

WATER MANAGEMENT MODEL FOR THE RIO GRANDE/BRAVO BASIN SCENARIOS

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Scenarios for Improved Water Management

Scenario Development

- Developed through extensive consultations with stakeholders from both sides of the border
- Evaluating physical feasibility of scenarios using model
- Survivors analyzed for economic, legal and institutional feasibility

Stakeholder Groups (MX & US)

Water Users

Irrigators
Municipalities
Environmental groups

Government Representatives

Mx: CNA, CILA, SEMARNAT
TX: TCEQ, TPWD, TWDB, TDA
US: IBWC, EPA, USDA, DOI, FWS, DOS

Planners & Policy Makers

Scientists and Experts

Stakeholder Suggested Improvements

- Objectives
 - Increase Whole System Benefits
 - Improve Ag. Supply Reliability
 - Increase Muni. Water Supply
 - Restore Environmental Flows
- Methods
 - Water Right Buybacks & Transfers
 - Groundwater Banking & Conjunctive Management
 - Non-treaty Tributary Flows
 - Water Conservation & Reuse
 - Facility Reconfiguration & Reoperation
 - Brackish Water Desalination

Scenarios

Methodology

- Analyze the alternative water allocation policy to be evaluated (Lit. Review)
- Include this policy into the model.
- Compare it against the Baseline Scenario.

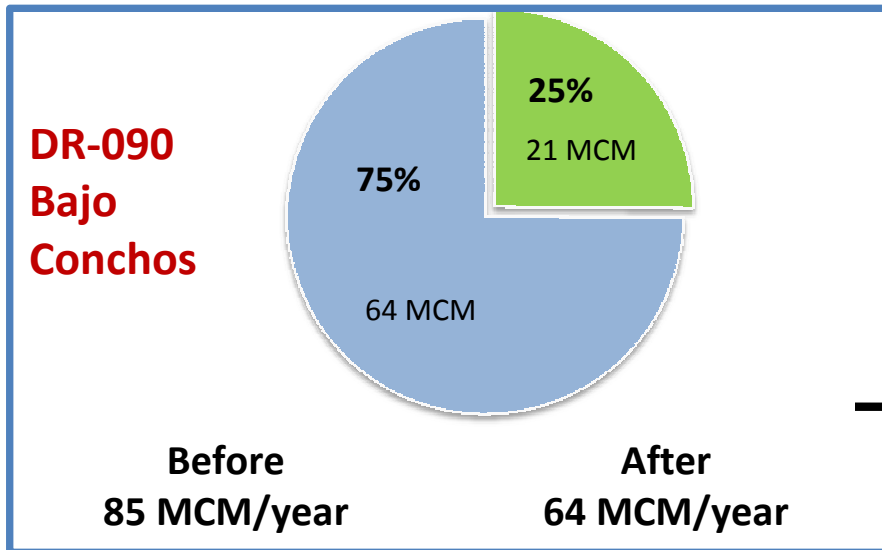
Performance Criteria

- Reliability - Frequency with which demand is satisfied
- Resilience - Probability of recovering from deficit. How fast a demand recovers from a deficit.
- Vulnerability - Expected deficit for a water demand. Average deficit

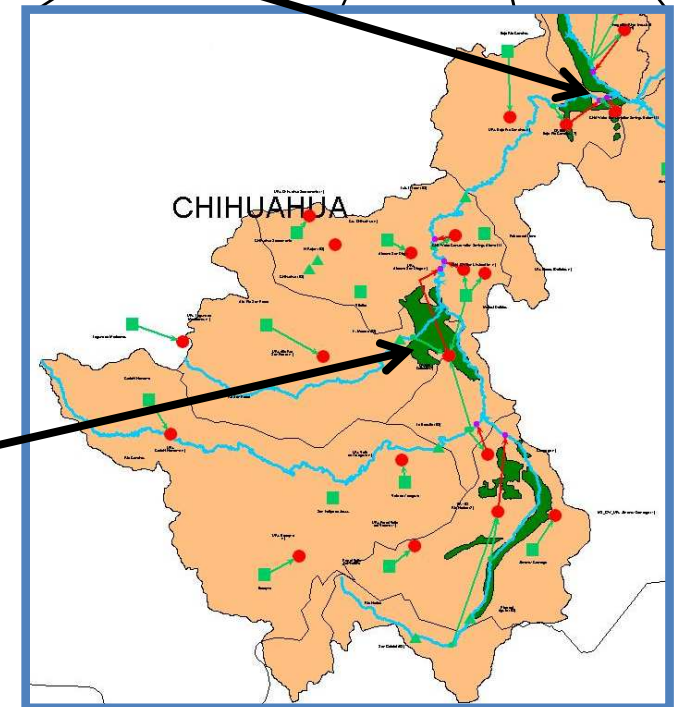
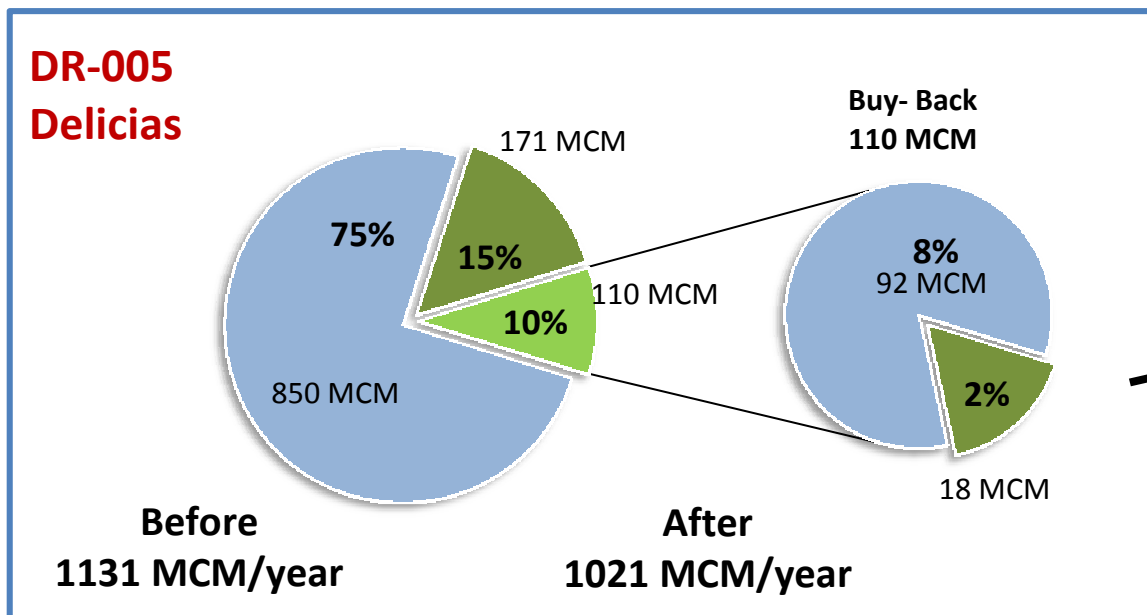
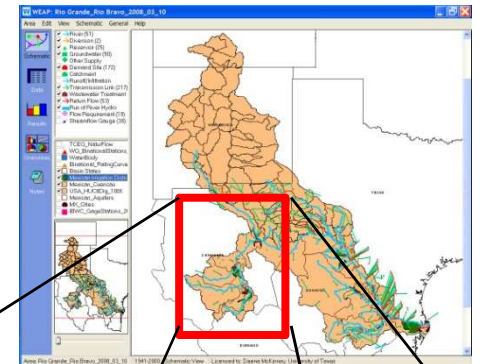
Some Scenarios Analyzed So Far

- Water Rights Buyback
 - PADUA (I.A)
 - Reduction of DR-005 to 50,000 ha (I.A.a)
- Groundwater Banking (I.B)
 - Groundwater Banking + Buyback PADUA (I.B.1)
- Water Conservation (II.A.1)
 - Delivery of Saved Water to Treaty (II.A.1.b)
 - Delivery of Saved Water to DR-005 (II.A.1.a)
 - With GW Banking & Delivery to DR-005 (I.B.4)
 - Delivery of Saved Water to Treaty + GW Bank to DR-005 (II.A.1.b+I.B)
 - Delivery of Saved Water to Treaty + GW Bank to DR-005 Reduction of DR-005 +(II.A.1.b+I.A.a+I.B)
- Environmental Flows in Conchos Basin (IV.A)

Water Rights Buyback



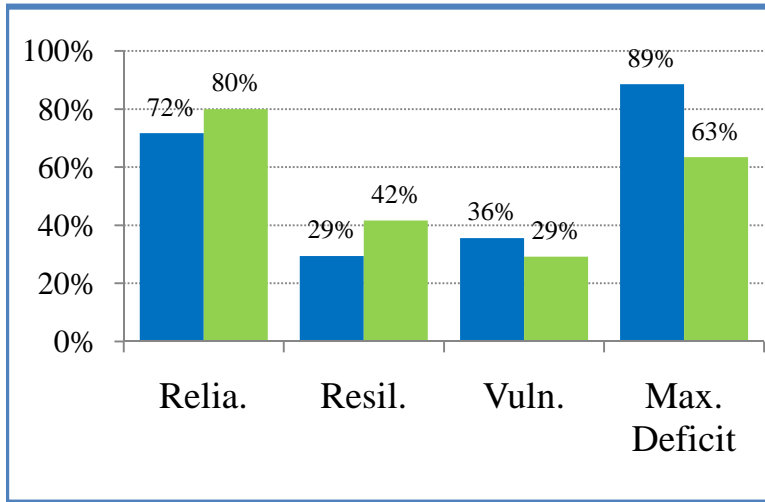
- Surface Water
- Groundwater
- Buy-back



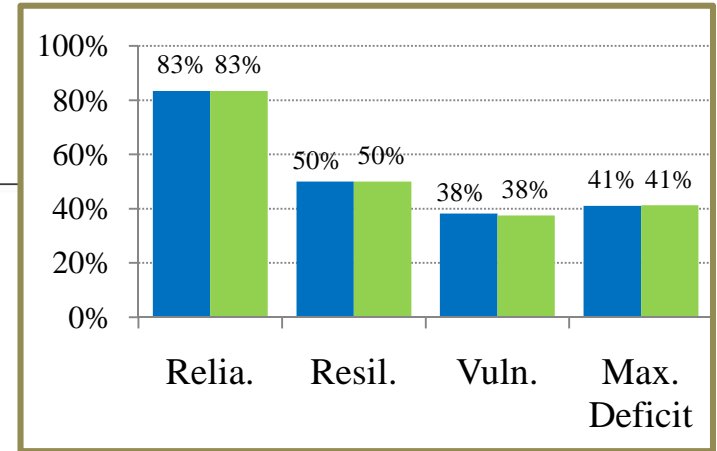
Scenario I.A

Water Rights Buyback (PADUA)

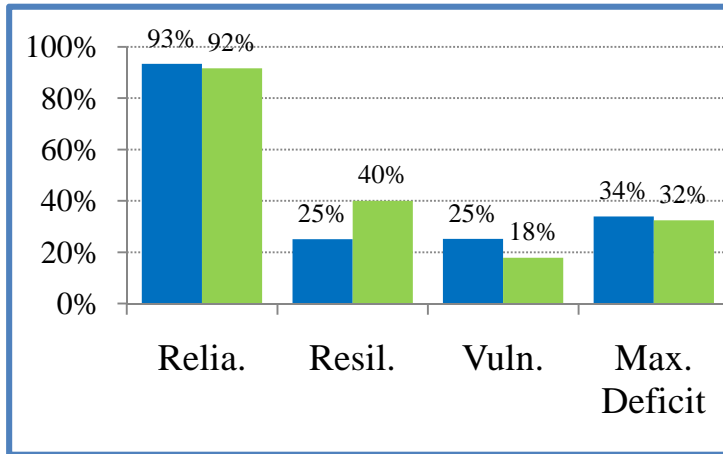
DR-005 Delicias



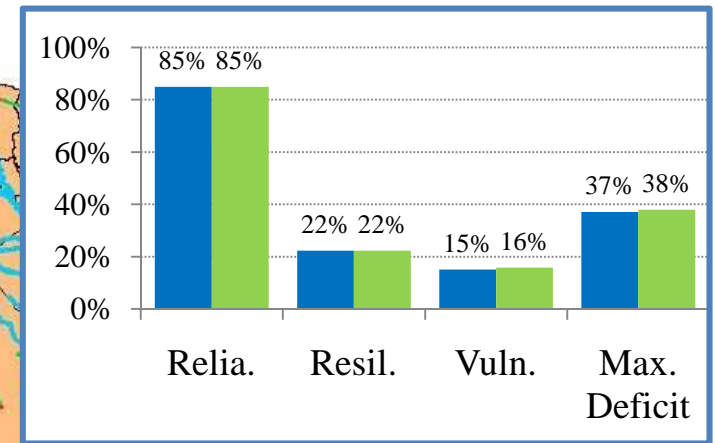
Treaty Obligations



DR-025 Bajo Rio Bravo



WMS 8-13



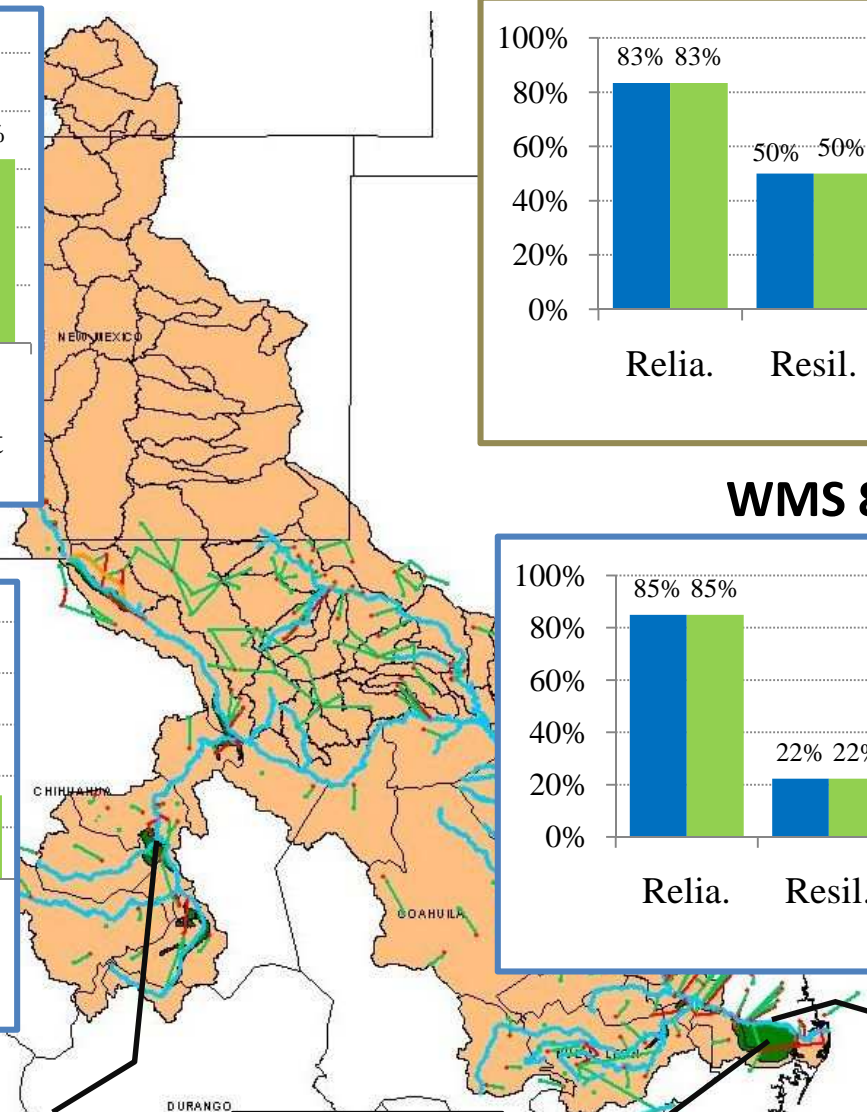
- Baseline Run
- Scenario I.A

DR-005

DR-025

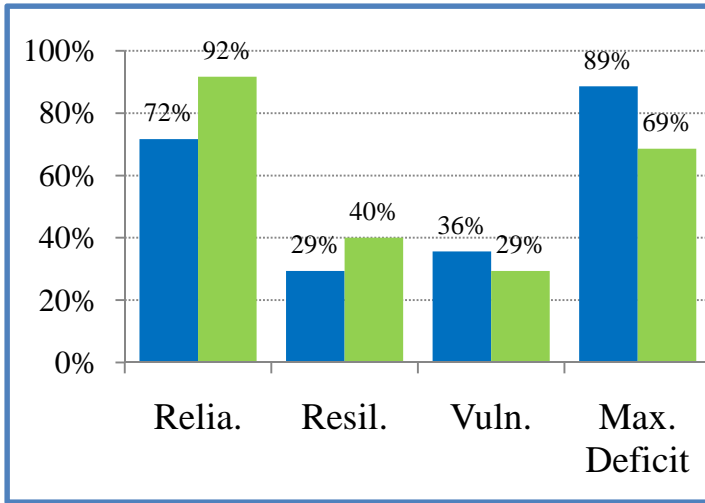
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Scenario I.A

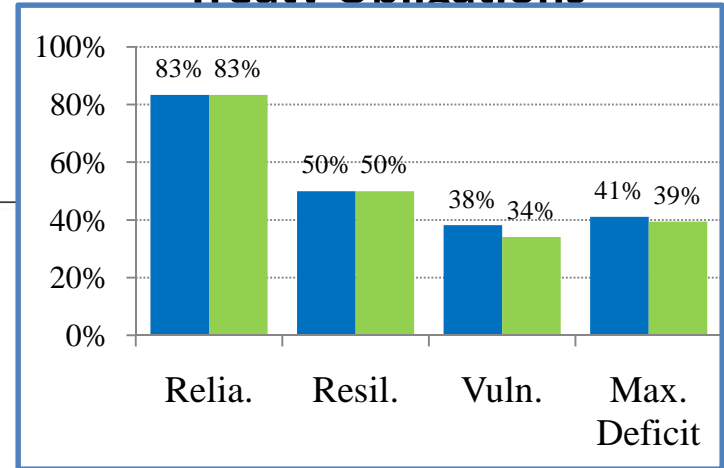


Water Rights Buyback - Reduction of DR-005 to 50,000 ha.

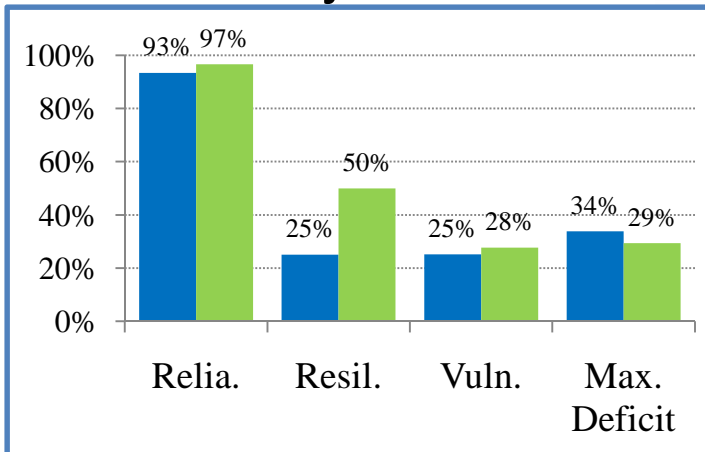
DR-005 Delicias



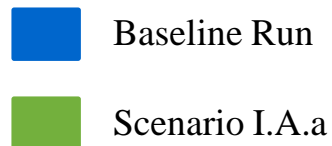
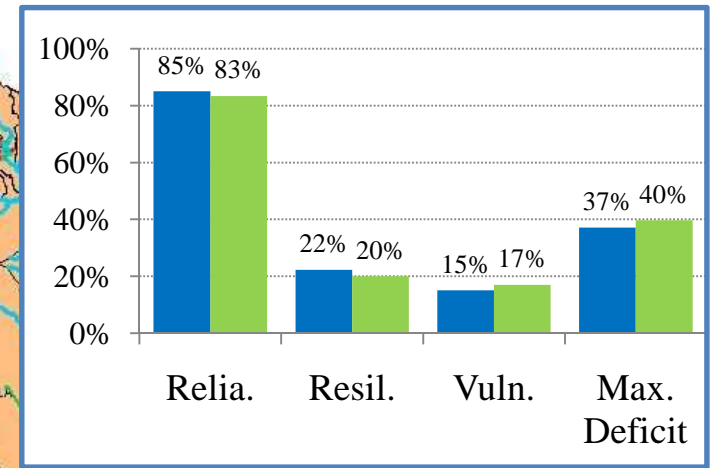
Treaty Obligations



DR-025 Bajo Rio Bravo



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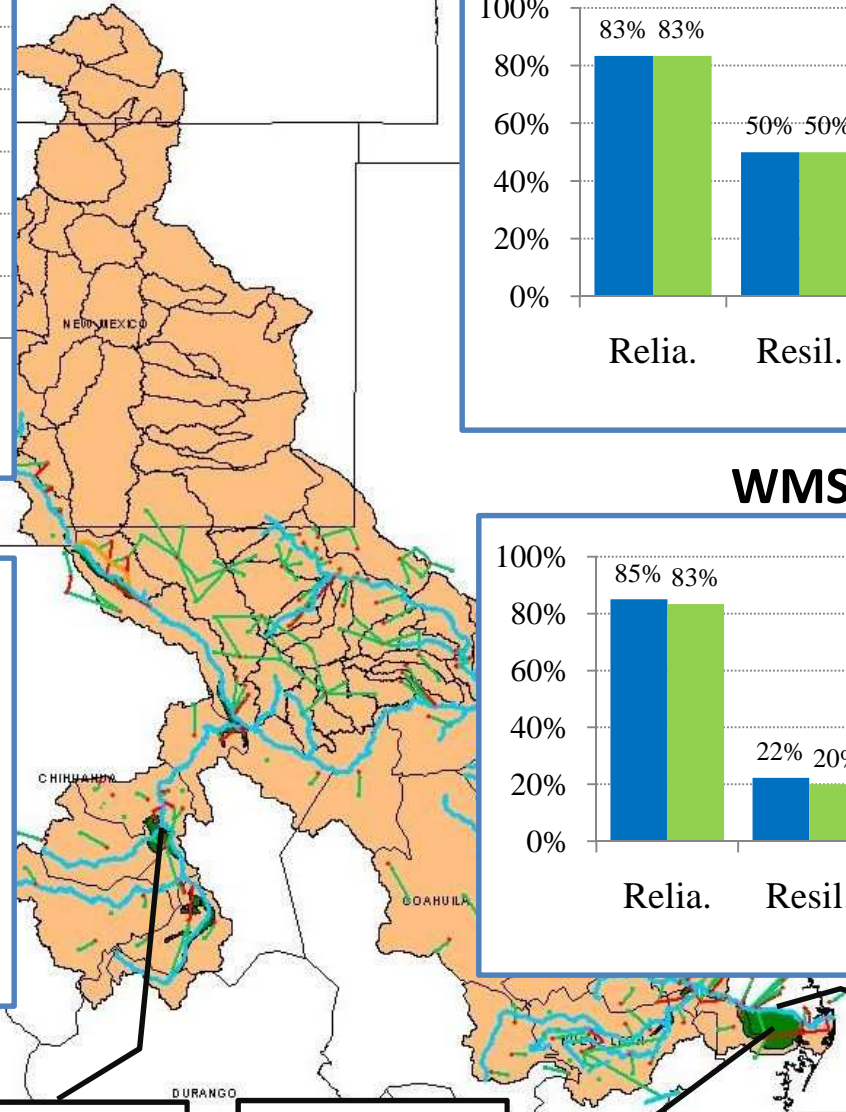


DR-005

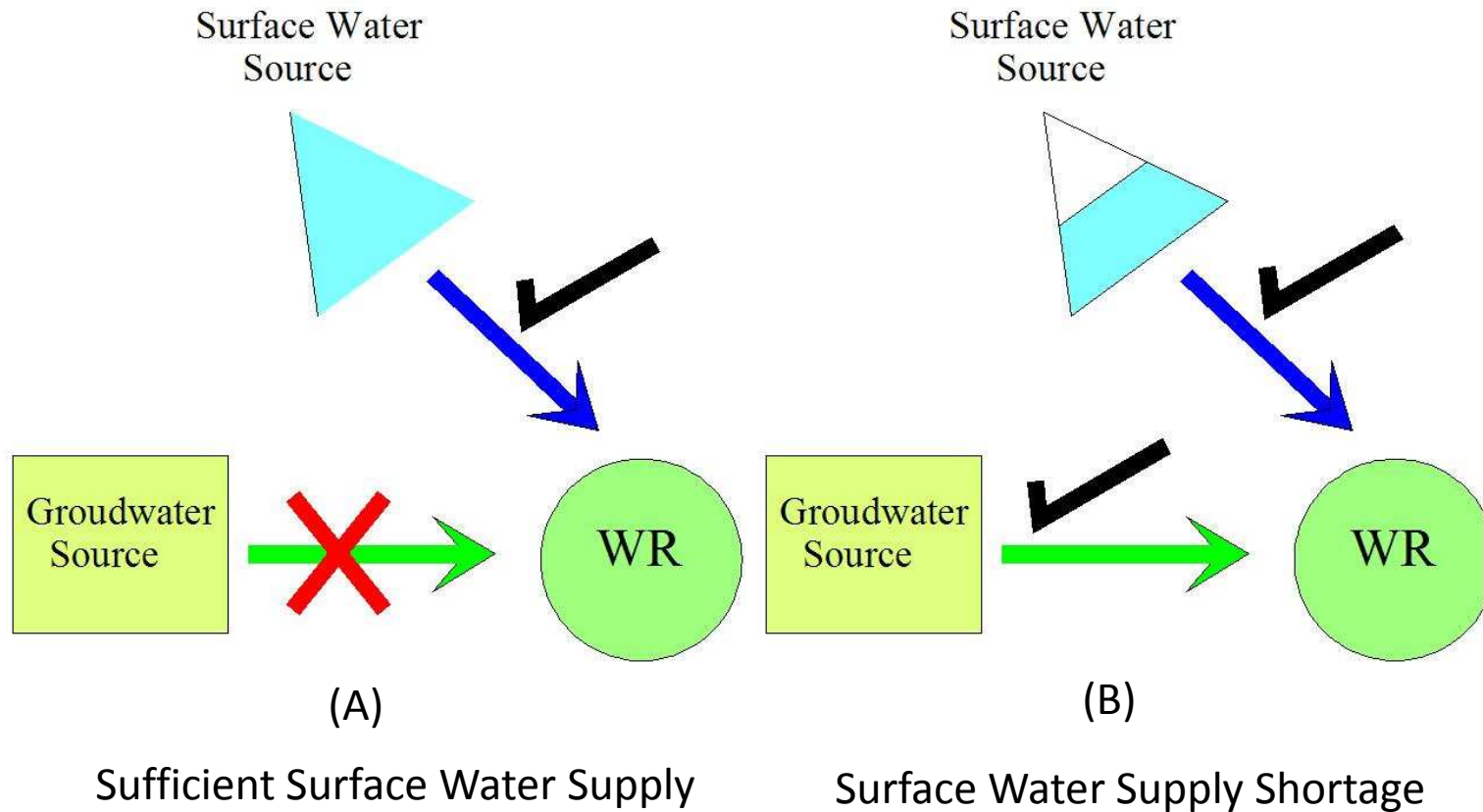
DR-025

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Scenario I.A.a



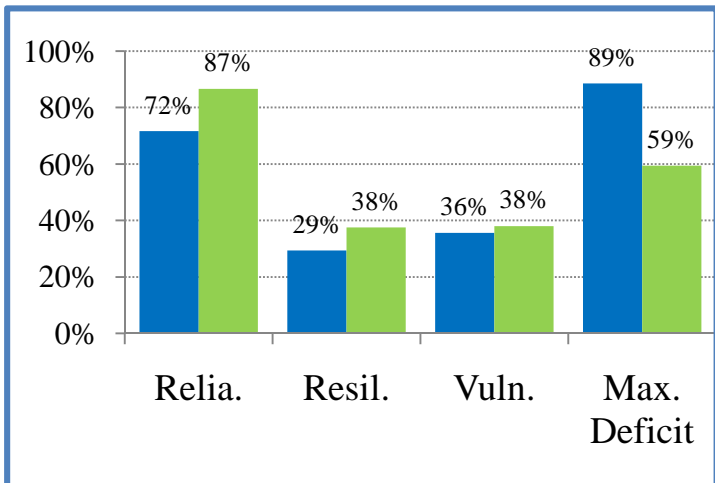
Groundwater Banking



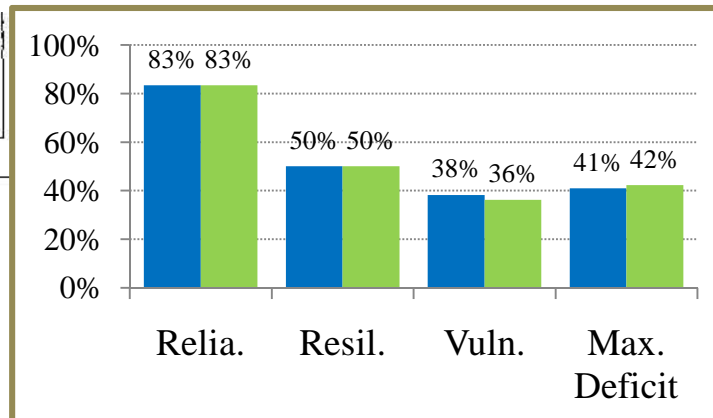
Scenario I.B

Groundwater Banking

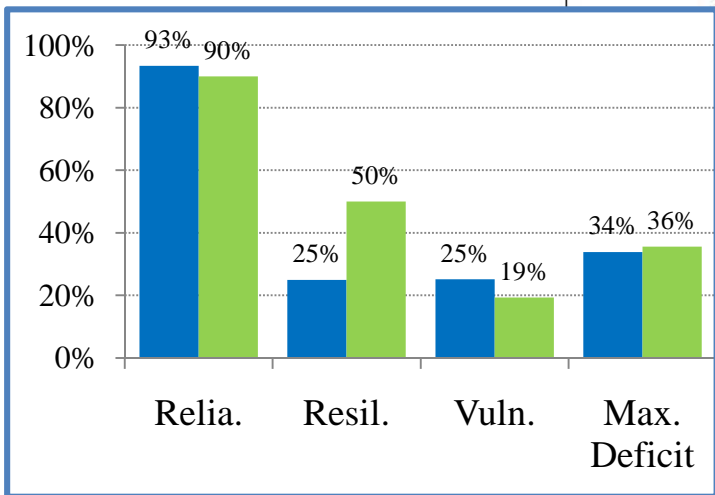
DR-005 Delicias



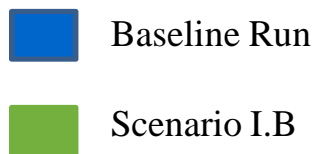
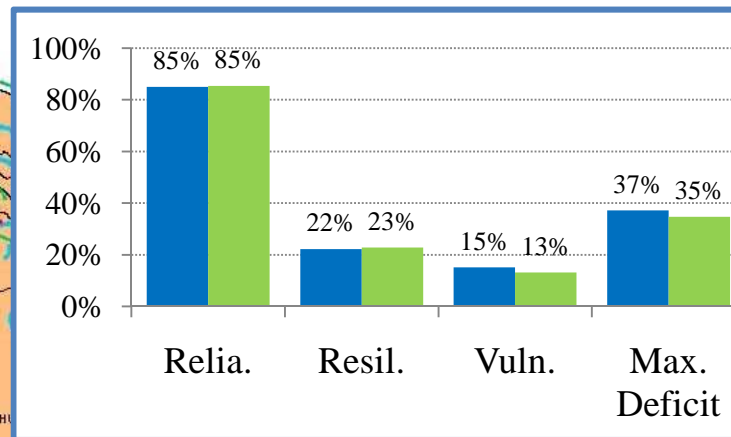
Treaty Obligations



DR-025 Bajo Rio Bravo



WMS 8-13

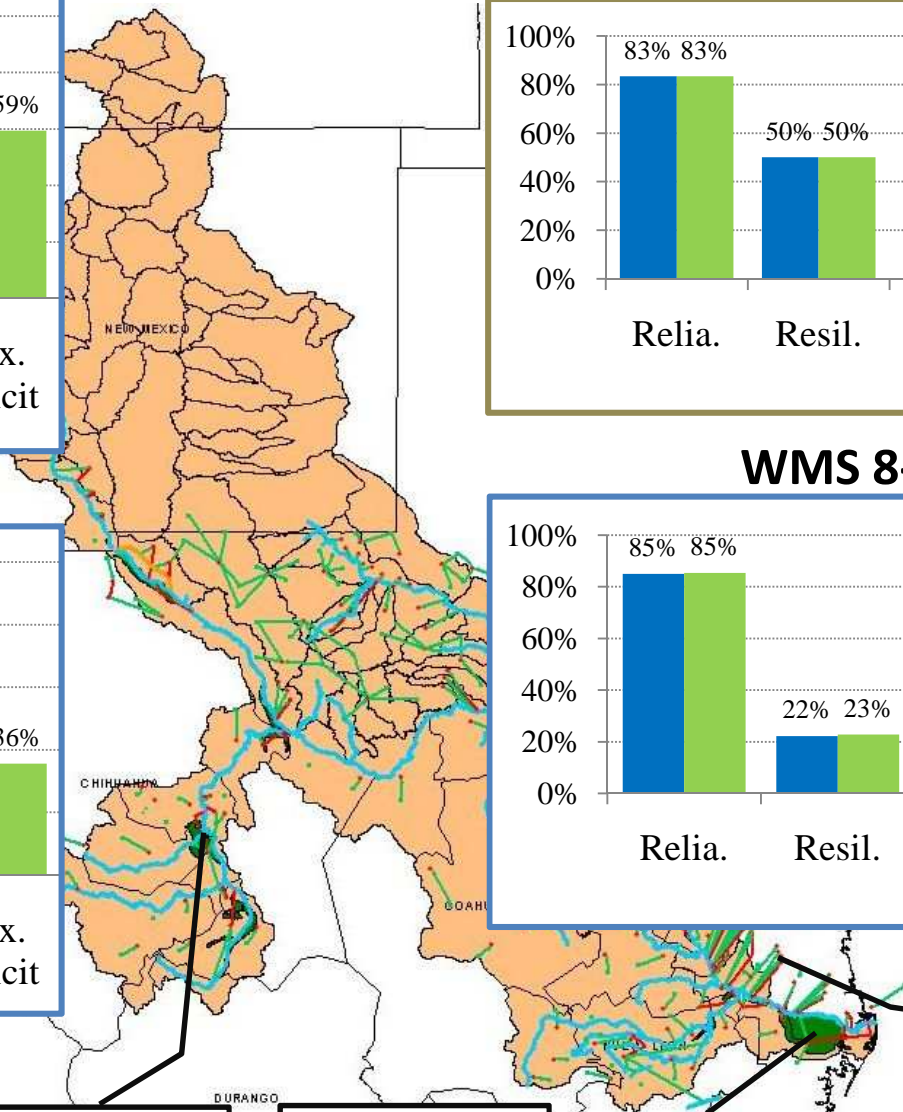


DR-005

DR-025

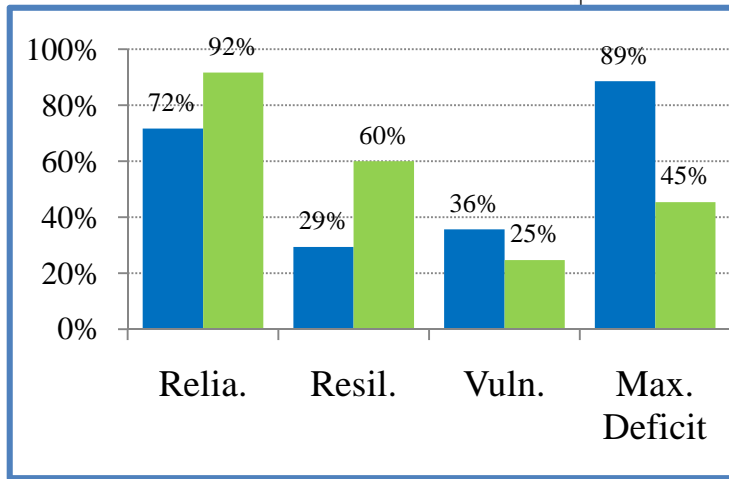
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Scenario I.B

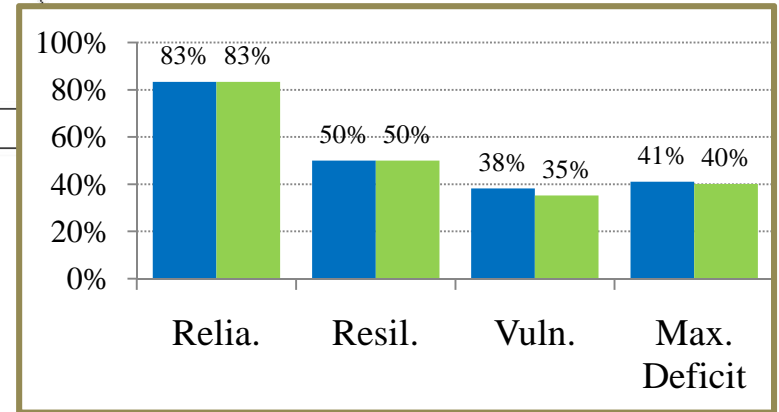


Groundwater Banking + Water Rights Buyback

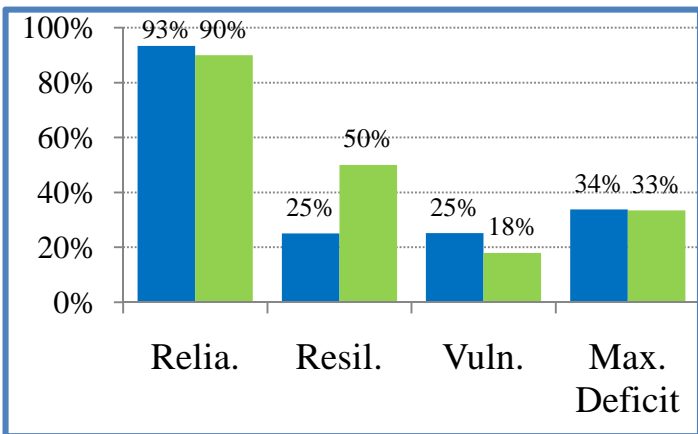
DR-005 Delicias



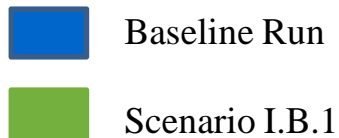
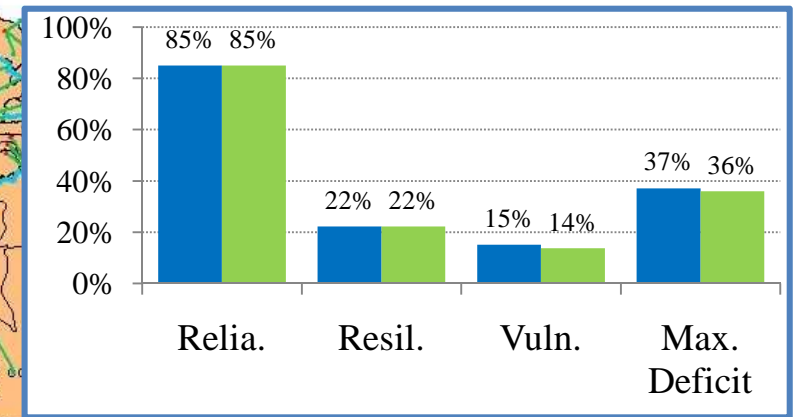
Treaty Obligations



DR-025 Bajo Rio Bravo



WMS 8-13

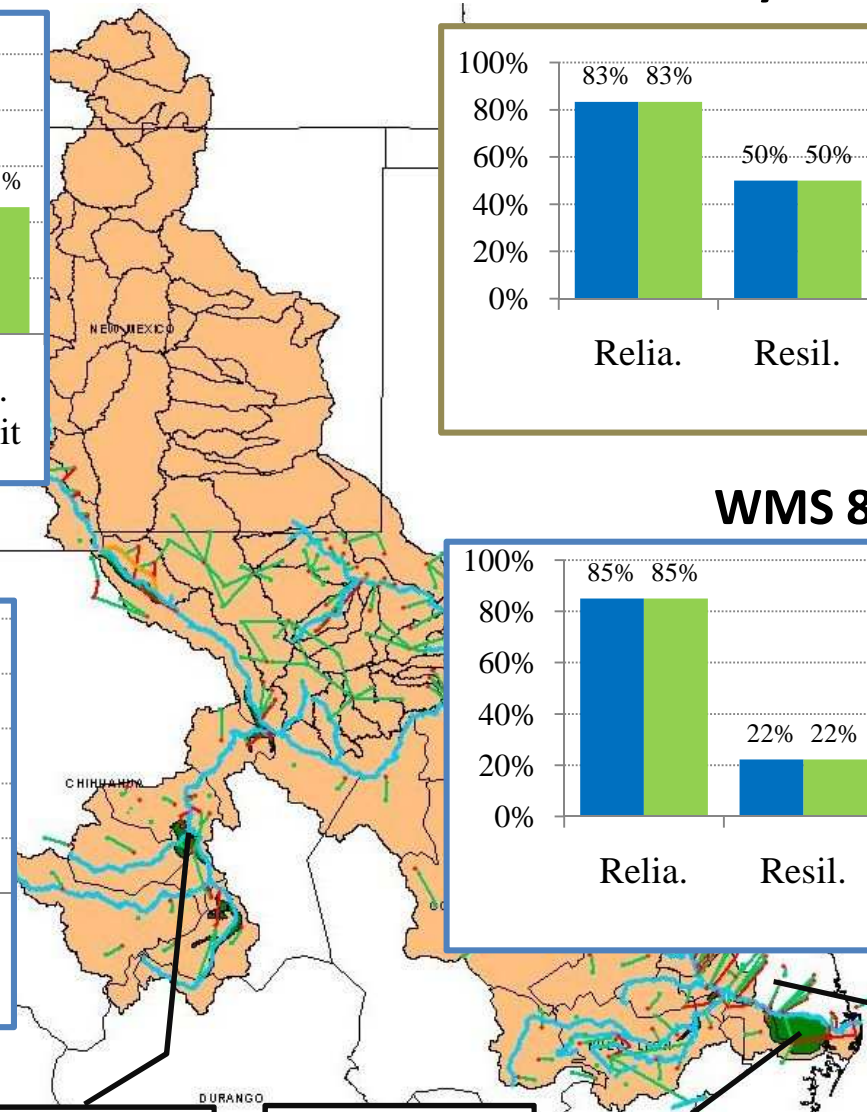


DR-005

DR-025

WMS 8-13

Scenario I.B.1

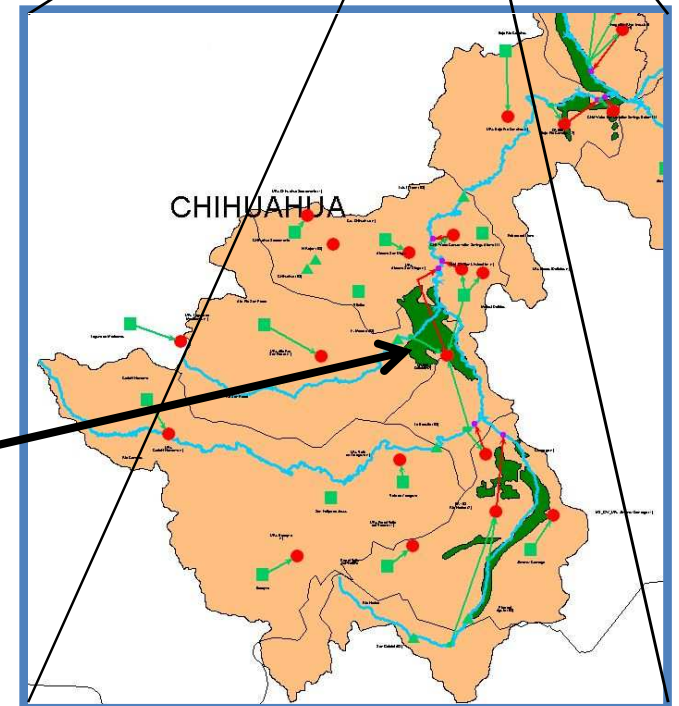
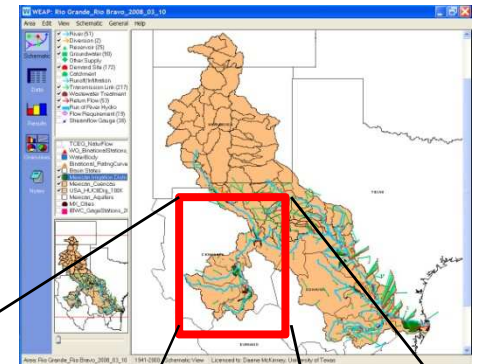


Water Conservation - Minute 309

Water Conservation Measures implemented in the Rio Conchos Basin

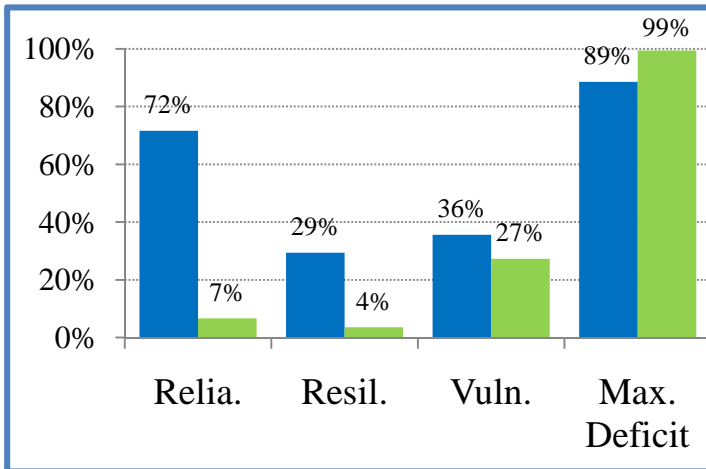
Increase Global Efficiency of DR-005 Delicias from 33% to 55%

Item	Conveyance Efficiency (%)	Application Efficiency (%)	Global Efficiency (%)
Old system	61%	54%	33%
New system	69%	80%	55%

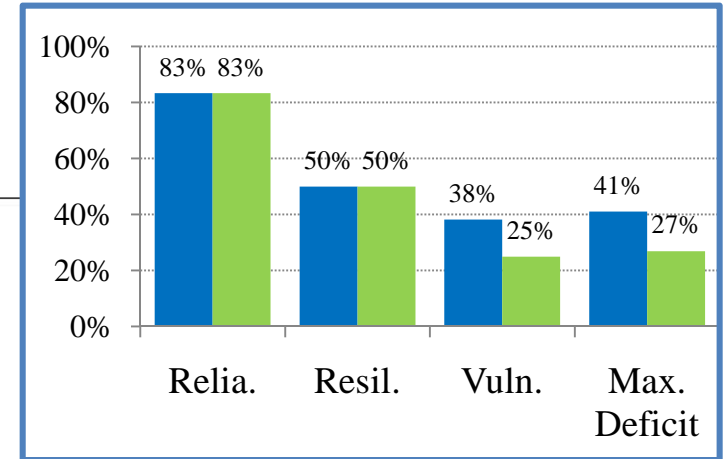


Deliver Saved Water to Treaty

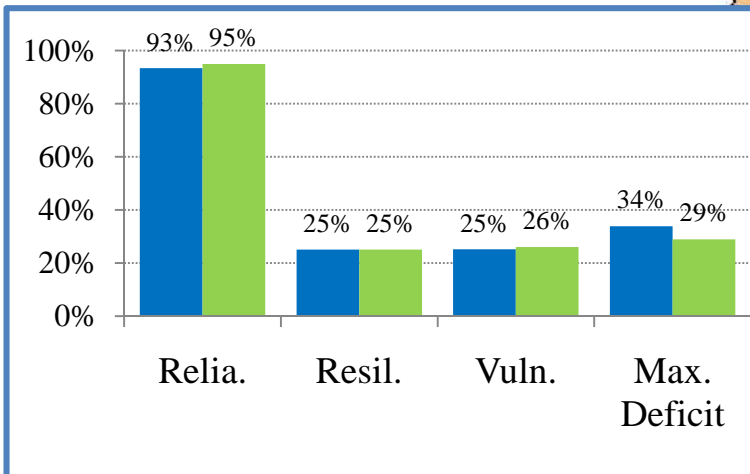
DR-005 Delicias



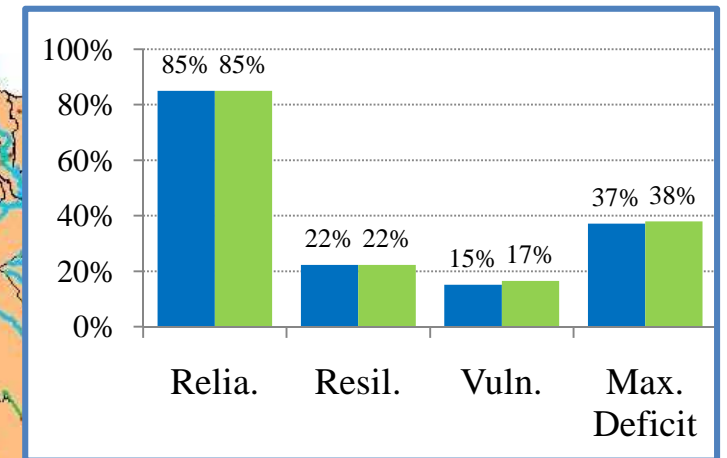
Treaty Obligations



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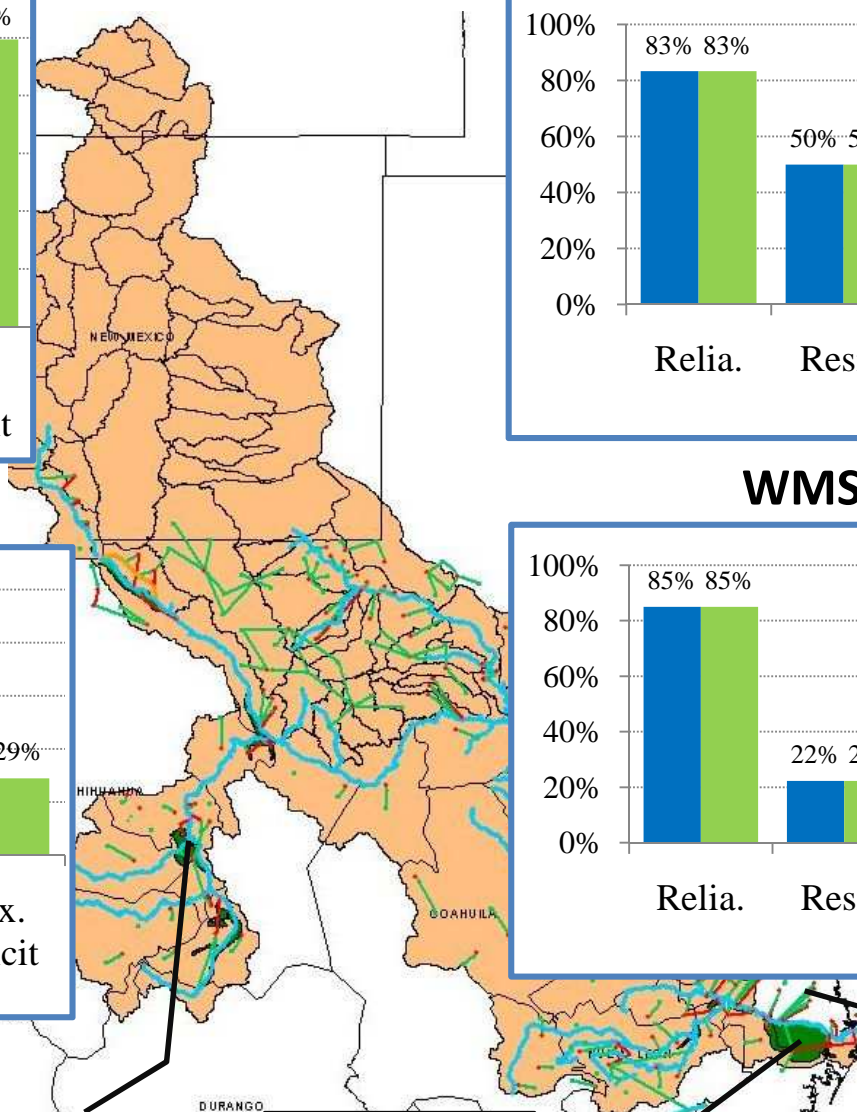
■ Baseline Run
■ Scenario II.A.1.b

DR-005

DR-025

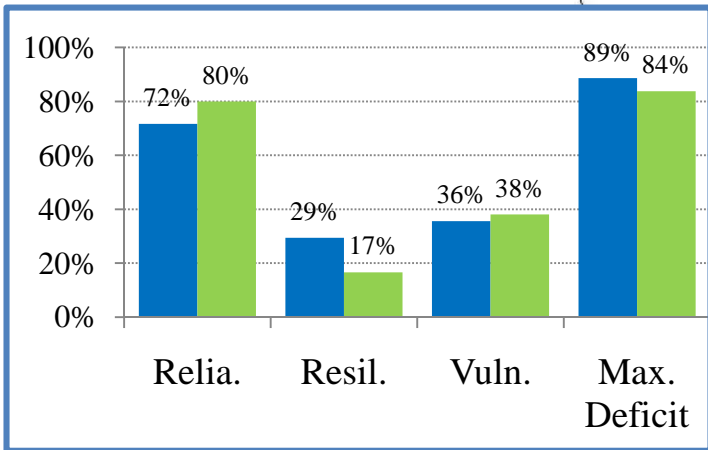
WMS 8-13

Scenario II.A.1.b

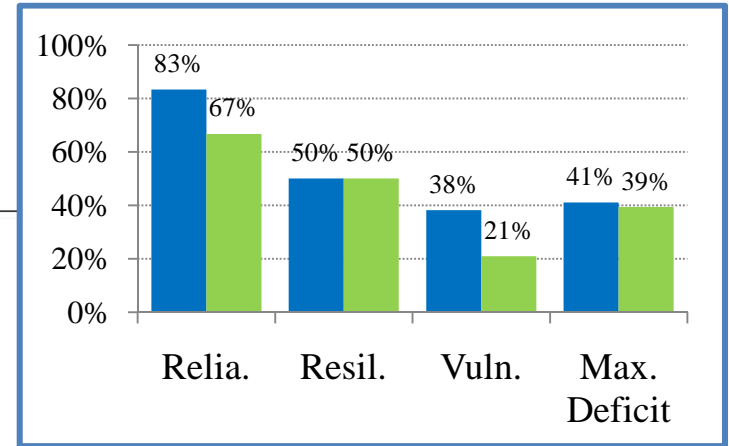


Deliver Saved Water to DR-005

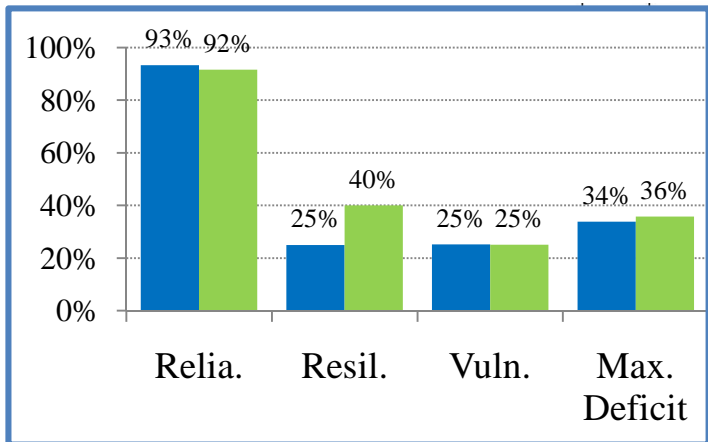
DR-005 Delicias



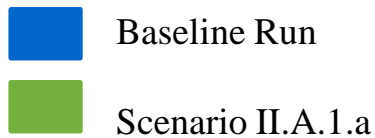
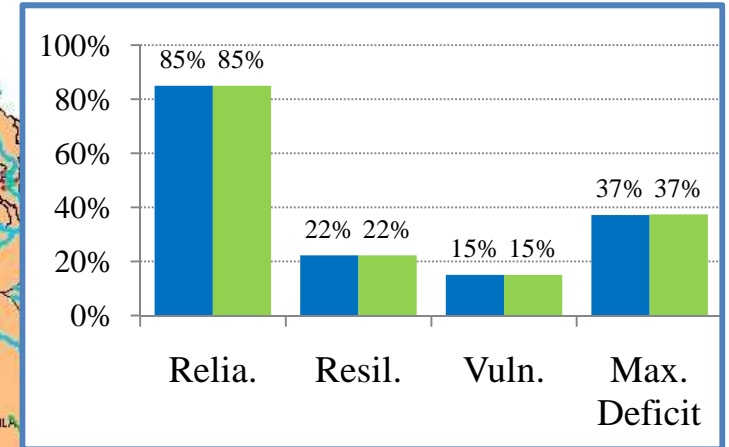
Treaty Obligations



DR-025 Bajo Rio Bravo



WMS 8-13

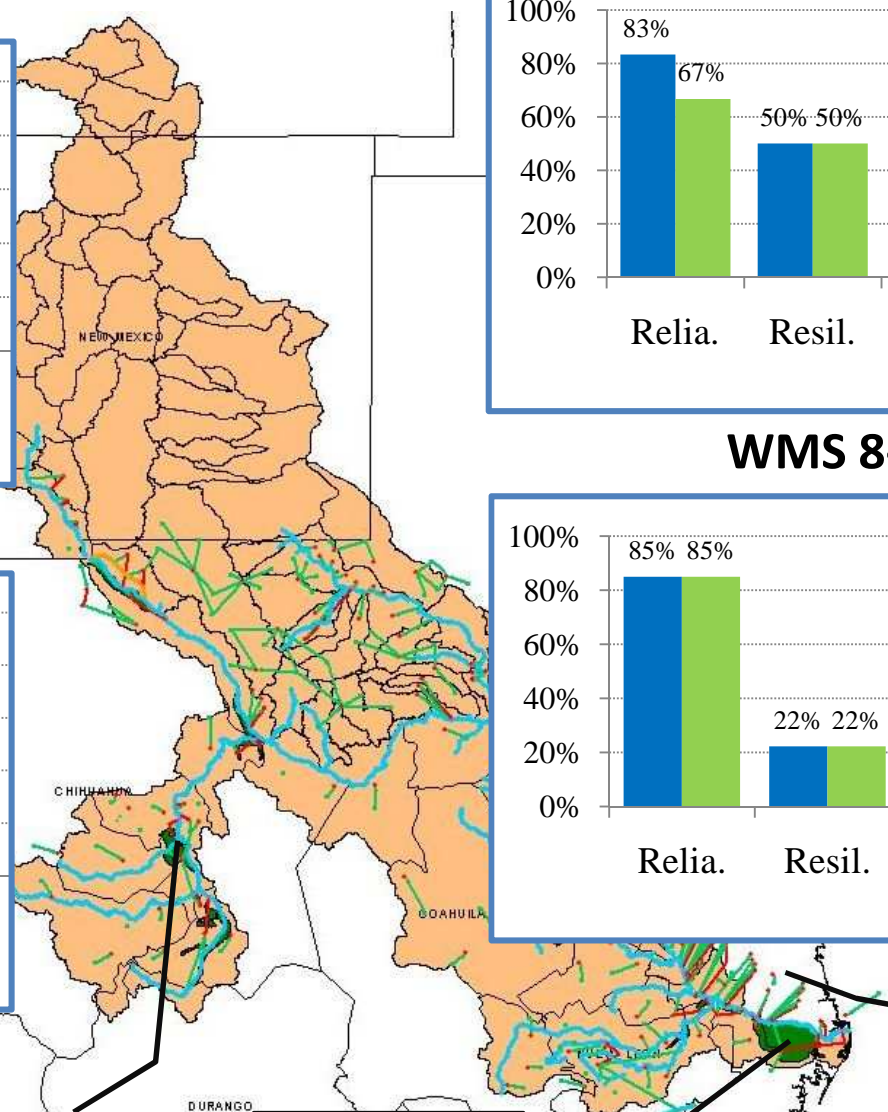


DR-005

DR-025

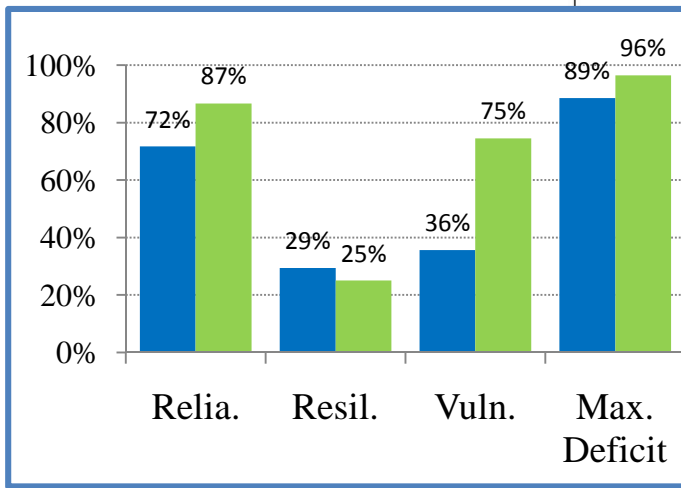
WMS 8-13

Scenario II.A.1.a

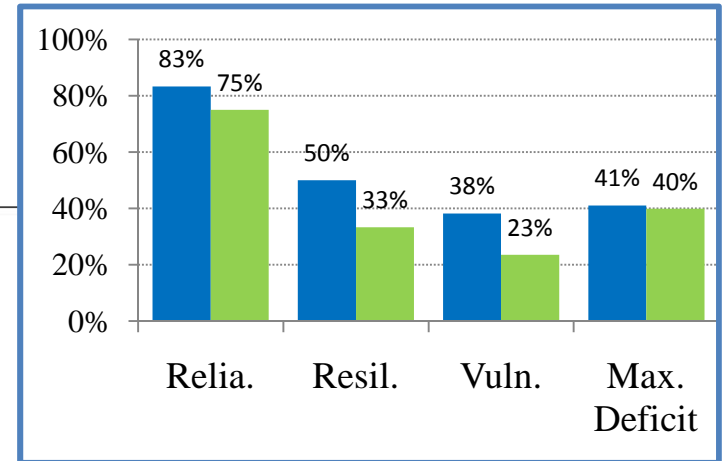


Deliver Saved Water to DR-005 + Groundwater Banking

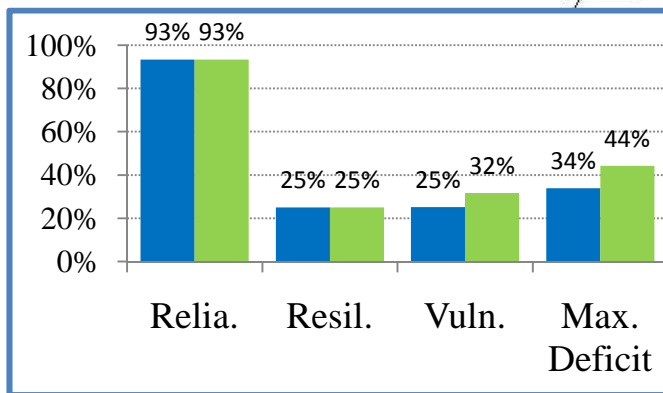
DR-005 Delicias



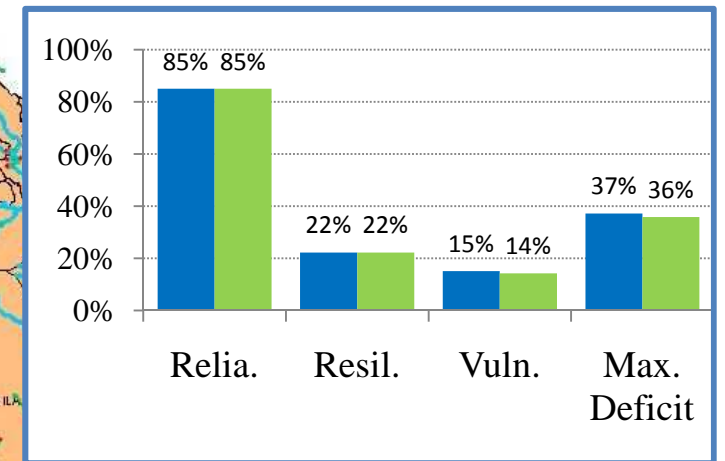
Treaty Obligations



DR-025 Bajo Rio Bravo



WMS 8-13



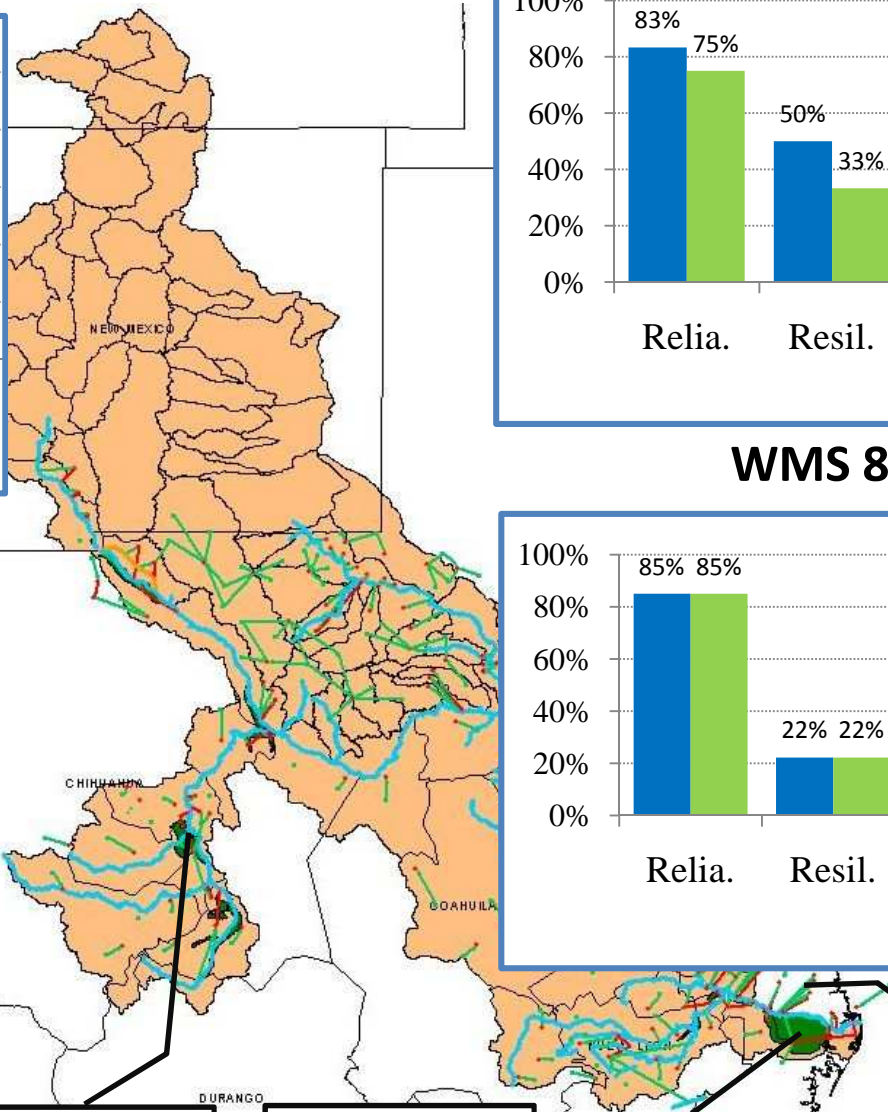
■ Baseline
■ Scenario I.B.4

DR-005

DR-025

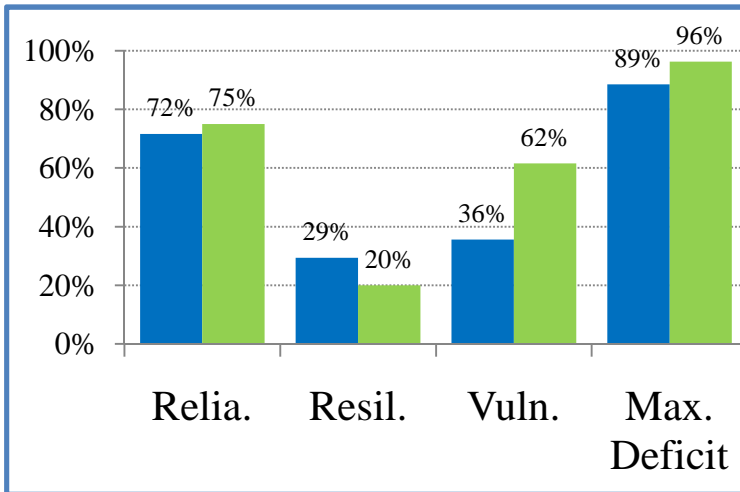
WMS 8-13

Scenario I.B.4

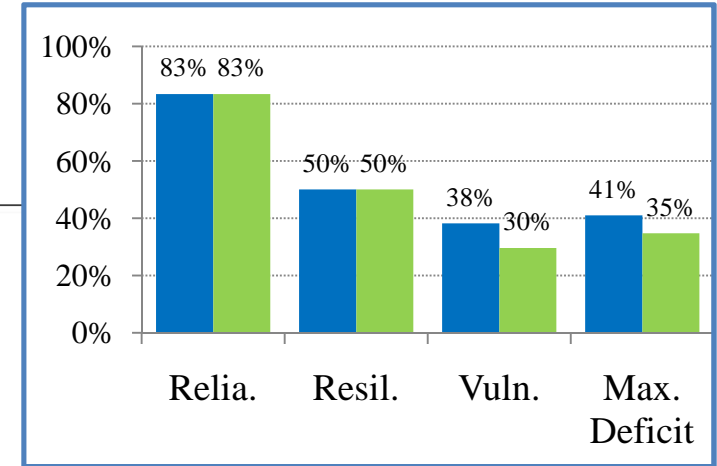


Delivery of Saved Water to Treaty + GW Bank in DR-005 Delicias

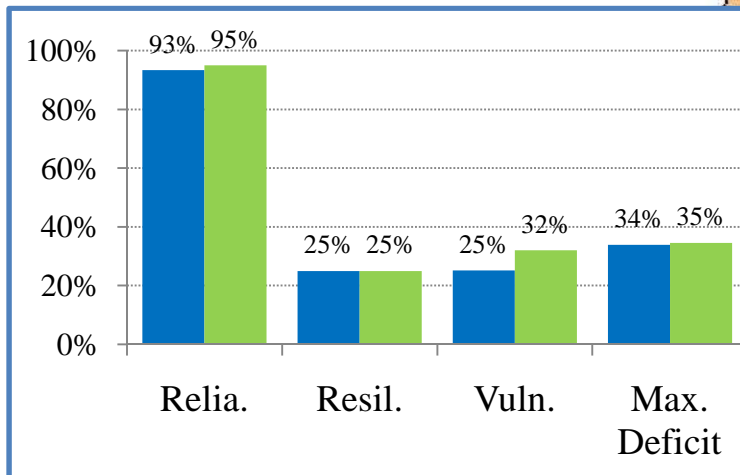
DR-005 Delicias



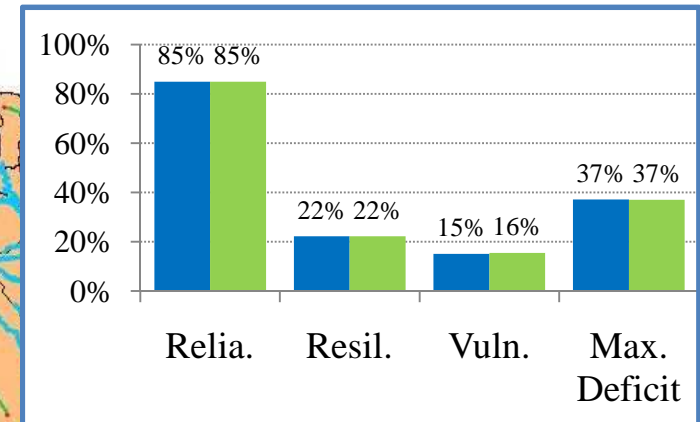
Treaty Obligations



DR-025 Bajo Rio Bravo



WMS 8-13



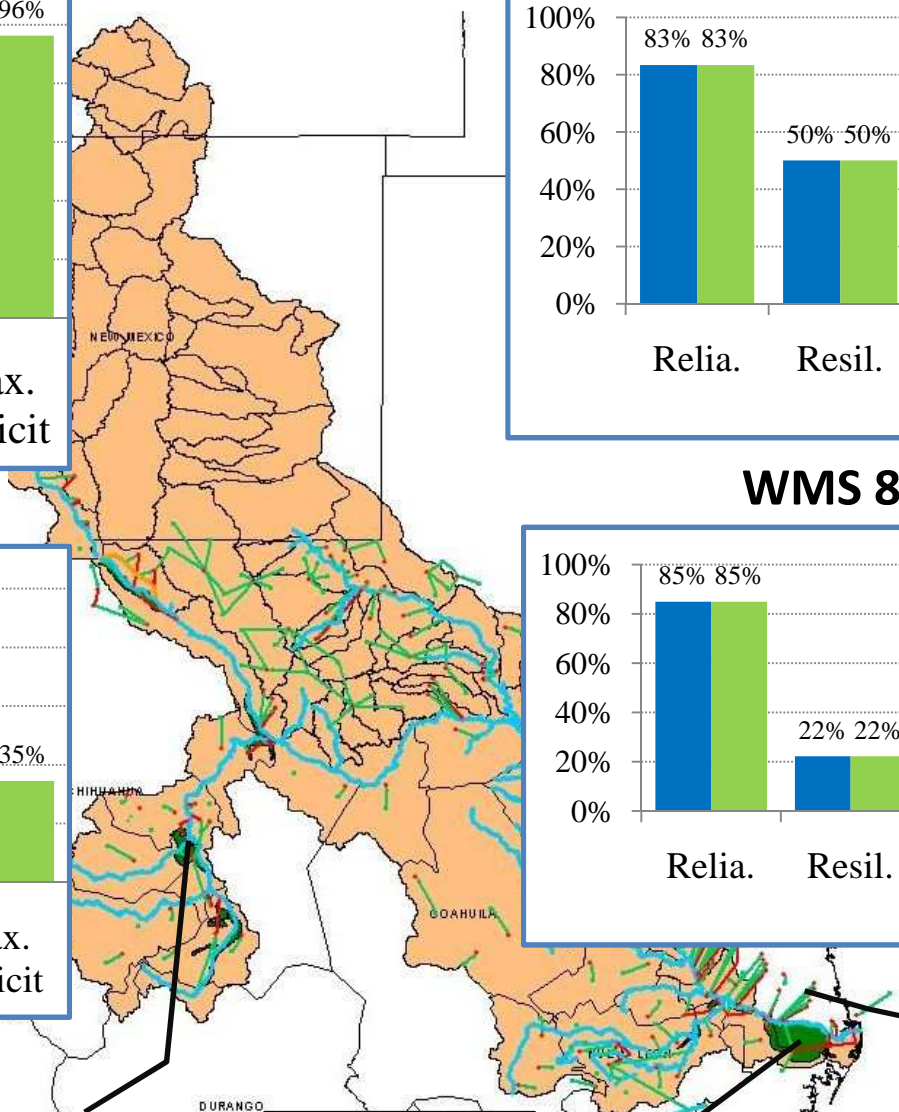
■ Baseline Run
■ Scenario II.A.1.b + I.B

DR-005

DR-025

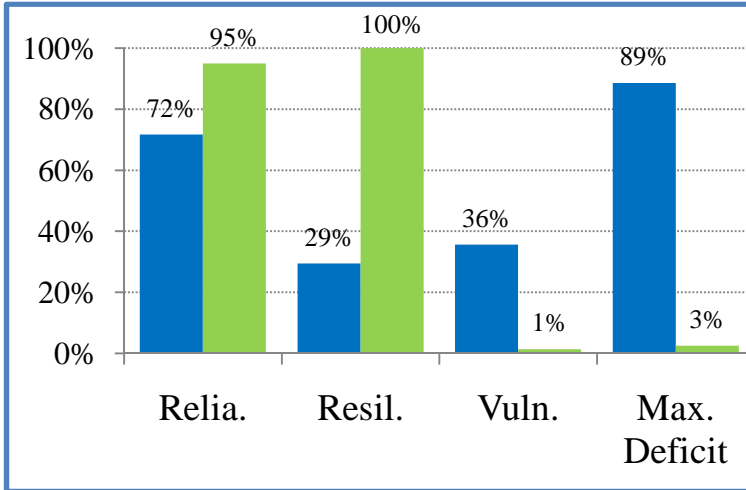
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Scenario II.A.1.b + I.B

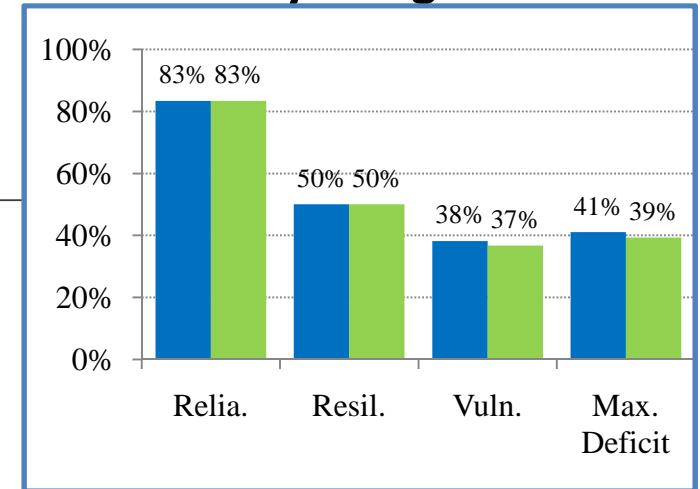


Delivery of Saved Water to Treaty + Reduction to DR-005 + GW Bank to DR-005 Delicias

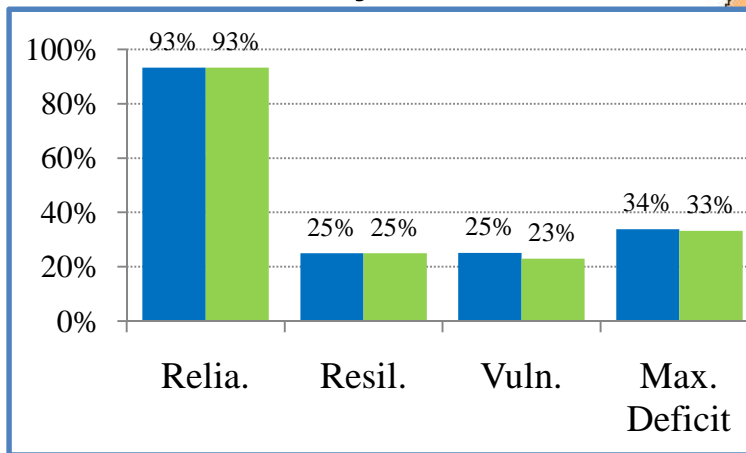
DR-005 Delicias



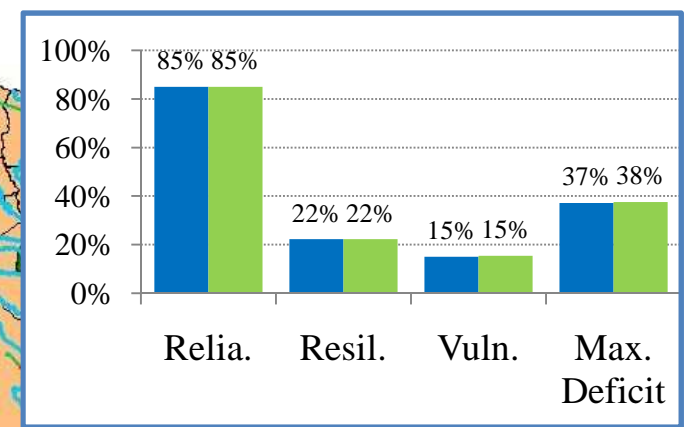
Treaty Obligations



DR-025 Bajo Rio Bravo



WMS 8-13



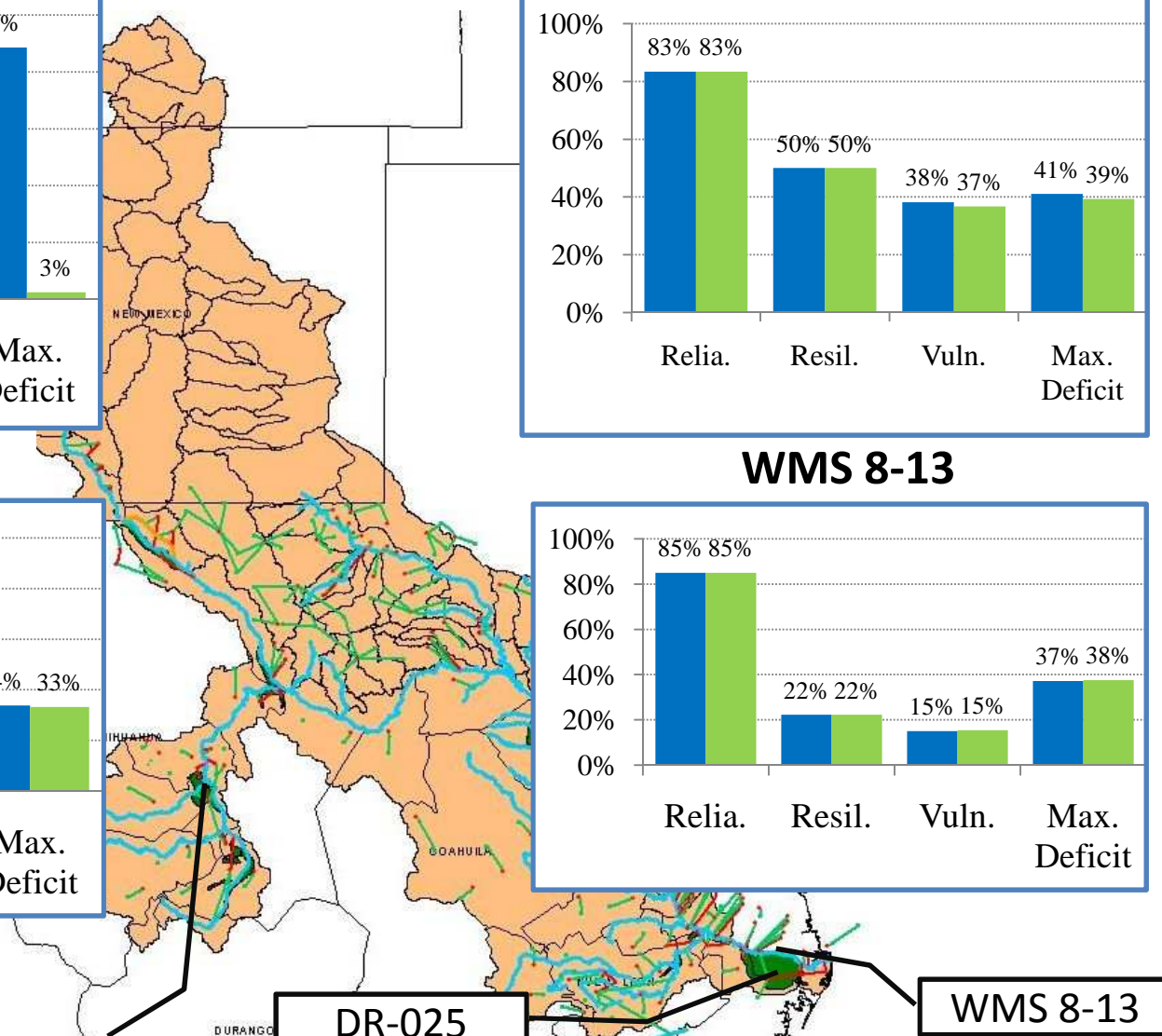
■ Baseline Run
■ Scenario II.A.1.b + I.A.a + I.B

DR-005

DR-025

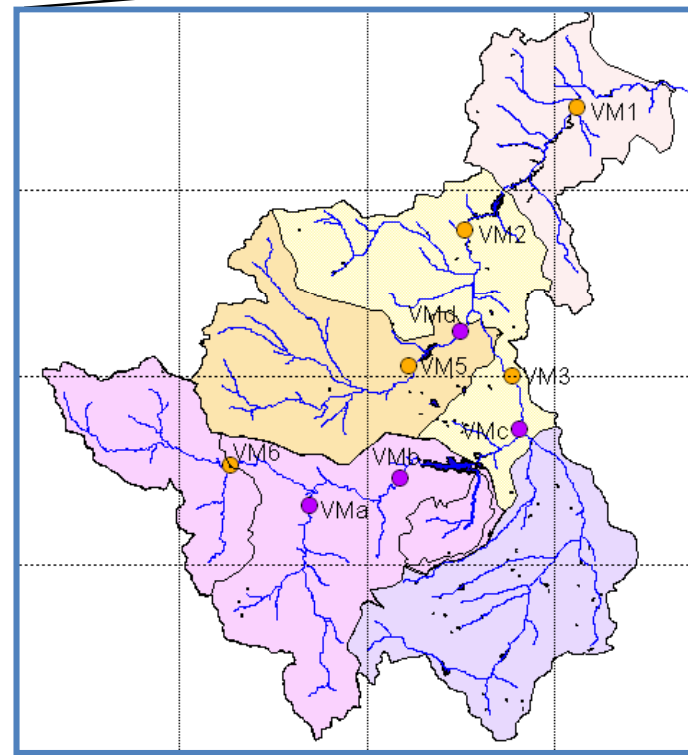
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Scenario II.A.1.b + I.A.a + I.B

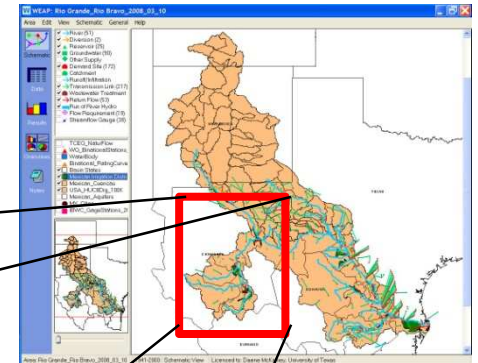


Environmental Flows in Conchos Basin

- Building Block Method to Determine Environmental Flows (WWF – Chihuahua)
- Enough dam storage to supply water users?
 - Yes: deliver normal year environmental flows
 - No: deliver dry years environmental flows



Rio Conchos Basin

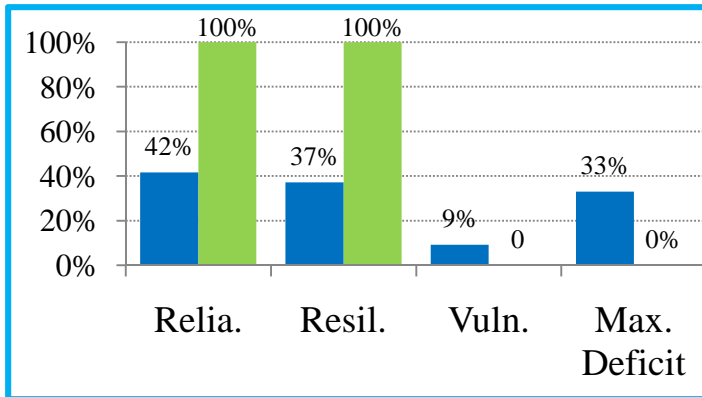


- Env Flow Location ('07)
- Env Flow Location ('08)

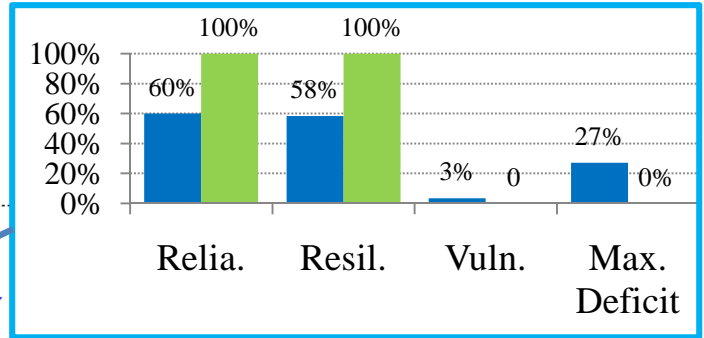
Scenario IV.A

Environmental Flows in Conchos Basin

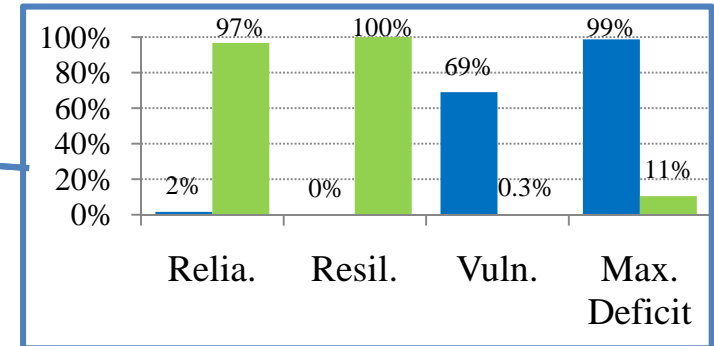
VM_2 Above LLL



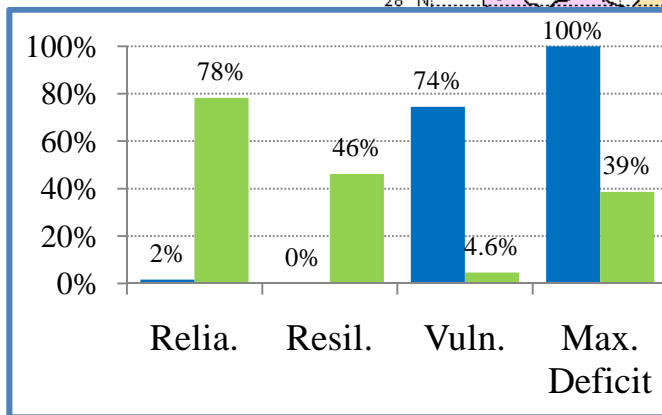
VM_1 Below LLL



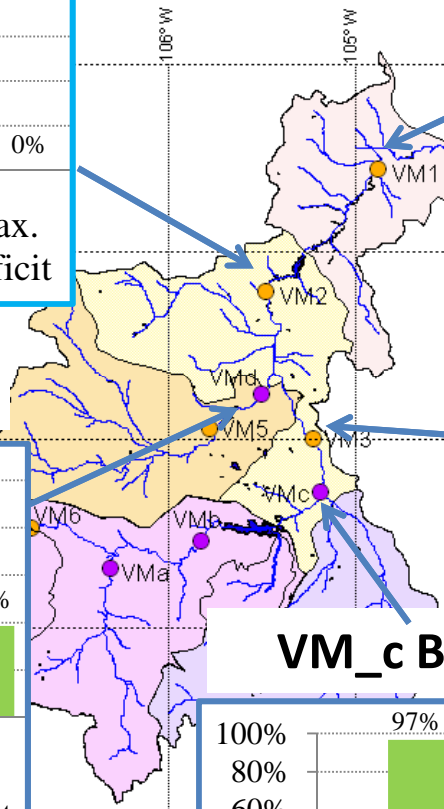
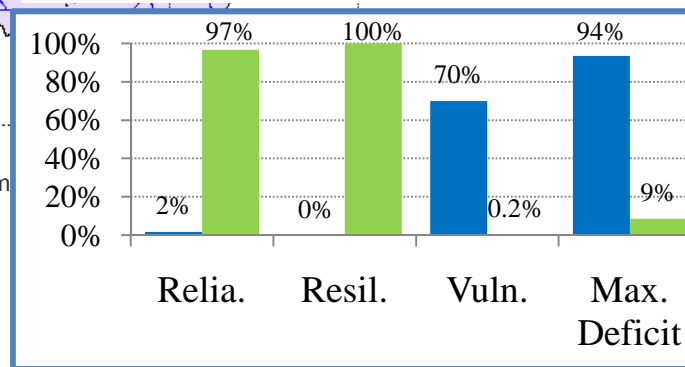
VM_3 Below Florido



VM_d Below F. Madero



VM_c Below La Boquilla

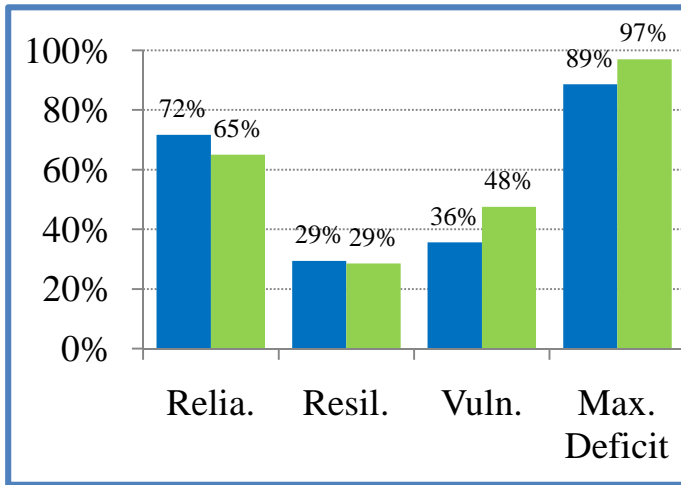


■ Baseline Run
■ Env. Scenario

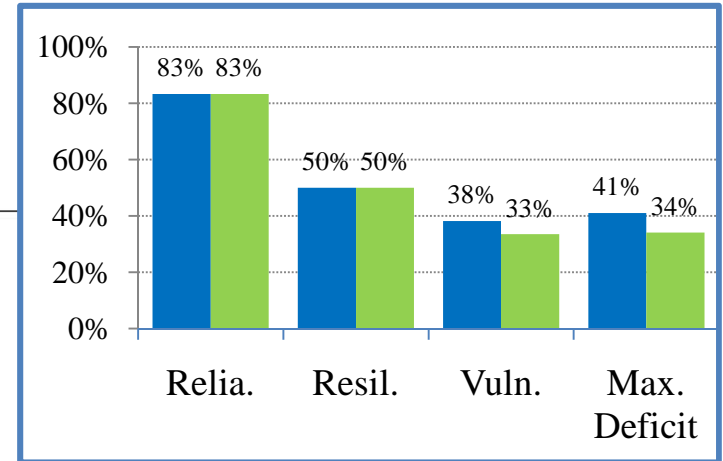
Scenario IV.A

Environmental Flows in Conchos Basin

DR-005 Delicias

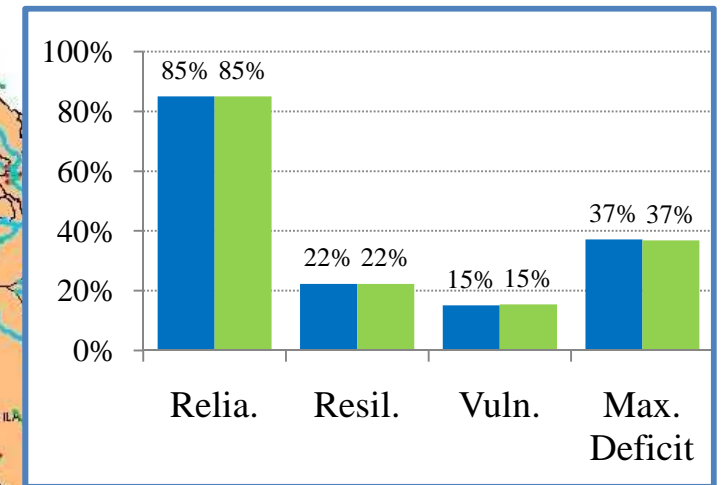
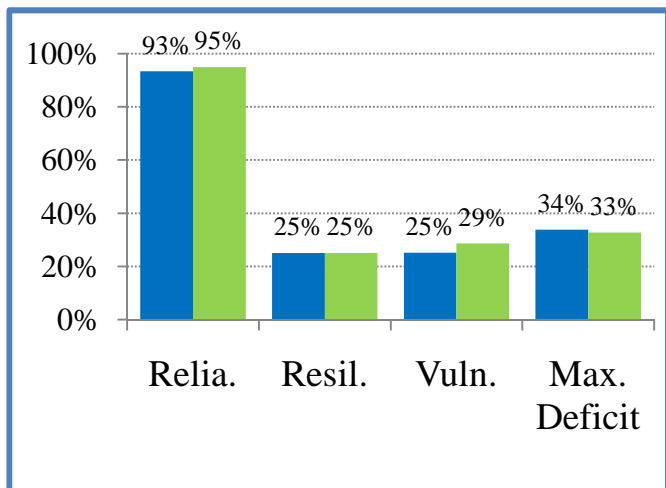


Treaty Obligations



WMS 8-13

DR-025 Bajo Rio Bravo



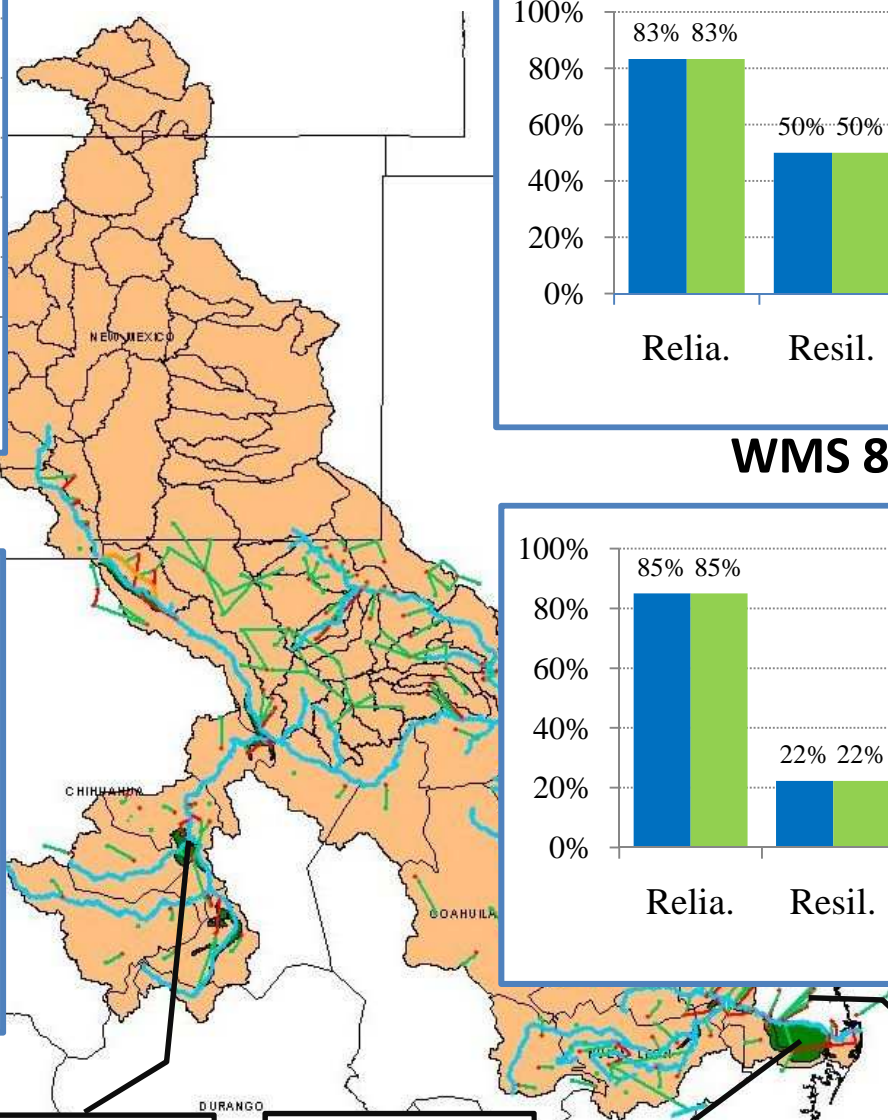
■ Baseline Run
■ Scenario IV.A

DR-005

DR-025

WMS 8-13

Scenario IV.A



Summary

- Water Rights Buyback
 - PADUA
 - Increase in benefits for water local users, no decrease in global benefits
 - No decrease in deliveries to treaty
 - Reduction of DR-004 Delicias to 50,000 ha.
 - Increase in benefits for water local users, no decrease in global benefits
 - Decrease in treaty vulnerability
- Groundwater Banking
 - Improvement in whole basin water supply
 - No decrease in deliveries to treaty
 - Groundwater Banking + PADUA.
 - Improved benefits for water users than the previous one
 - Improved deliveries to treaty

Summary

- Water Conservation
 - Deliver Saved Water to Treaty
 - Decrease in benefits for DR-005 Delicias
 - Improved deliveries to treaty
 - Deliver Saved Water to DR-005
 - Mixed benefits
 - Increased treaty deficits
 - Deliver Saved Water to DR-005 + GW Banking
 - Decrease in benefits basin wide
 - Deliver Saved Water to Treaty + GW Bank in DR-005 Delicias
 - Mixed benefits for DR-005 Delicias (when run out of water)
 - Improved deliveries to treaty
 - Deliver Saved Water to Treaty + Reduction to DR-005 to 50,000 ha + GW Bank in DR-005
 - Improvement in whole basin water supply
 - Improved deliveries to treaty

Summary

- Environmental Flows in Conchos Basin
 - Environmental flows are unsustainable under current conditions
 - Increase in treaty deliveries with smaller deficits
 - Decrease in benefits to DR-005 Delicias

THANK YOU!!!

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