Natural Flood Management in the Rio Real Basin

Artur Ribeiro, Julian Fulton, Laura Norlander, Patricia Terceiro

June 1, 2007
Upper Basin Flood Characteristics

**Cadaval Municipality**
- No consistent inflood problems
- No large levee structures
Middle Basin Floodplain

Rio Bogota
Rio Corga
Bombarral
Rio Real
Lower Basin Floodplain
Natural Flood Management

Natural floodplain

Conventional flood control

Ecological benefits

floodplain

levee setback

Targeted control

Natural flood management
Natural Flood Management

Benefits

- Reduce capital and maintenance costs
- Reduce potential for catastrophic loss to cities and farms
- Water quality improvements
- Groundwater recharge
- Natural channel restoration
  - Habitat improvements
  - Reduced bank erosion
Conventional Flood Management
Disadvantages

- False sense of security
- Bathtub Effect
  - Crops die if floodwaters are not able to drain
- Increased flood height and velocity
- Lost sediment for floodplain
- Habitat loss
Bombarral Flood
November 2006
Ave. Monthly Precipitation Data (1980-2005 at Vermelha, mm)

Crop Danger Zone
Ave. Monthly Precipitation Data (1980-2005 at Vermelha, mm)

Crop Danger Zone

€ 600,000 – € 7 million
Bombarral Recommendations
Bombarral Recommendations

- Create floodplain and urban park: 1000 m²
- Set levee back = natural floodplain
- Breach eastern levee
- Reinforce western levee along city

North
Bombarral Recommendations

- New bridge at flood bottleneck
- Set levee back = natural floodplain
- Create floodplain and urban park: 1000m²
- New combined railroad trestles
- Breach eastern levee
- Reinforce western levee along city

Cost of levee setback / removal: € 200 per linear meter
Basin-wide Recommendations

**PLANNING**

*Include flood management analyses in PDMs*

*Establish no-build floodplain zones and REN zones*

  *Incorporate these protected areas into PDMs*

*Require new development (including roads) to mitigate increased stormwater runoff*

*Flood warning and response plan; reconstruction plan*

**OUTREACH**

*Farmer outreach programs to emphasize ecological and economic benefits of natural flood management*

*Organize activities to remove debris from the river channel caused by humans*
**Basin-wide Recommendations**

**ACTION: River Basin Management Authority**
- Approach flood management at a basin-wide scale to address upstream practices that cause and exacerbate floods.
- Oversee channel maintenance programs that work with local NGOs.
- Breach levees to create flood drainage zones that function as urban parks.
- Share flood management maps with local communities to promote best practice agricultural practices.

**ACTION: Riparian Landowners**
- Setback levees to create a flood buffer zone for crop protection
- Maintain 10m of riparian corridor per *decreto – lei no. 46-94*
- Reinforce existing levees with native vegetation
Why Take Action?

**Persistant Flooding Problems**

Floods continue to cause economic, social and environmental damage.

Severity and frequency of floods will increase with global climate change

**Water Framework Directive**

*River basin management plans due: 2010 -> Good Ecological Status*

**EU Flood Directive**

*Flood Risk Assessment: 2011*

*Flood Risk Maps: 2013*

*Flood Risk Management Plan: 2015*

**Compliance measures for WFD and Flood Directive should be coordinated**
Funding Opportunities

Municipalities and river basin managers have at least two options:

*European Agricultural Fund for Rural Development (EAFRD)*

*EU Structural and Cohesion Funds*

*Use for:*
- Farmer compensation for levee setbacks
- Bridge rebuilds
- Channel maintenance programs
- Targeted levee reinforcements
- Education / outreach programs
Benefits of Natural Flood Management Plans:

Integrate conventional flood control needs with ecological protection

Protect local economy and population from increased flood uncertainty due to climate change

Esperamos então não continuar a ver.....
.... os comboios a passar!