ENVIRONMENTAL & SOCIAL BENEFITS OF TRANSBOUNDARY WATER COOPERATION

LESSONS FROM THE LOWER JORDAN RIVER BASIN

MAY 23, 2014
UNECE, GENEVA
Transboundary River System

Lower part of Jordan River divides into three political areas:

**Israeli:**
Sea of Galilee to Yarmouk River

**Jordanian-Israeli:**
Yarmouk River to Bezek Stream

**Palestinian-Jordanian:**
Bezek Stream to Dead Sea
The Mighty River Jordan
Back Door Dump / Conflict Mindset
Environmental Flow Study Methodology

- Regional team of experts sampled the LJR twice during 2009
- **Morphological and hydrological** variables including cross sections, velocity, discharge
- **Water Quality**: temperature, transparency, Electric Conductivity, salinity, Dissolved Oxygen, % oxygen saturation etc.
- **Macroinvertebrates**
- **Botanical Survey**
- **Constraints** in sampling: access, mines, budget, historical references
Key Findings:

- Macroinvertebrate taxa richness is at least 50% lower than in the reference sites
- Fast flow habitats have completely vanished and with them all species adopted to fast flow conditions
- Plant species diversity decreases from N-S; primarily saline tolerant plants; reduction of flow and flood frequency

<table>
<thead>
<tr>
<th>Stations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Species Richness</td>
<td>82</td>
<td>69</td>
<td>50</td>
<td>50</td>
<td>29</td>
</tr>
</tbody>
</table>
## Possible Rehabilitation Scenarios

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Required Flow</th>
<th>Required Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take No Action</td>
<td>50-100 X 10^6 m³/Y</td>
<td>Salinity: 3000-4000 ppm Mostly effluents, agricultural and fishpond runoff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Most effluents, agricultural and fishpond runoff</td>
</tr>
<tr>
<td>Full Restoration</td>
<td>900 – 1,400 X 10^6 m³/Y</td>
<td>Salinity: 250-350 ppm No effluents, agricultural or fishpond runoff</td>
</tr>
<tr>
<td></td>
<td>3 minor flood/Y</td>
<td>No effluents, agricultural or fishpond runoff</td>
</tr>
<tr>
<td>Partial Restoration</td>
<td>600 – 800X10^6 m³/Y</td>
<td>Salinity: 500-750 ppm No effluents, agricultural or fishpond runoff</td>
</tr>
<tr>
<td></td>
<td>1 minor flood/Y</td>
<td>No effluents, agricultural or fishpond runoff</td>
</tr>
<tr>
<td>River Rehabilitation</td>
<td>300 – 400X10^6 m³/Y</td>
<td>Salinity: 1000-1500 ppm High quality effluents, agricultural and fishpond runoff</td>
</tr>
<tr>
<td></td>
<td>1 minor flood/2Y</td>
<td>up to 25% of baseflow</td>
</tr>
<tr>
<td>Flow Enhancement</td>
<td>300 – 400X10^6 m³/Y</td>
<td>Salinity: 3000-4000 ppm Mostly effluents, agricultural and fishpond runoff</td>
</tr>
<tr>
<td></td>
<td>1 minor flood/2Y</td>
<td>Mostly effluents, agricultural and fishpond runoff</td>
</tr>
</tbody>
</table>
Set NGO Targets: Regional Rehabilitation Goal

- 400-600 mcm annually, one minor flood
- Salinity level less than 750 ppm; primarily fresh water with only the highest quality of effluents allowed up to 25% of the LJR's base flow
- This strategy would remove most of the disturbances, restore the river's structure and function, allow biodiversity to recover and achieve a fair to high ecosystem integrity and health.
- Would allow broad tourism activities, baptism, recreation and fishing.
To implement a rehabilitation strategy requiring at least 400 mcm per year, the following quantities would be needed annually:

Israel – 220 mcm (54%)
Syria – 100 mcm (24%)
Jordan – 90 mcm (22%)

Palestine would not be asked to contribute water rather it needs to receive riparian share of Jordan River waters.
DHV MED Road Map on How To Meet the Environmental Flow Needs

Used WEAP Model

✓ Reaches
✓ Water Sources
✓ Water consumers
✓ Hydrometric Stations
✓ Quality Samples
✓ Drainage Basins
✓ Dams
✓ Fishponds
✓ Groundwater

...
## Reintroduction Scenario Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>MCM</th>
<th>Salinity ton/Yr</th>
<th>NIS (Undiscounted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Capital Fixed Per m³</td>
</tr>
<tr>
<td>1. Cease pumping from lower Yarmouk to the SoG, if the later is higher than the bottom red line</td>
<td></td>
<td>2,300</td>
<td></td>
</tr>
<tr>
<td>2. The brine of the SWC will be transferred to the Dead Sea</td>
<td>-8</td>
<td>47,000</td>
<td>130m 3.9m</td>
</tr>
<tr>
<td>3. Transferring effluents from Kishon to AMWA and Harod</td>
<td>10-15</td>
<td>-</td>
<td>40m 1.2m 0.07</td>
</tr>
<tr>
<td>4. Further and faster decreasing pumping to the NWC¹</td>
<td>30</td>
<td>++</td>
<td>1.55</td>
</tr>
<tr>
<td>5. Exchanging 50% of the fishponds with field crops and alfalfa²</td>
<td>10</td>
<td>36,000</td>
<td>0.2</td>
</tr>
<tr>
<td>6. Diminish saline agriculture by 30% by 2020</td>
<td>10</td>
<td>+</td>
<td>0.7</td>
</tr>
<tr>
<td>7. Diminish fresh agriculture by 30% by 2020</td>
<td>9-12</td>
<td>+</td>
<td>1.6</td>
</tr>
<tr>
<td>8. Maintain present consumption level in the UJR</td>
<td>27</td>
<td>++</td>
<td>1.6</td>
</tr>
<tr>
<td>9. Discharge some of the effluents of the Kishon to Harod River to reduce salinity</td>
<td>2-3</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>10. Desalination of 1.5 MCM/Yr of the SWC water, on top of the current plan</td>
<td>-</td>
<td>3,000</td>
<td>7 m 1.5</td>
</tr>
</tbody>
</table>
Social Benefits Identified through Grassroots Action
Expand Social Action Globally: A Tradition of Pilgrimage

For many pilgrims the Jordan River features prominently along routes connected to Biblical and Islamic texts, drawing visitors to the places where miracles occurred and prophets walked.

Friends of the Earth Middle East (FoEME)
2013: Rehabilitation of Lower Jordan River ... underway

- Sewage Being Removed: Waste Water Treatment Plants being built in Israel, Jordan and Palestine
- Israel – National Master Plan Being Developed
- Jordan/Israel – Rehabilitation Committee Established
- Israel Releases Fresh Water – 30mcm pa
- With EU Support Regional NGO Master Plan Developed
Lessons from the Lower Jordan River Basin

• Civil society can be effective catalyst
• Need regional approach and regional vision
• Undertake sound research – environmental & socio-economic
• Identify clear targets and benchmarks
• Build local constituents – schools/activists/mayors/faith based groups across the basin.
• Attract the media local & global
• Mindful of synergy between bottom up and top down advocacy

Must be directed to create Political Will

For more information visit www.foeme.org