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Bridging Science, Policy, and Practice in the Colorado River Delta

Upper Colorado River Basin Water Forum
Jennifer Pitt
November 8, 2018

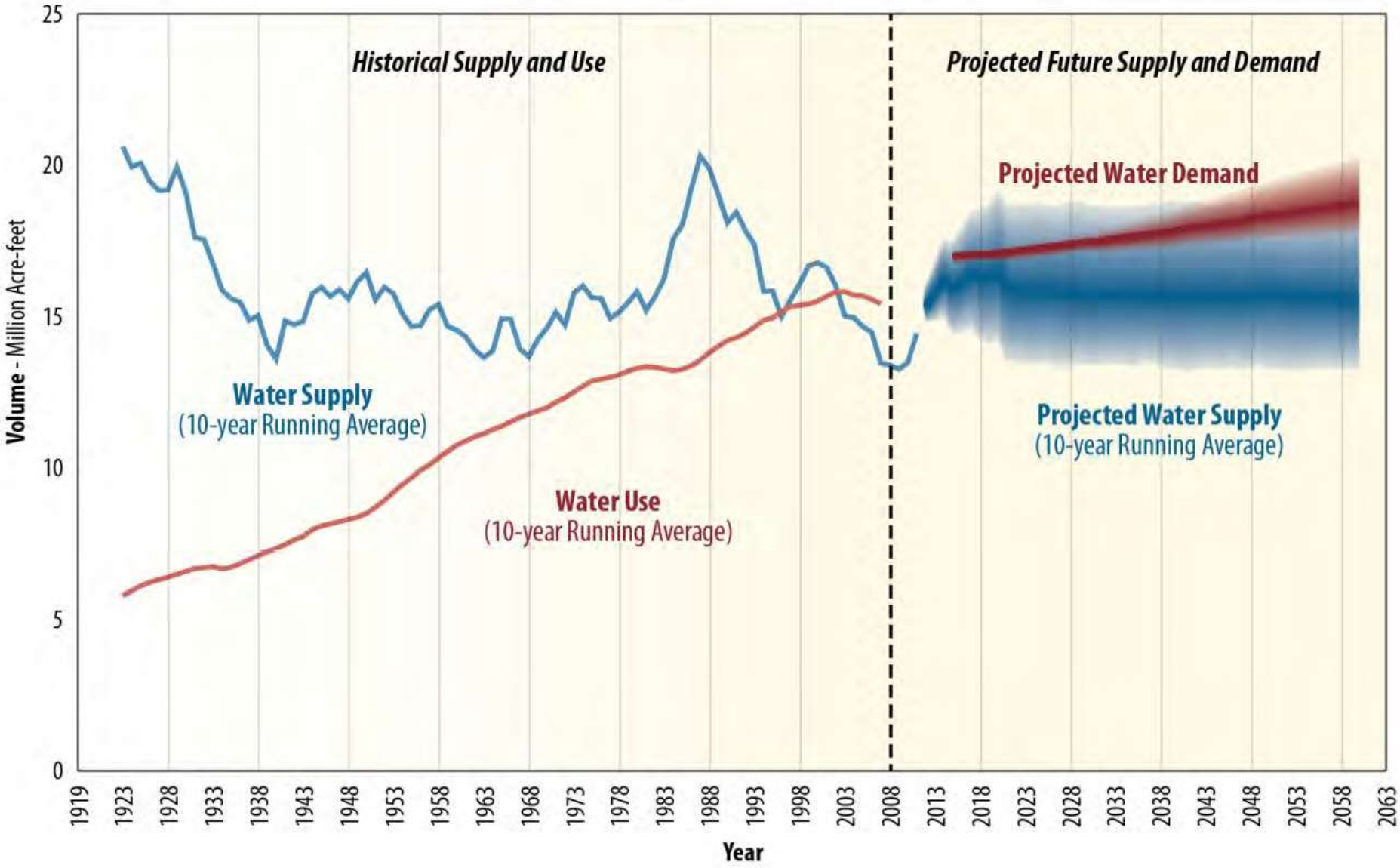
OVERVIEW

The end of the Colorado River

Binational negotiations and Minutes

Role of Science

Restoring the Delta



source: USBR 2012

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WYOMING
IDAHO
Green R.
Flaming Gorge Dam
Yampa R.
Duchesne R.
White R.
NEVADA
UTAH
Green R.
Colorado River
San Juan R.
Glen Canyon Dam
Lake Colorado R.
Hoover Dam
Davis Dam
Parker Dam
CALIFORNIA
ARIZONA
NEW MEXICO
Salt River
Gila River
Colorado River
USA
MEXICO
Gulf of California
0 25 50 100 150 200
Miles


Just add water:
260,000 acre-feet pulse flow 1 in 4 years
50,000 acre-feet base flow


Advocacy

2000 - “surplus” for delta

beyond purpose and need

2000 - “one percent for the delta”

but no way to move water across the border

2001 - Mexicali delta summit is binational, federally convened

9/11

2003 - Defenders v. Norton

finds Treaty overrides ESA

2003 - UN Security Council vote to support invasion of Iraq

Mexico does not support

2007 - US rulemaking on CO River shortages

unilaterally suggests MX takes shortages too

2007 - NGOs bring water managers to the table, US and MX announce “holistic” water management discussions

2008 US & MX lead negotiators die in a tragic plane crash

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International Boundary & Water Commission,
U.S. Section
San Diego Projects Office
2225 Dairy Mart Road

- Minute 319 (2012 – 2017)
- Minute 323 (2017 – 2026)
- Shortage sharing, water banking
- Binational water conservation and water exchanges
- Explore management improvements
- Restoration in the Colorado River Delta

Minute 319

Pulse flow ~105,000 acre-feet

Base flows ~52,000 acre-feet

$ for restoration

Commitment to monitoring

Implementation: International Boundary and Water Commission binational environmental work group guides work carried out by NGOs, federal agencies, and university researchers

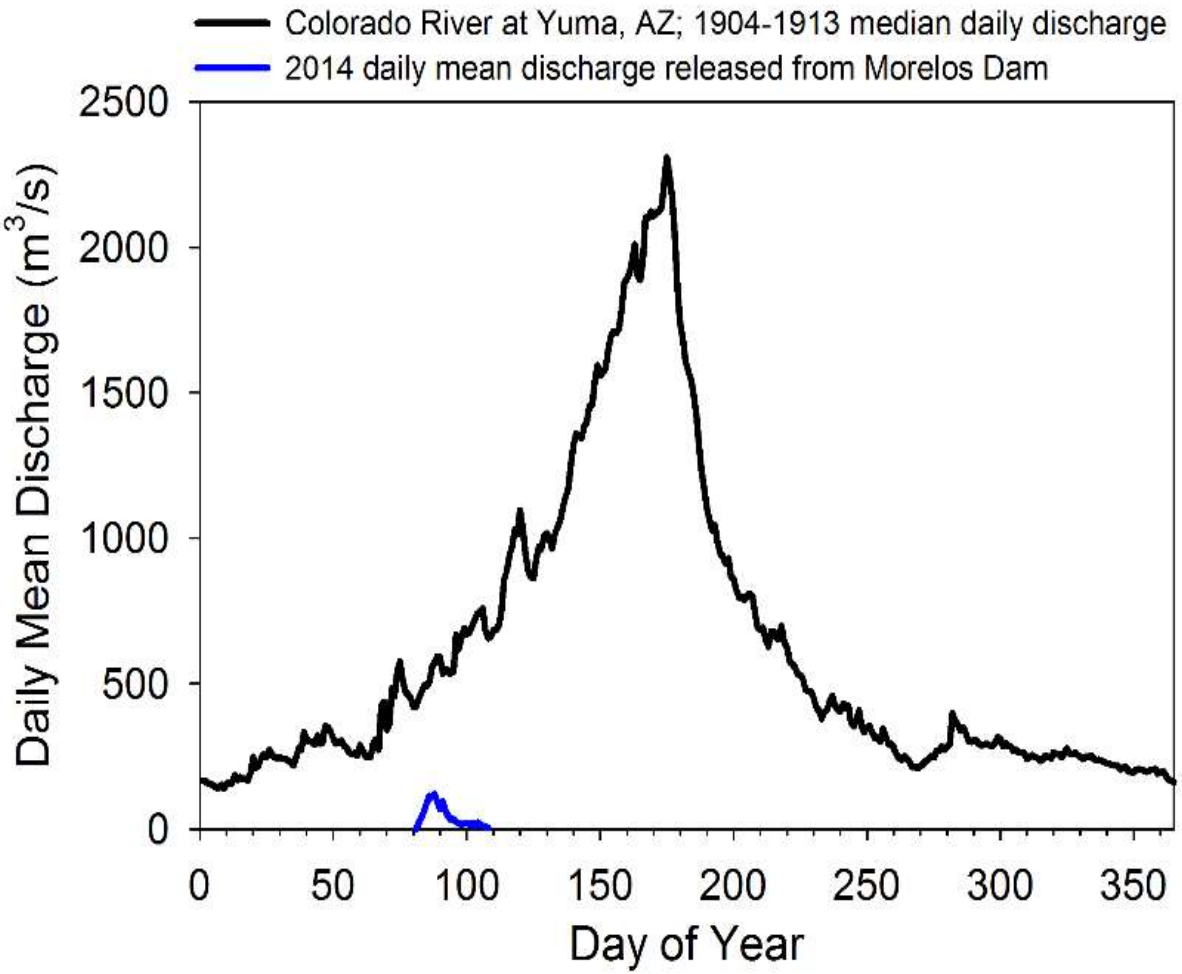
Did Science Inform Minute 319?

CON

- US water users and states unable to recognize environmental standards or goals outside of the US (= outside of ESA)
- Environmental flows were Mexico's "ask" negotiated in context of shortage commitment, water transfers, other management reforms
- Existing data sparse
- Environmental flows less than ½ volume hypothesized in literature

PRO

- Enough to water to send a signal
- Binational commitment to monitoring


Colorado River at Yuma, AZ; 1904-1913 median daily discharge
2014 daily mean discharge released from Morelos Dam
Daily Mean Discharge (m3/s)
2500
2000
1500
1000
500
0
0
50
100
150
200
250
300
350
Day of Year

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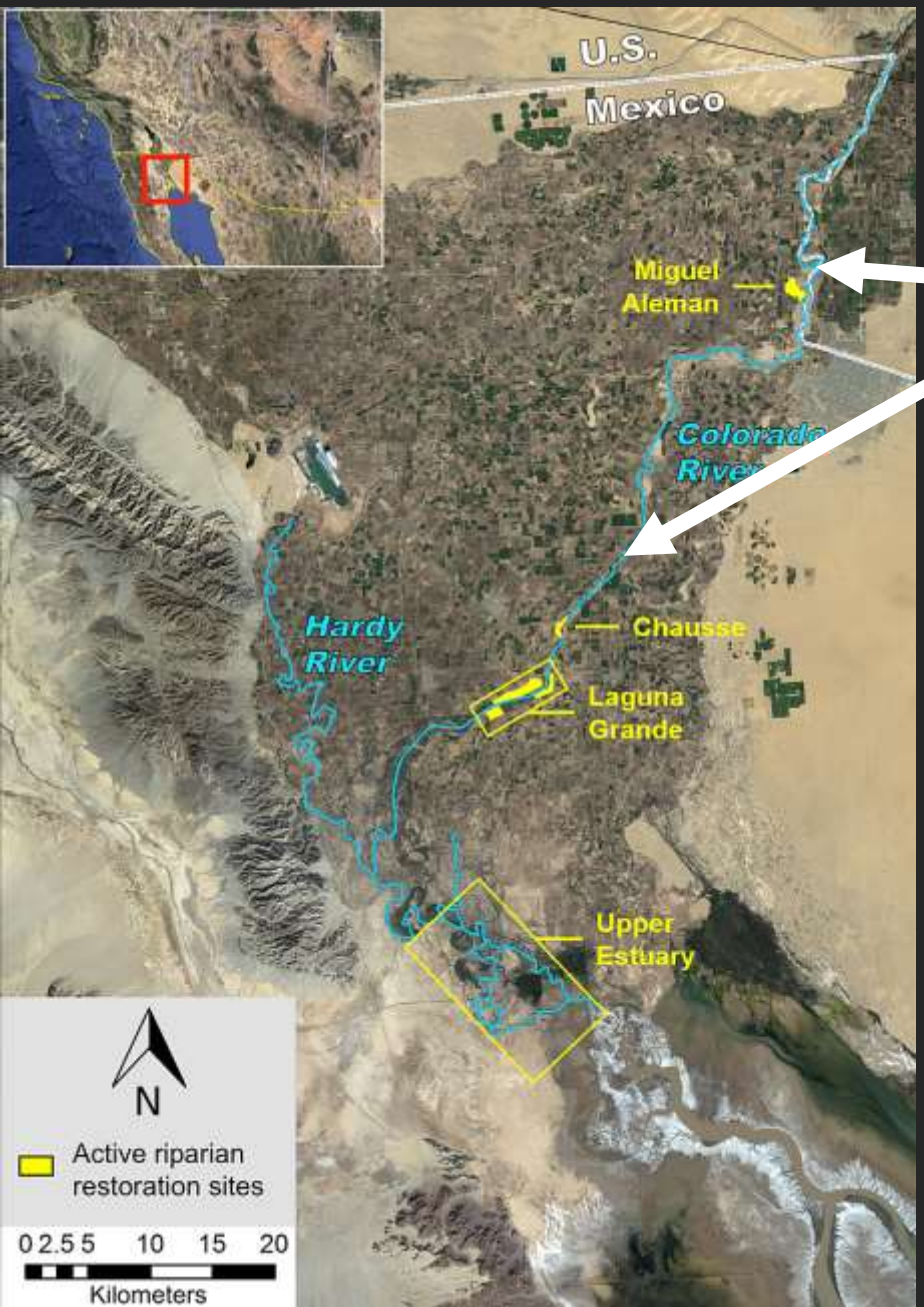
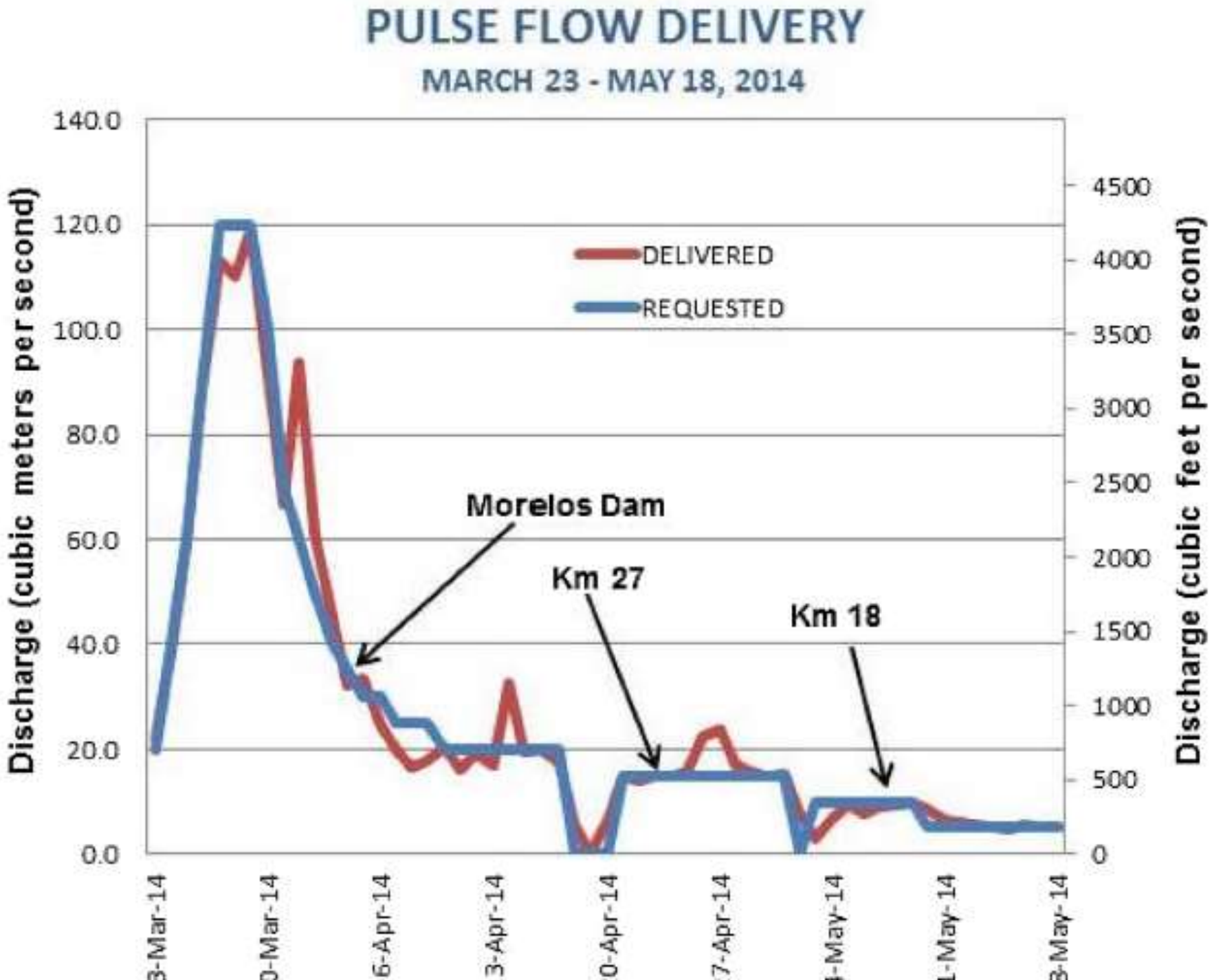


DRY REACH


PULSE FLOW DELIVERY
MARCH 23 - MAY 18, 2014
Discharge (cubic meters per second)
Discharge (cubic feet per second)
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
4500
4000
3500
3000
2500
2000
1500
1000
500
0
DELIVERED
REQUESTED
Morelos Dam
Km 27
Km 18
23-Mar-14
30-Mar-14
6-Apr-14
13-Apr-14
20-Apr-14
27-Apr-14
4-May-14
11-May-14
18-May-14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Noticias

SAN LUIS

DIARIO BINACIONAL SIN FRONTERAS

Año 9 Edición No. 3371

www.diarionoticias.info

MIERCOLES

AMBIENTALISTAS DEL MUNDO LO CELEBRAN

pag. 3

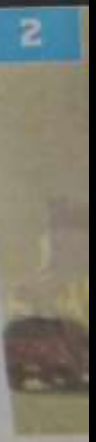
¡Fluye! agua por el Río

PACTO
ALC

10

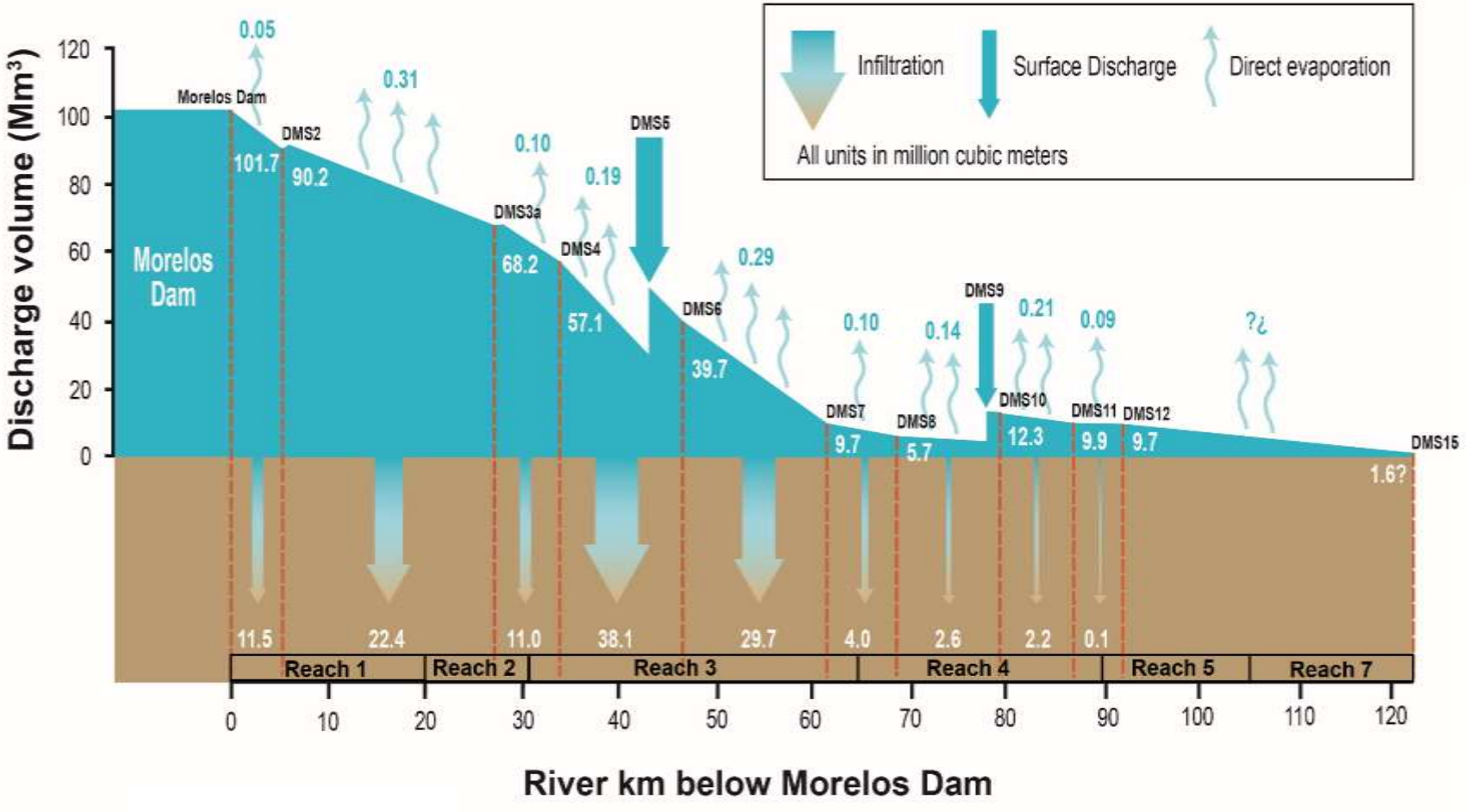
A
TOR

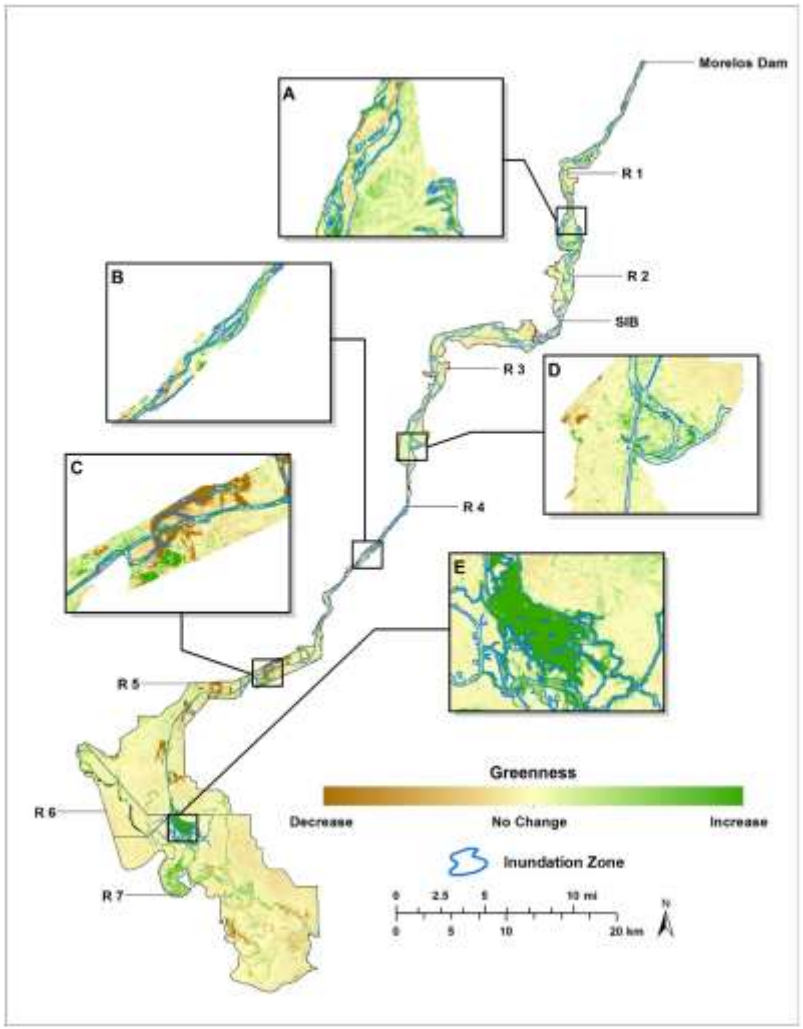
2



HIDRIOS PARA

F. Zamora with support from Lighhawk


Infiltration
Surface Discharge
Direct evaporation
All units in million cubic meters
Discharge volume (Mm³)
River km below Morelos Dam
Morelos Dam
DMS2
DMS3a
DMS4
DMS5
DMS6
DMS7
DMS8
DMS9
DMS10
DMS11
DMS12
DMS15
0.05
0.31
0.10
0.19
0.29
0.10
0.14
0.21
0.09
?¿
101.7
90.2
68.2
57.1
39.7
9.7
5.7
12.3
9.9
9.7
1.6?
11.5
22.4
11.0
38.1
29.7
4.0
2.6
2.2
0.1
Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
Reach 7
0
10
20
30
40
50
60
70
80
90
100
110
120



Pre-pulse to post-pulse “greenness” increase of 17% in riparian corridor - Jarchow et al., Ecological Engineering 2017

Lessons learned

- The Colorado River reached the sea.
- Limited scour and deposition.
- Water that soaks into the ground is not lost water.
- Ground water flows downstream.
- Ground water supports existing vegetation and agriculture.
- Vegetation responded to the pulse flow.
- Restoration should be actively managed.
- Importance of the canal system
- Preparing the landscape and the ground
- Increased abundance and diversity of waterbirds and riparian birds.
- Two published monitoring reports; final to be published by end of 2018

Does Science Inform Minute 323?

PRO

- 4 years intensive monitoring of environmental flow impacts
- Binational environmental workgroup used data and models to quantify impacts for a range of possible environmental flow scenarios:
  - Innundation and hydrologic connectivity
  - New habitat
  - Social impact
- Negotiators looked at environmental flow scenarios
- Minute identifies target for environmental and social impact

CON

- Environmental flows were Mexico's "ask," negotiated in context of shortage commitment, water transfers, other management reforms
- Commitments of water and dollars are well below identified target for environmental and social impact
- US water users and states unable to recognize environmental standards or goals outside of the US (= outside of ESA)

Water leaders in Mexico in the United States saw something good happening in the Colorado River Delta – science confirms it and science improves it

Minute 323
Environmental Commitments

Resources from US, Mexico, and NGOs (1/3 each):

- 210,000 acre-feet
  (may increase to 405,000 af)
- $9M for restoration
- $9M for science and monitoring

Implementation: International Boundary and Water Commission binational environmental work group guides work carried out by NGOs, federal agencies, and university researchers

Legend / Leyenda

- Marsh / Marisma
- Dryland Vegetation / Revegetación en Zonas Áridas (Tamarix, Atriplex)
- Cottonwood / Willow Revegetation / Reforestación con Álamos y Sauces
- Mesquite Revegetation / Reforestación con Mesquite
- Mexico & US Border 1971 / Frontera México Y USA- 1971
- Cleared Public Safety & Flood Control / Zona Limpia para la Seguridad Pública y el Control de Inundaciones
- Open Water / Agua Superficial
- Agriculture / Agricultura
- Colorado River Miles / Millas del Río Colorado

Total Acres/ Total de Actes

Mexico Park Area: 27.0 Acres, 11.0 Hectares
Área del Parque en México: 27.0 Acres, 11.0 Hectáreas

Total Open Water: 39.0 Acres, 15.8 Hectares
Total de Agua Superficial: 39.0 Acres, 15.8 Hectáreas

Total 60 Ft Channel: 16,261 Linear Feet, 4,958 Linear Meters
Total del Canal de 60 Pies (18 metros): 16,261 pies lineales, 4,958 metros lineales

Total Dryland (Upland) Revegetation: 560.0 Acres, 227.0 Hectares
Total de Revegetación de Zonas Áridas (Tamarix Atriplex): 560.0 Acres, 227.0 Hectáreas

Total Cleared Public Safety / Flood Control: 511.5 Acres, 207.1 Hectares
Total de Zona Limpia para la Seguridad Pública y el Control de Inundaciones: 511.5 Acres, 207.1 Hectáreas

Total Marsh: 45.0 Acres, 18.2 Hectares
Total de Marisma: 45.0 Acres, 18.2 Hectáreas

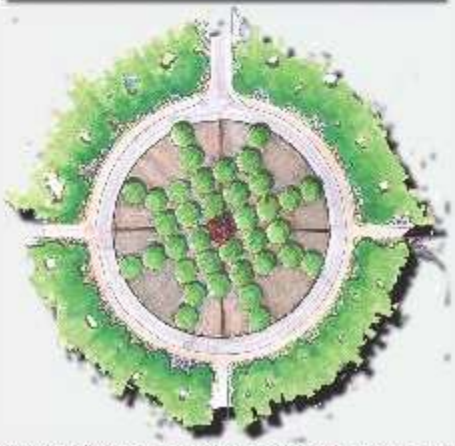
Total Mesquite Revegetation: 165.5 Acres, 67.0 Hectares
Total de Reforestación con Mesquites: 165.5 Acres, 67.0 Hectáreas

Total Cottonwood / Willow Revegetation: 119.3 Acres, 48.3 Hectares
Total de Reforestación con Sauces y Álamos: 119.3 Acres, 48.3 Hectáreas

Total Saltgrass: 22.51 Acres, 9.0 Hectares
Total de Pasto Salado: 22.51 Acres, 9.0 Hectáreas

Total Riparian Revegetation: 119.0 Acres, 48.2 Hectares
Total de Reforestación Ribereña: 119.0 Acres, 48.2 Hectáreas

Plaza de Entendimiento Común



KEY FEATURES OF PLAN / ASPECTOS CLAVE DEL PLAN

1) Public Safety

Parque Natural de México/
Plaza de Entendimiento Común

Public Safety Corridor /
Corredor de Seguridad Pública

Restored Cottonwood Habitat /
Hábitat Restaurado con Álamos

Flood Irrigated Cottonwood and Willow /
Álamos y Sauces Irrigados por Gravedad

Mode Canal / Canal Modo

Security Levee / Bordo de Seguridad

Hunters Hole Restoration /
Restauración en Hunters Hole

Restored Mesquite Bosque /
Bosque Restaurado con Mesquites

Restored Marsh / Marismas Restaurada

Dryland Revegetation /
Revegetación Zona Árida

Public Safety Corridor /
Corredor de Seguridad Pública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TAHOE
BLUE®
Band Size
Location


KEEP
TAHOE
BLUE


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SEMANA DE
REFORESTACIÓN
EN

Minute 319 PROGRESS

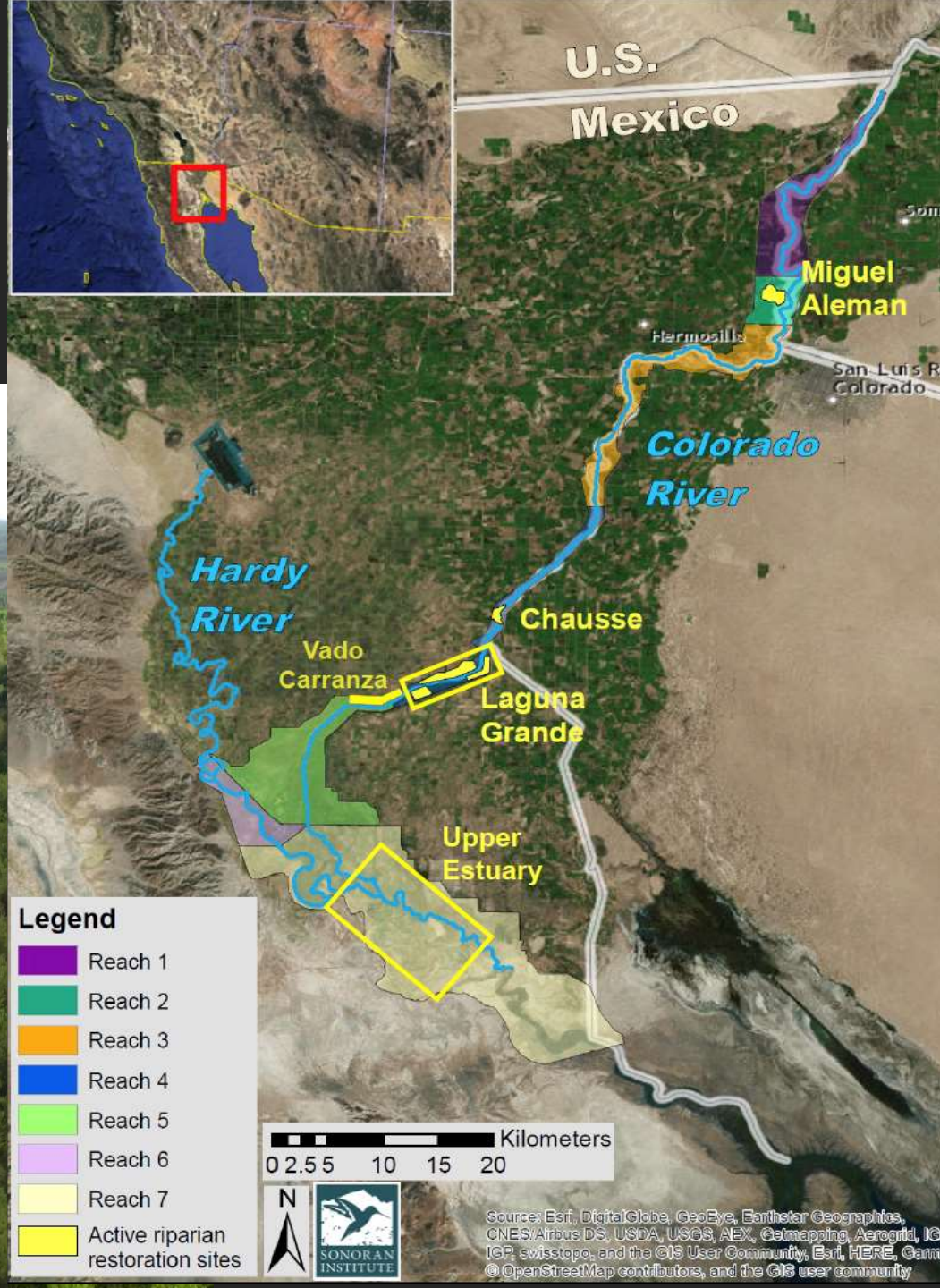
1214 acres (486 ha) restored (total)

Increasing populations of wildlife conservation targets

> 100 jobs created

> 3000 people/year engaged

> $10M raised




Ej. Luis Encinas Johnson


THE UNIVERSITY OF ARIZONA


Reed Phillips Consulting


POR LA REALIZACION PLENA DEL HOMBRE


U.S. DEPARTMENT OF THE INTERIOR
MARCH 3, 1849


SONORAN INSTITUTE


RAISE THE RIVER
RECONNECT THE COLORADO


NATIONAL GEOGRAPHIC


U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION


Reserva de la Biosfera
ALTO GOLFO DE CALIFORNIA
Y DELTA DEL RÍO COLORADO


CONAGUA
Comisión Nacional del Agua


pro natura
noroeste


CEDES


USGS
science for a changing world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REDFORD
CENTER


AEURHYC A.C.

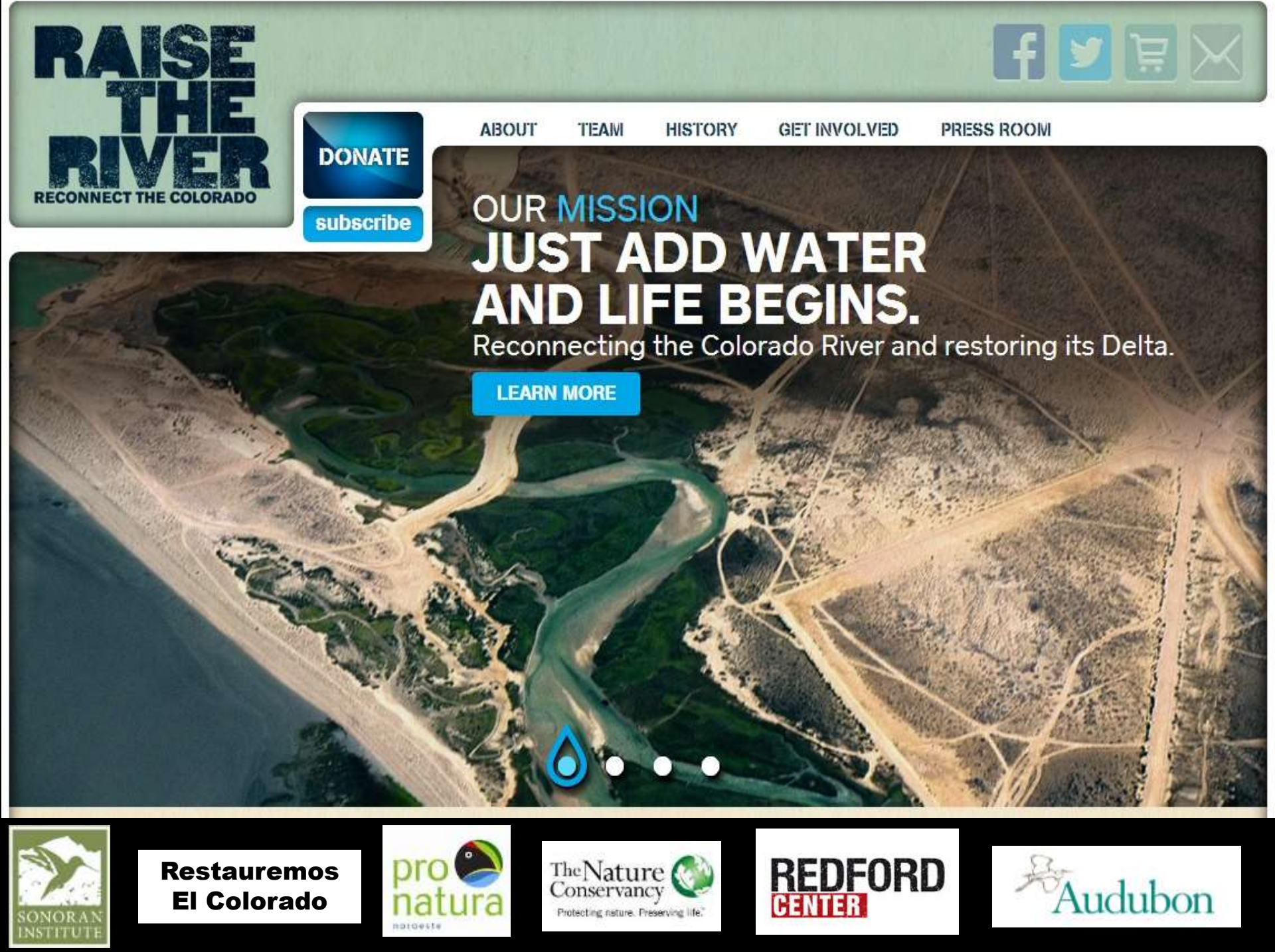

INTERNATIONAL BOUNDARY AND WATER COMMISSION
COMISION INTERNACIONAL DE LIMITES Y AGUAS


North American Wetlands Conservation Act
NAWCA


The Nature Conservancy
Protecting nature. Preserving life.


SJV


SEMARNAT
SECRETARÍA DE
MEDIO AMBIENTE
Y RECURSOS NATURALES


RAISE THE RIVER
RECONNECT THE COLORADO
DONATE
subscribe
ABOUT
TEAM
HISTORY
GET INVOLVED
PRESS ROOM
OUR MISSION
JUST ADD WATER AND LIFE BEGINS.
Reconnecting the Colorado River and restoring its Delta.
LEARN MORE
SONORAN INSTITUTE
Restauremos El Colorado
pro natura
The Nature Conservancy
Protecting nature. Preserving life.
REDFORD CENTER
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Behold

The Mighty Colorado River.

This river has thrived for six million years. It took fifty years to deplete it.

RAISE THE RIVER
RECONNECT THE COLORADO

For more than six million years, the Colorado River served as the lifeblood of the American West. In recent times, however, it's become anything but. Due to intensive water consumption, the river and its surrounding ecosystems have suffered, and the Colorado River runs dry 70 miles before it reaches the sea. But there is hope. As a result of our efforts to date, in May of 2014 the river reached the sea for the first time in decades. Help us continue to breathe life back into the Delta.

Learn more at: www.raisetheriver.org

thanks!
jpitt@audubon.org

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