Vetiver in California's Mojave Desert A Trial for Application in Ecological Restoration

Matthew Huffine
&
David S. Price (presenter)

Outline

- Setting: the Mojave Desert
- Vetiver utilization and trials
- Outcomes and challenges


Reno
San Francisco
NEVADA
UTAH
UNITED STATES
CALIFORNIA
Colorado River
PACIFIC OCEAN
MOJAVE DESERT
Las Vegas
Lancaster
Barstow
Victorville
Los Angeles
ARIZONA
Phoenix
N
W
E
S
0
100
200 mi
0
100
200
300 km
MEXICO
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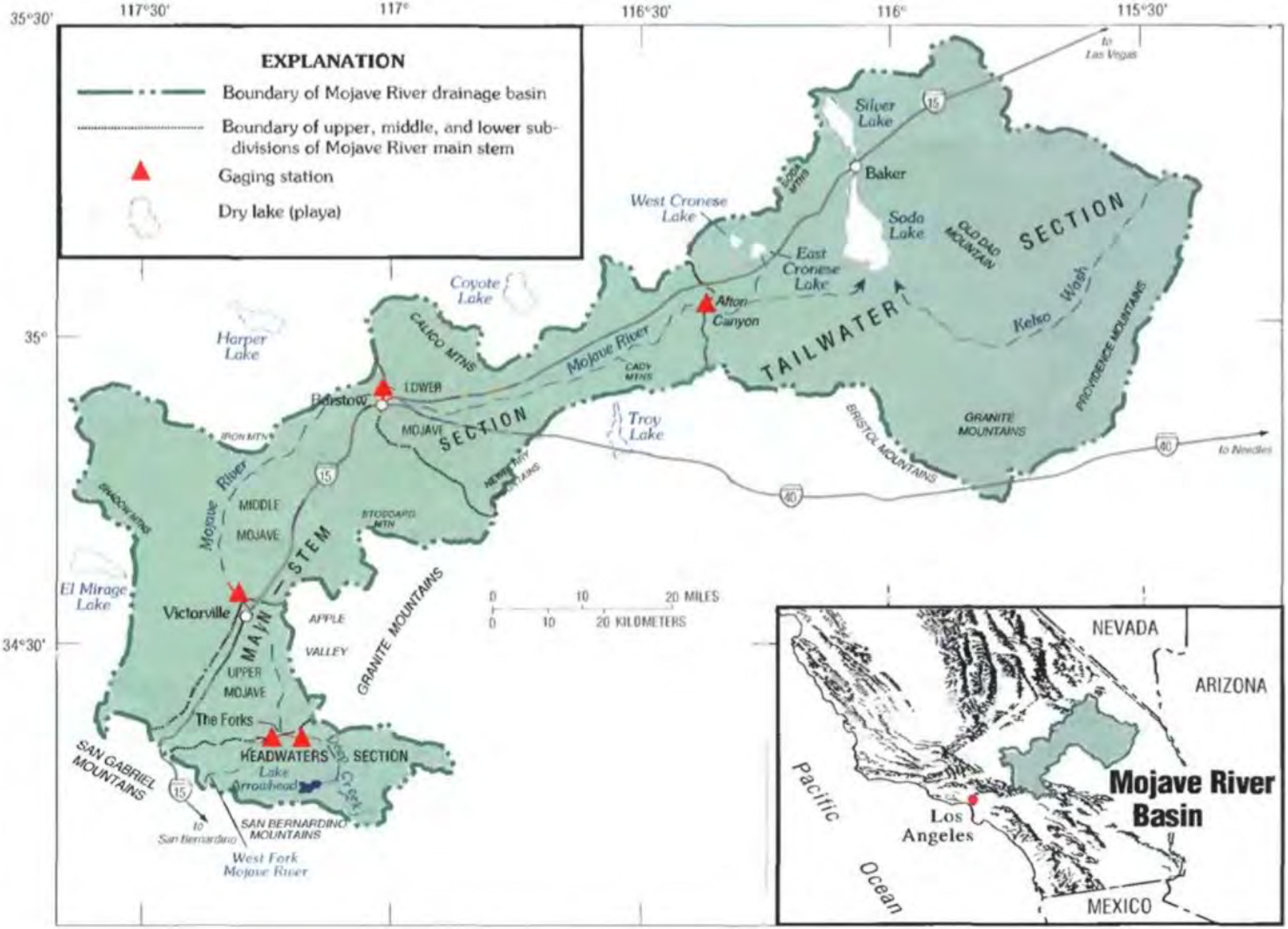
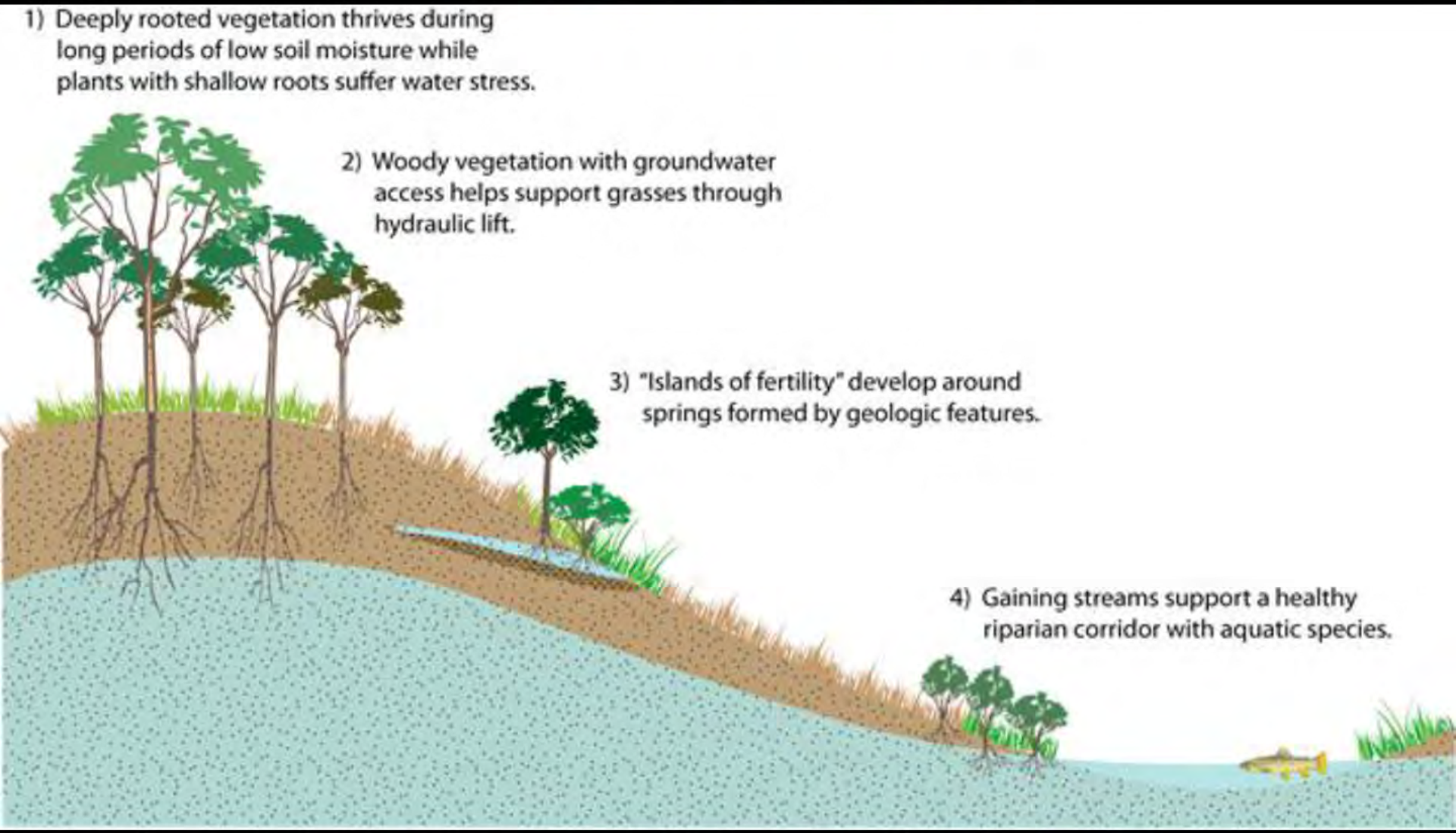


Figure 1. The Mojave River drainage basin.

Phreatophytes



Tamarisk

Tamarix ramosissima

Russian Olive

Elaeagnus angustifolia


Giant Reed
Arundo donax

Mojave Water Agency (MWA)

monitoring and management of watershed's groundwater

Mojave Desert Resource Conservation District (MDRCD)

removal of invasive species

BUT!

no strategy or initiatives for replanting with natives

High Desert Tall Pot & Mojave River Native Plant Rehabilitation Project (HDTP & MRNPRP)

to restore the structure and function of parts of the riparian ecosystem after the removal of non-native invasive species by local authorities, and to replace them with phreatophytic native vegetation transplanted from HDTP & MRNPRP project nurseries

High Desert Tall Pot & Mojave River Native Plant Rehabilitation Project (HDTP & MRNPRP)

Mojave River Campus (MRC)
of Academy for Academic Excellence (K-12 charter)
Victorville

TALL POT ISLAND DEMONSTRATIONS -- LCER

	PRIMARY (INITIAL) SHRUB LAYER		SECONDARY UNDERSTORY FORB/SHRUB LAYER		TERTIARY OVERSTORY TREE LAYER	
	COOL-SEASON	WARM-SEASON	COOL-SEASON	WARM-SEASON	COOL-SEASON	WARM-SEASON
Fall Planting	Fourwing saltbush	Quailbush Bladderpod Creosotebush	Indian ricegrass Desert needlegrass Brittlebush	Alkali sacaton [1] Big galletagrass Desert broom	Fremont cottonwood Goodding's willow Black willow	Honey mesquite
Late Winter / Early Spring Planting (recommended)	Desert saltbush	Screwbean mesquite	Evening primrose Anderson wolfberry Desert globemallow Mojave buckwheat		Desert willow Arizona ash	Blue palo verde

[1] finer soil textures only.

SUGGESTED PLANT PALETTE (ALPHA BY SCIENTIFIC NAME)

1 Indian ricegrass (*Achnatherum hymenoides*)
2 Desert needlegrass (*Achnatherum speciosum*)
3 Fourwing saltbush (*Atriplex canescens*)
4 Desert saltbush (*Atriplex polycarpa*)
5 Quailbush (*Atriplex lentiformis*)
6 Desert broom (*Baccharis sarothroides*)
7 Desert willow (*Chilopsis linearis*)
8 Bladderpod (*Cleome isomeris*)
9 Brittlebush (*Encelia farinosa*)
10 Mojave buckwheat (*Eriogonum fasciculatum*)
11 Arizona ash (*Fraxinus velutina*)
12 Creosotebush (*Larrea tridentata*)
13 Anderson wolfberry (*Lycium andersonii*)
14 Evening primrose (*Oenothera deltoides*)
15 Blue palo verde (*Parkinsonia florida*)
16 Big galletagrass (*Pleuraphis wrightii*)
17 Fremont cottonwood (*Populus fremontii*)
18 Honey mesquite (*Prosopis glandulosa*)
19 Screwbean mesquite (*Prosopis pubescens*)
20 Goodding's willow (*Salix gooddingii*)
21 Black willow (*Salix nigra*)
22 Desert globemallow (*Sphaeralcea ambigua*)
23 Alkali sacaton (*Sporobolus airoides*)

Native species for revegetation

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Native species for revegetation

Holl, Karen D., *et* al. 2011. Planting seedlings in tree islands versus plantations as a large-scale tropical forest restoration strategy. *Restoration Ecology*, 19: 470-479.

Vetiver trials

- Shelter and protect nursery site from erosion
- In chevrons, providing nurse treatment for natives' outplanting sites

Vetiver temperatures

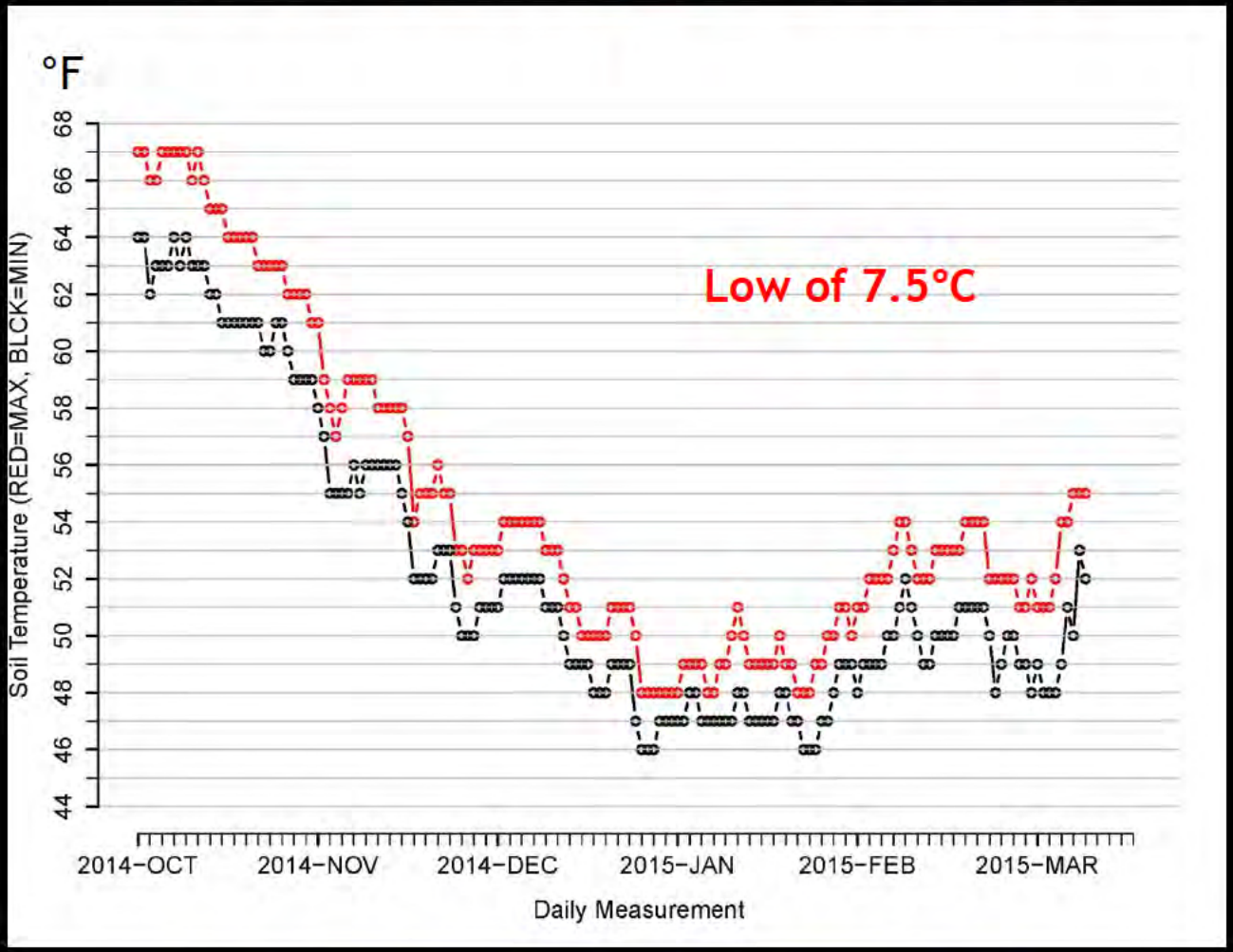
- -12°C (10°F)

Nursery site


AAE
KNIGHT
2012


Aquila
06

Soil temperatures



Nowhere near freezing soil

Problems

- Perception as potentially invasive

Problems

- Perception as potentially invasive

US$120 billion / year

David Pimentel, Rodolfo Zuniga & Doug Morrison. (2005). Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological Economics*, 52: 273-288.

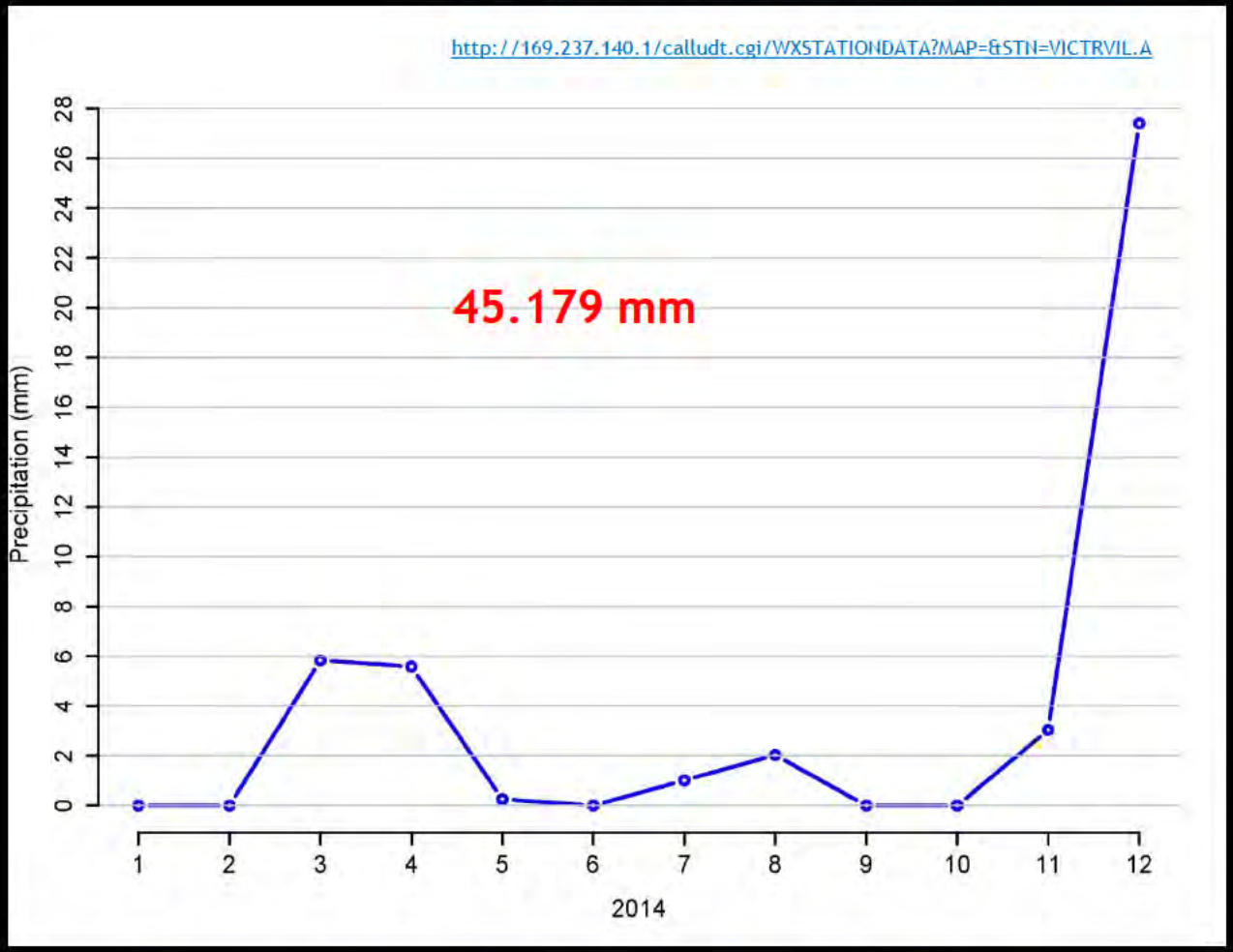
Problems

- Perception as potentially invasive
- Rare extreme cold winters

Problems

- Perception as potentially invasive
- Rare extreme cold winters
- Water availability for irrigation

Problems



- Water availability for irrigation

Acknowledgements

LEAD Asia

Richard Grimshaw