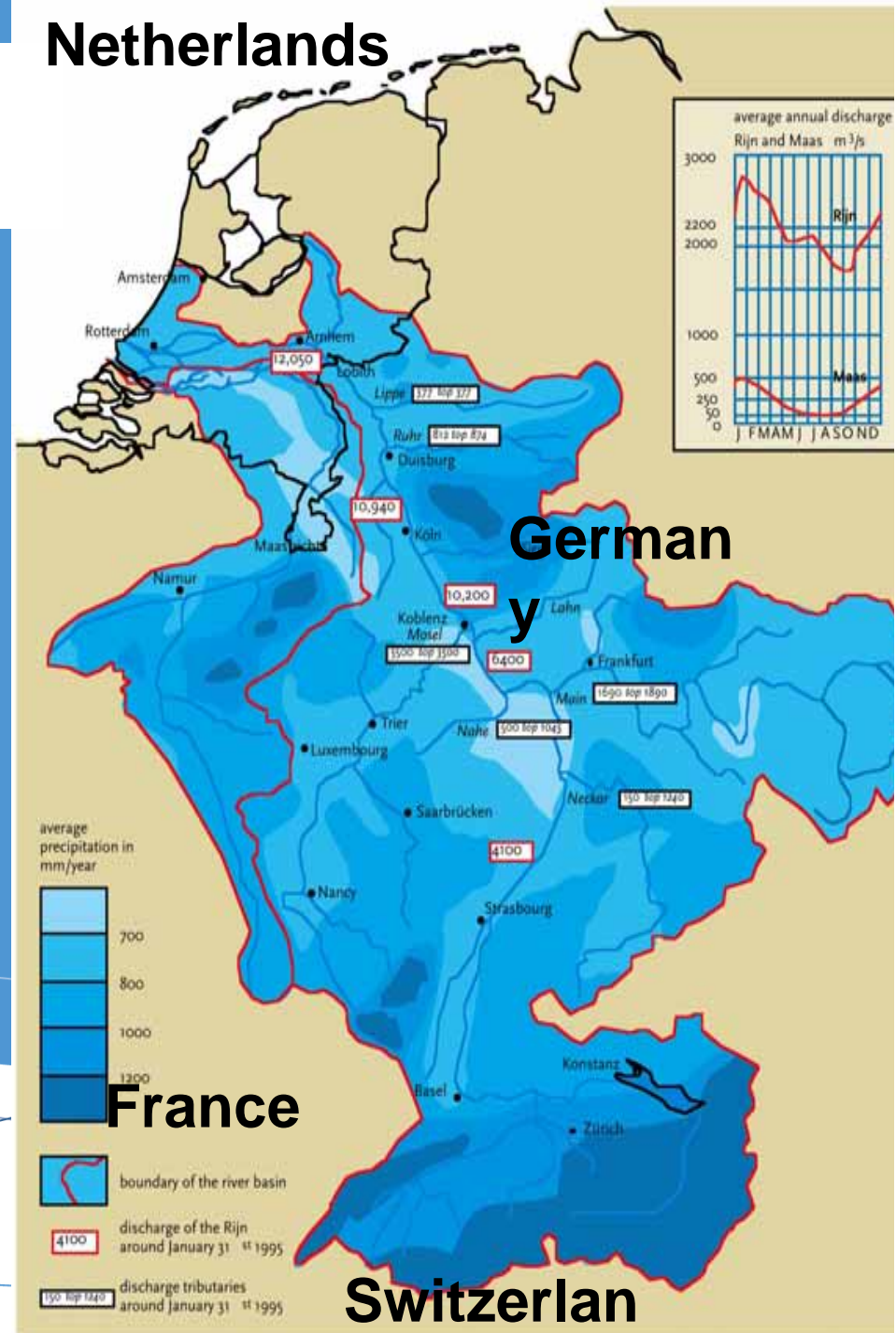


- Higher lands
- Flood prone areas

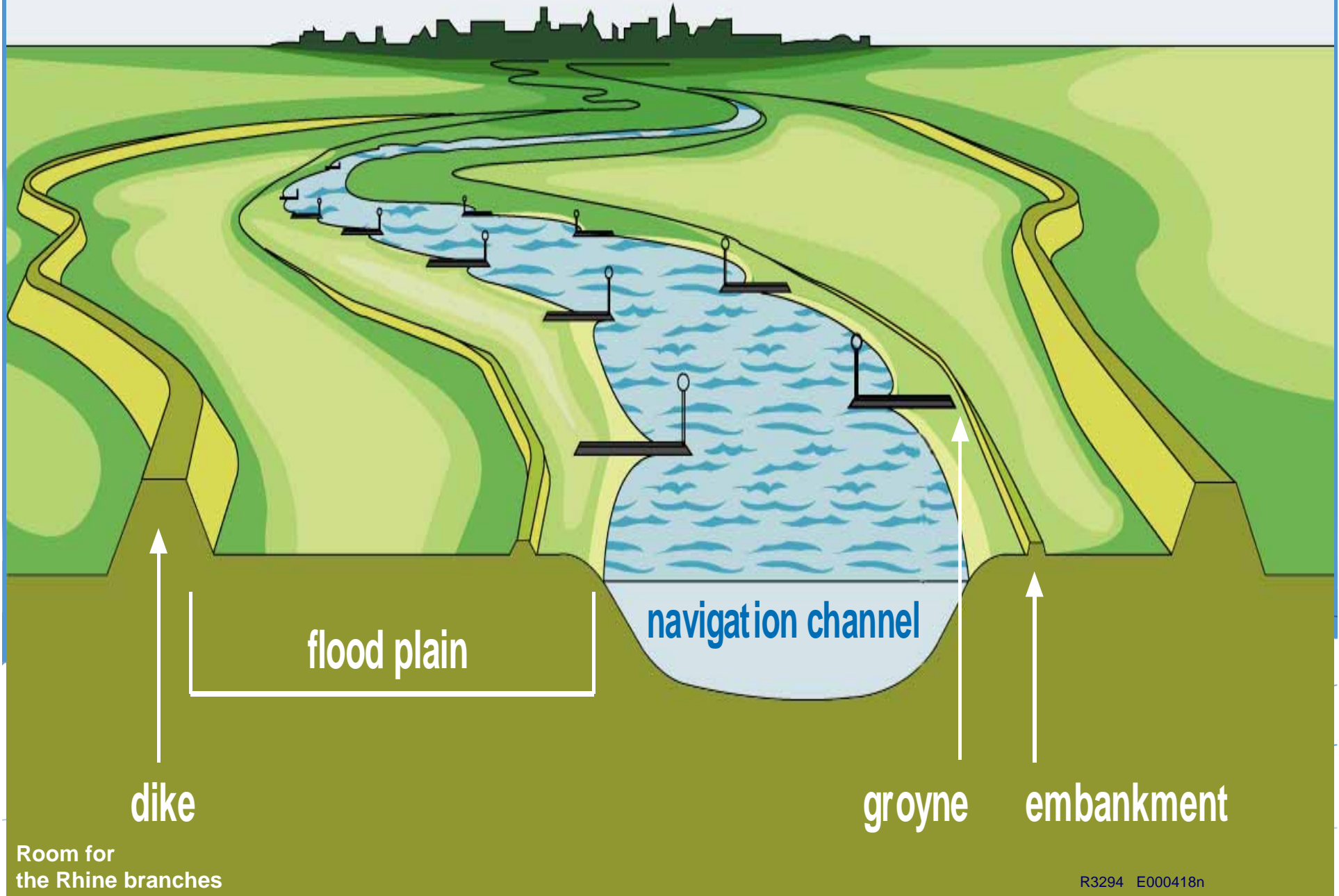
Catchments of rivers Rhine and Meuse

- ~ Discharge at Lobith
(border with Germany):
- ~ average: 2,200 m³/s
- ~ top: 12,000 m³/s
- ~ peak: 16,000 m³/s
(1/1250 per year)

Netherlands



Lay-out of the Dutch rivers

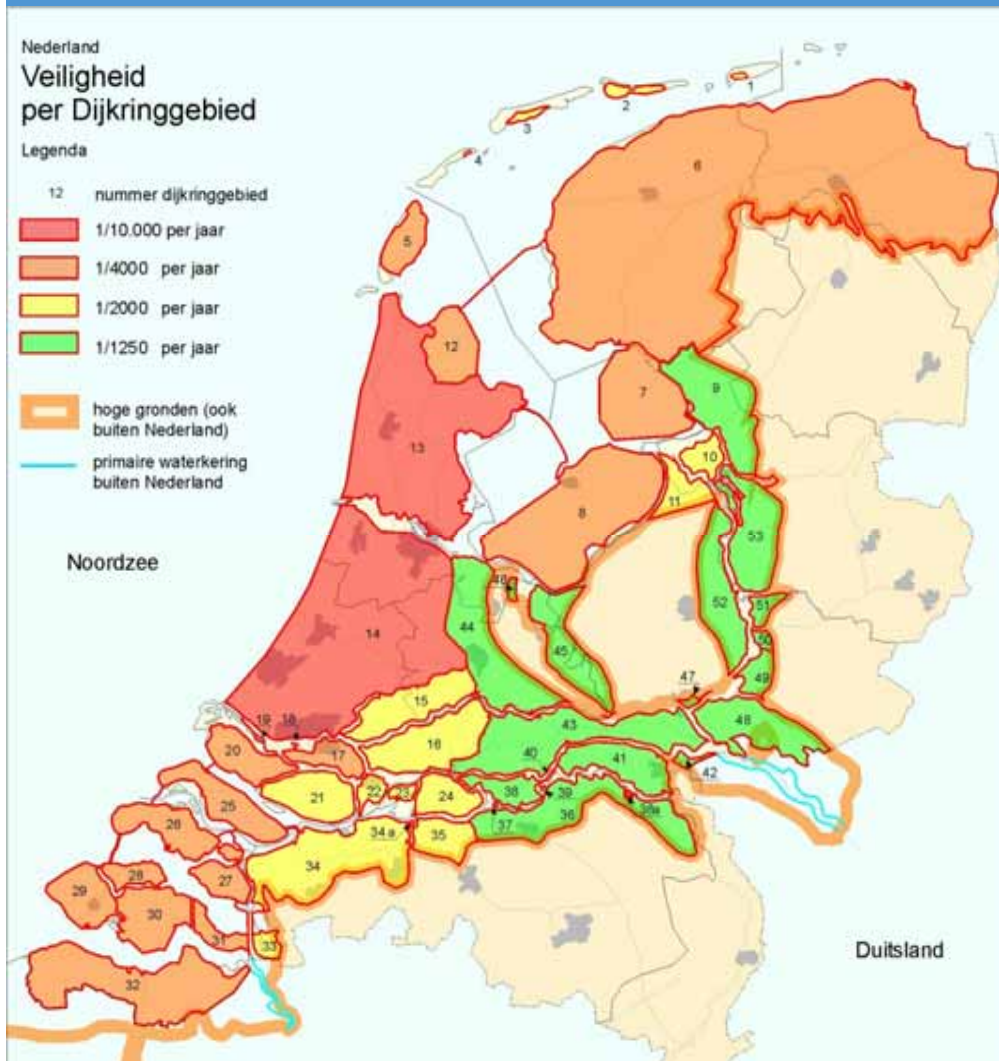


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Dike ring areas / safety levels

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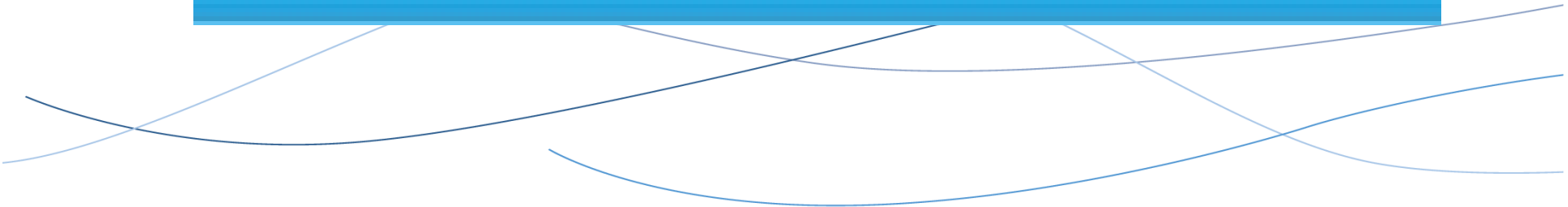
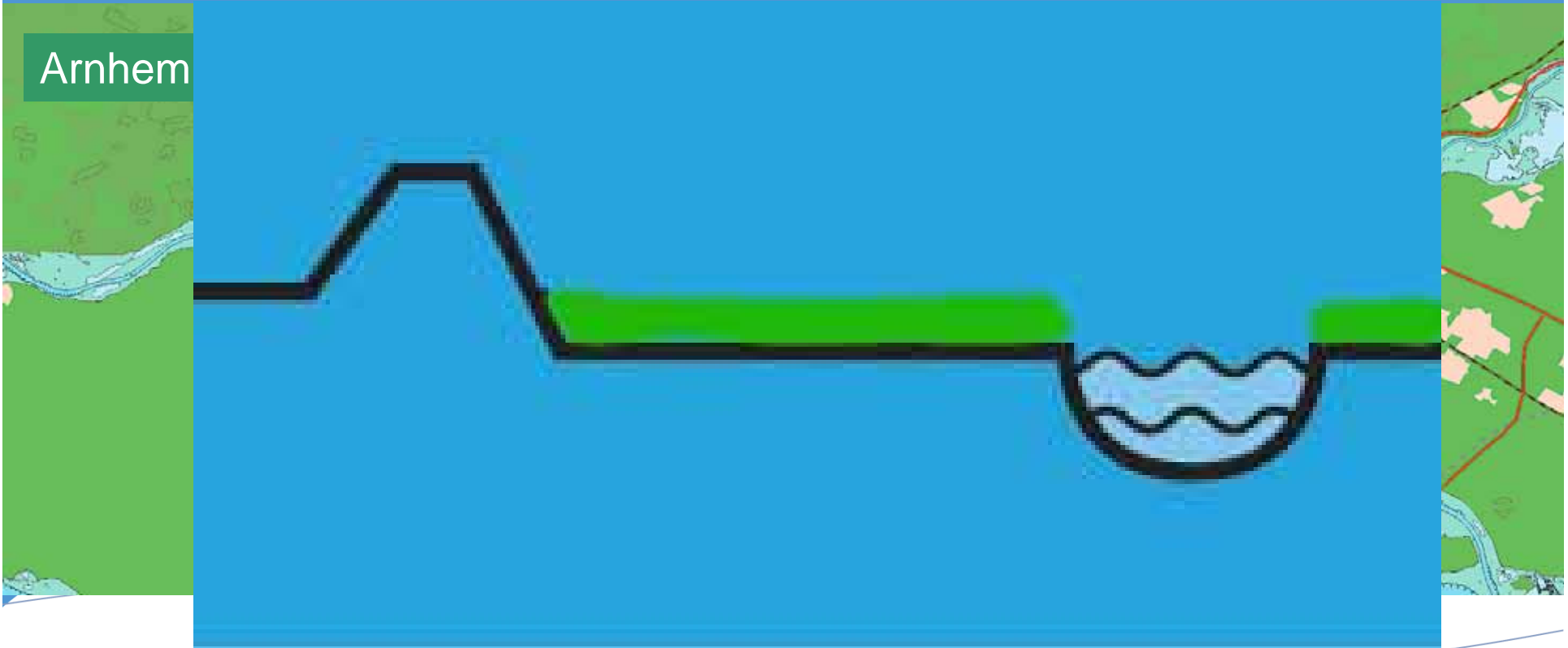
~Established after the floods of 1953

~The safety level of the inland river area is 1/1250 per year

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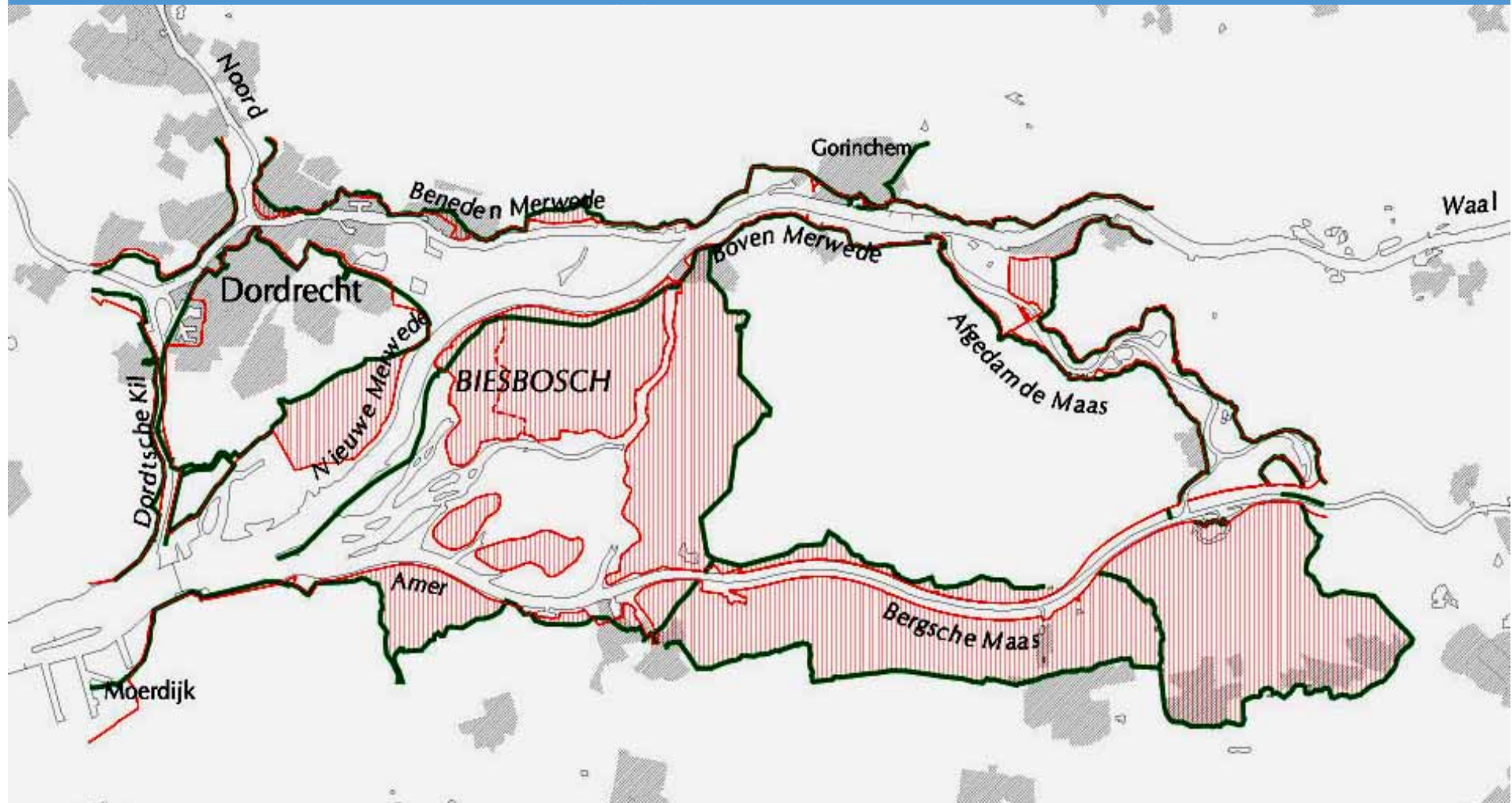
In time less space for the river

Arnhem



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Area of Floodplains decreased



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High water levels are a wake-up call and flooding remains a threat:

- ~ High water levels in 1993 and 1995
- ~ 200,000 people evacuated
- ~ Climate change is ongoing

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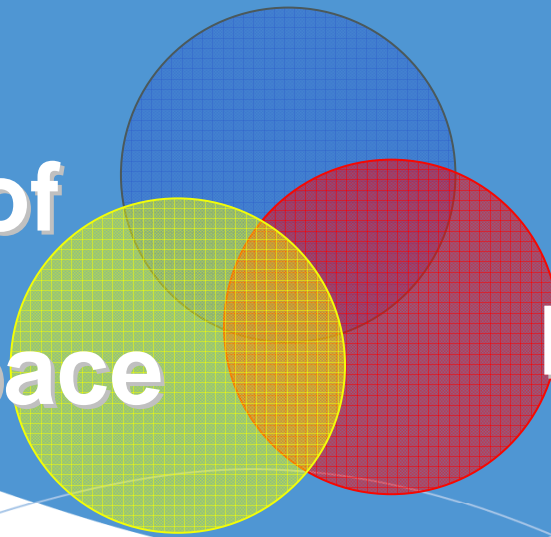




Main elements of our flood protection policy

Room for the River

Preservation of
the current space



Damage control

Objectives of Room for Rivers

1. Safety

“Improving flood protection in the Rivers Region up to the required level”

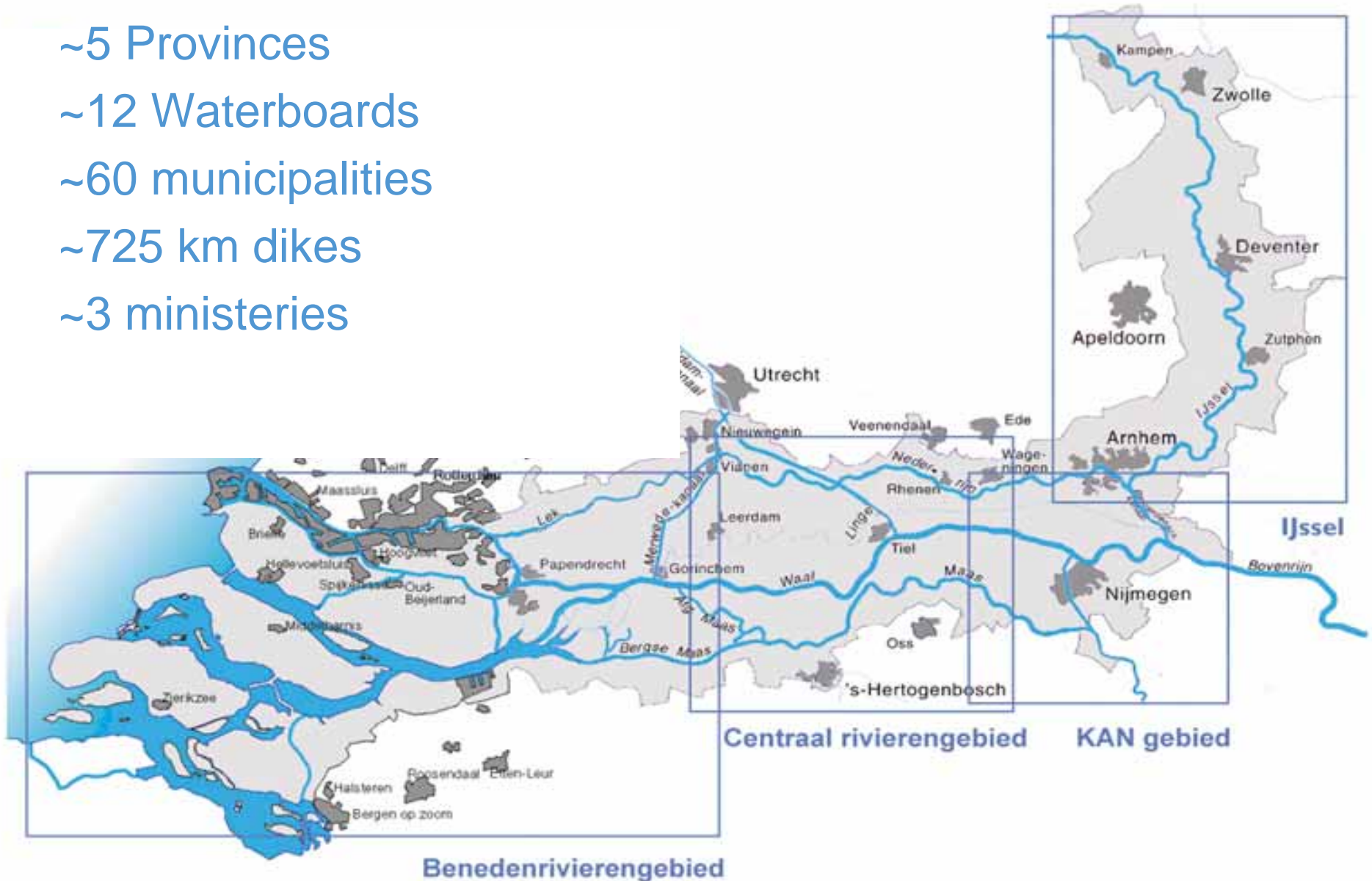
2. Spatial quality

“Contributing to improving the spatial quality of the Rivers Region”

The planning area Room for the River

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- ~5 Provinces
- ~12 Waterboards
- ~60 municipalities
- ~725 km dikes
- ~3 ministeries



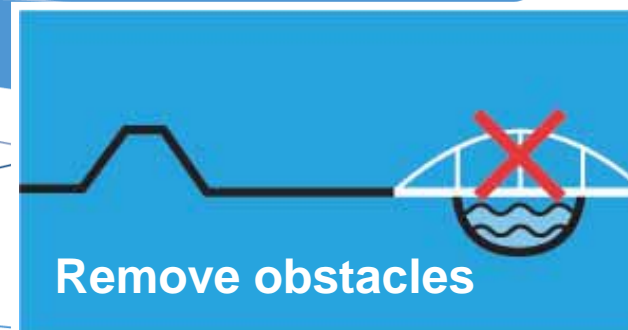
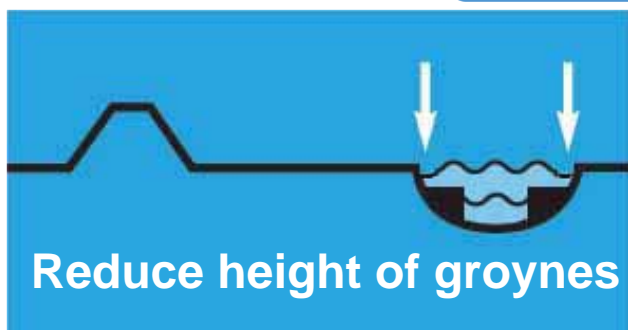
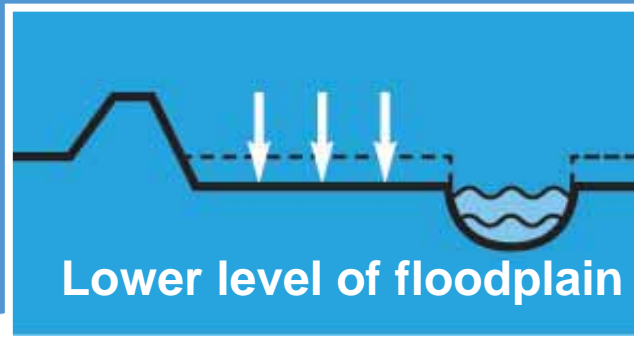
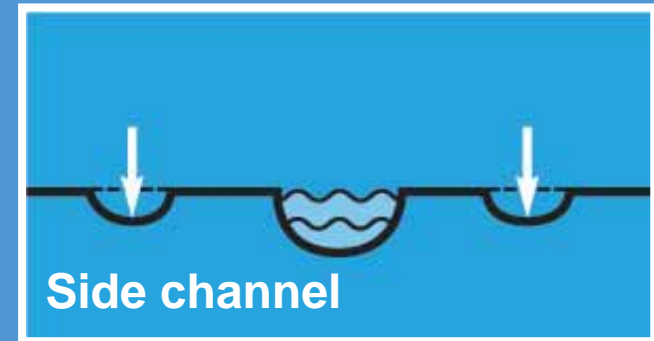
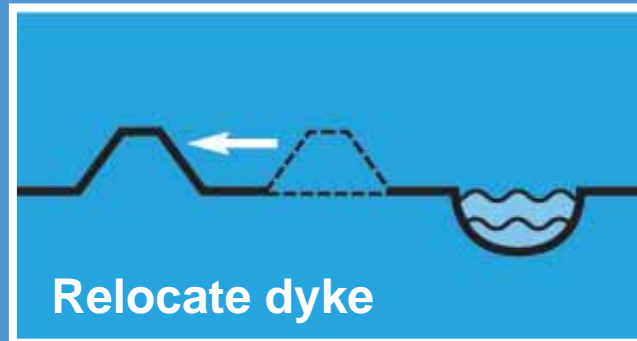


Safety: Room for Rivers Programme

- ~ Basic package of about 40 measures
- ~ Location and type of measures established
- ~ Further elaboration in planning phase
- ~ Standard: 16,000 m³/sec at Lobith in 2015
- ~ Investment of EUR 2.2bn

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Measures



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Town of Nijmegen



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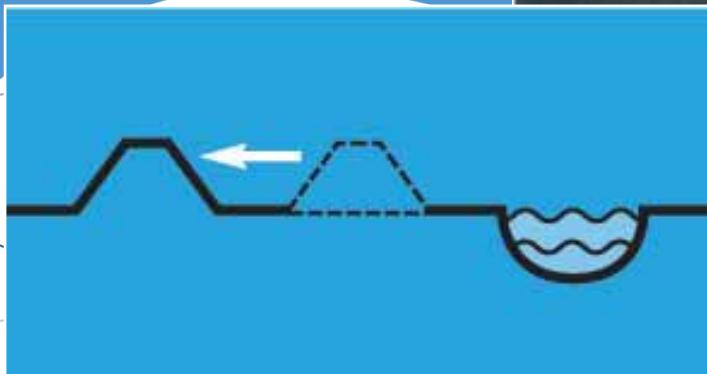
Dike re-location



Examples of measures

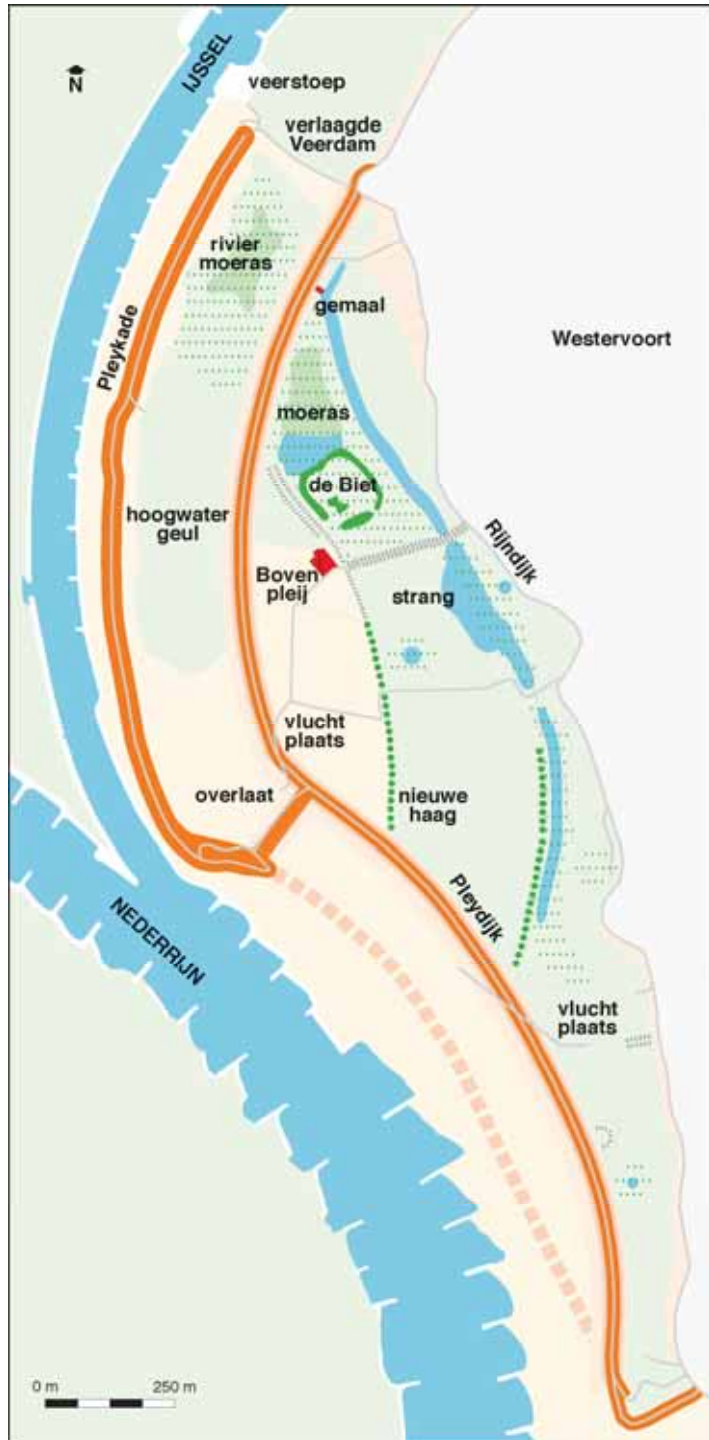
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Dike relocation Bakenhof *Cost : Euro 6.5 million*



Hondsbroeksche Pleij

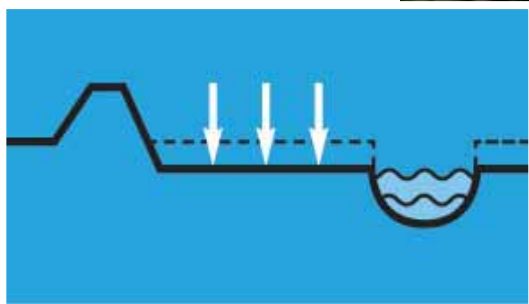
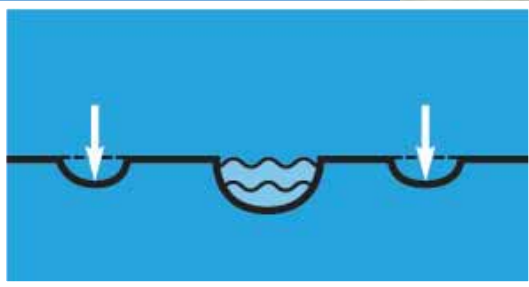
Cost: Euro 45 million



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Examples of measures

Lowering of
river foreland



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Examples of measures

De-poldering
Overdiepse polder



Railway bridge Oosterbeek

Cost: Euro 45 million

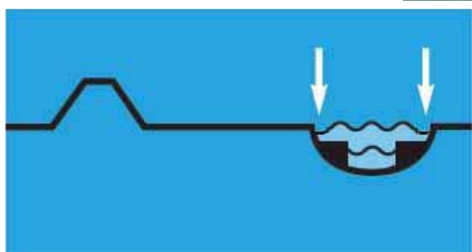
Removal of hydraulic obstacle:
replacement of railway dike by bridge



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Examples of measures

Lowering of the groins



Examples of measures

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Flood bypass

Veessen - Wapenveld





Cost estimates for measures

- ~Lage-scale dike relocation: Euro 350 – 400 million
- ~Dike relocation: Euro 25 – 70 million
- ~Lowering of groynes: average Euro 120,000./groyne
- ~Quay lowering: Euro 2 million



Cost estimates for measures

- ~Floodplain excavations: Euro 10 – 50 million
- ~Obstacle removal: Euro 8 million
- ~Green river bypass: Euro 190 million
- ~Summerbed lowering at Lower IJssel: Euro 65 million



Costs

**~Spatial Planning Key Decision: Euro 40 million
2000 - 2006**

**~Detailed Planning: Euro 180 million
2006- 2010**

**~ Implementation of basic package of 40
measures: Euro 2.0 billion
2007 –2015**

Upper Rhine/Waal , Pannerden Canal

Waal

Lower reaches of the rivers

Lower Rhine

River IJssel

Sub-total

Administrative choices

Project unforeseen (technical)

Total

Euro 414 mln

Euro 117 mln

Euro 579 mln

Euro 173 mln

Euro 496 mln

Euro 1779 mln

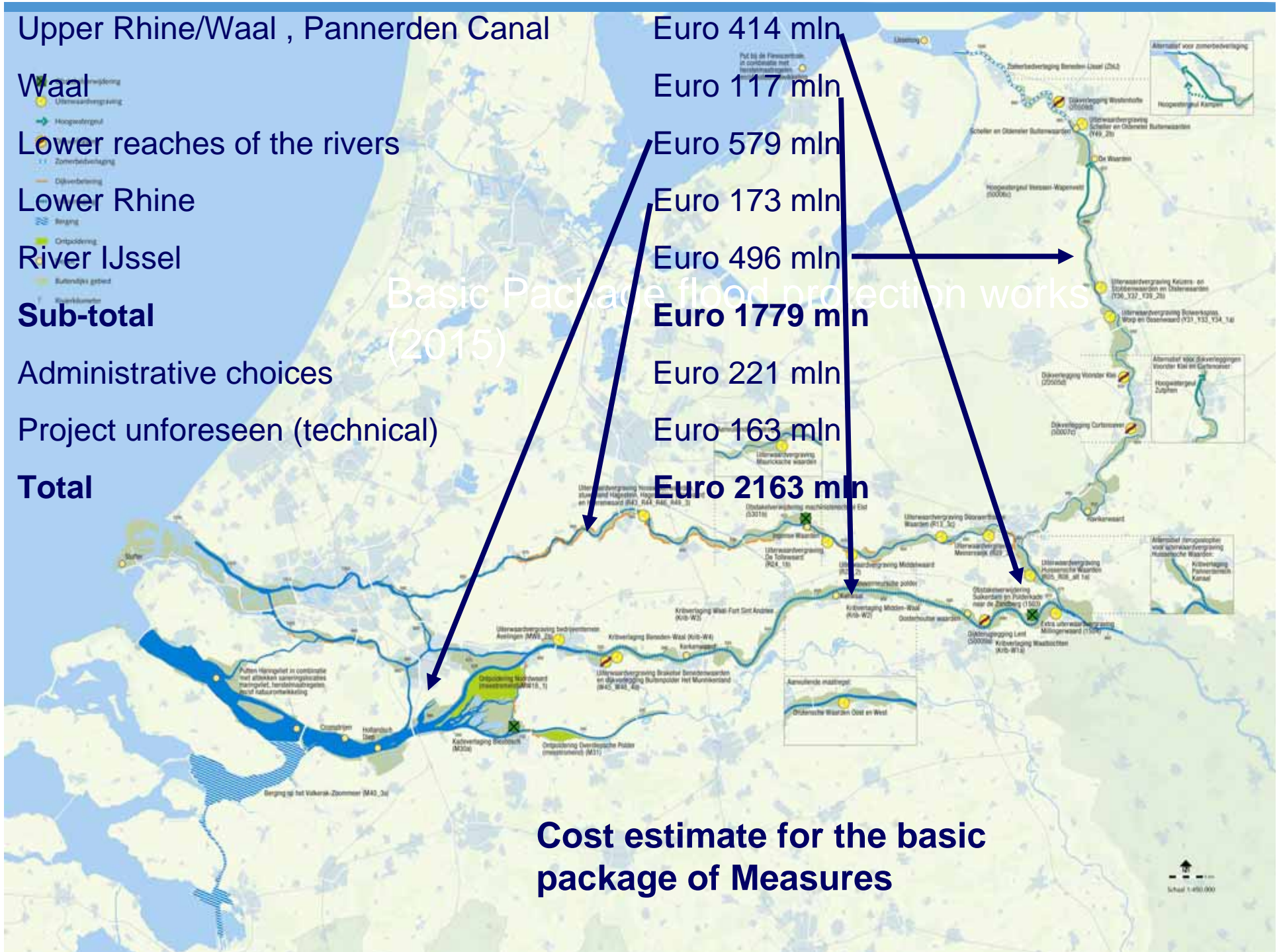
Euro 221 mln

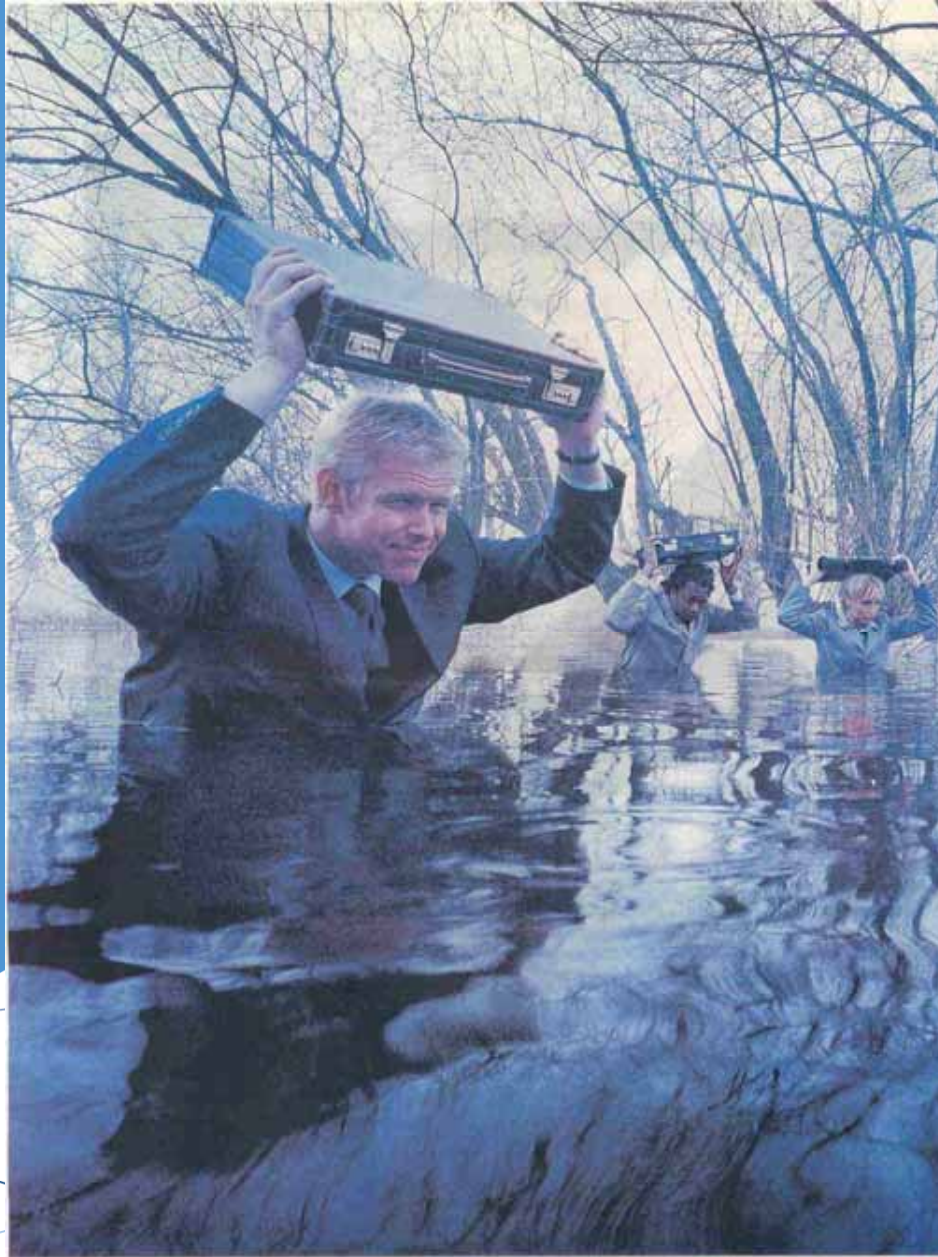
Euro 163 mln

Euro 2163 mln

Basic Package flood protection works (2015)

Cost estimate for the basic package of Measures





**The implementation
of the measures will
have to be finished in
2015**

**Otherwise, this
might be our future**



Thank you for listening!

For more information: www.ruimtevoorderivier.nl