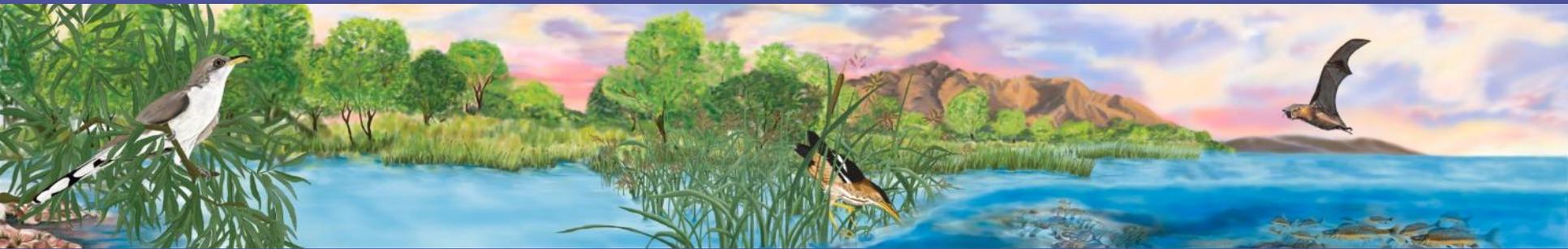


Lower Colorado River Multi-Species Conservation Program



Balancing Resource Use and Conservation

LCR MSCP's Use Of Technology In Data Management And Habitat Monitoring



Jimmy Knowles, Adaptive Management Group Manager
Bureau of Reclamation
Boulder City, Nevada



Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Data Management

- a) Field data collection
- b) Data processing
- c) Data sharing

Habitat monitoring

- a) Lidar
- b) Multispectral imagery
- c) Soil and groundwater monitoring



Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Data Management

a) Field data collection





Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Data Management

a) Field data collection

- **Pros**

- Cross platform
- Cloud based (all data in one place)
- Flexible forms
- Map-centric and form-centric options
- Affordable/accessible devices
- Leverages DOI's ELA w/ Esri
- Standard format compatible w/ egdb's

- **Cons**

- Frequent updates
- Time needed to develop forms/maps
- Abort due to constraint violations error
- No OOTB backups



Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Data Management

b) Data reporting & processing





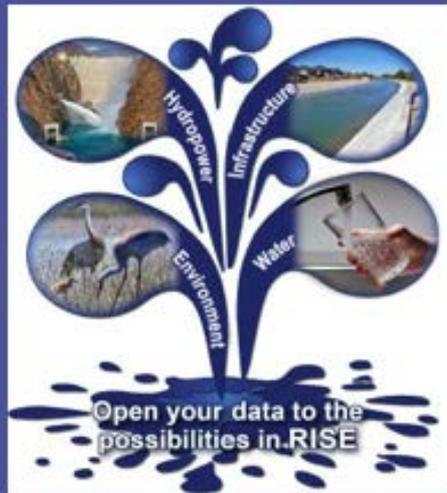
Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Data Management c) Data sharing



BUREAU OF
RECLAMATION



AGOL



<https://data.usbr.gov>

<https://www.arcgis.com/>

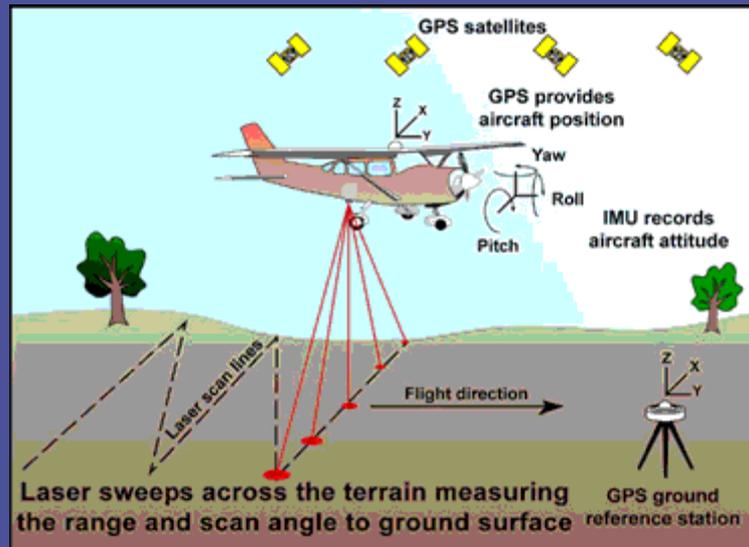


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Balancing Resource Use and Conservation

Habitat monitoring

a) Lidar



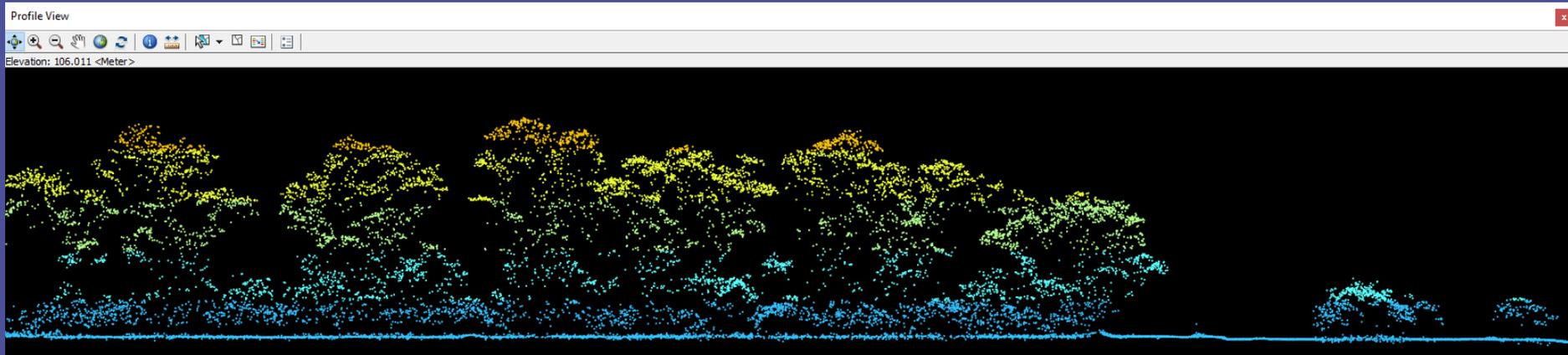


Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Habitat monitoring

a) Lidar





Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Habitat monitoring

a) Lidar – SWFL habitat metrics

Ground	0-50cm	50cm – 2m	2m – 5m	5m – 12m	>12m	Class	Code
0	0	0	0	0	0	NoData	1
= 1		0	0	0	0	Ground	2
>0	>0	>.25	0	0	0	Low veg	3
>0	>0	0	>.25	0	0	Medium veg	4
>0	>0	>0	>.25	0	0	Medium low veg	5
>0	>0	0	0	>.25	0	Moderate	6
>0	>0	0	>0	>.25	0	Moderate medium veg	7
>0	>0	>0	>0	>.25	0	Moderate medium low veg	8
>0	>0	>0	0	>.25	0	Moderate low veg	9
>0	>0	0	0	0	>0	High veg	10
>0	>0	0	0	>0	>0	High moderate veg	11
>0	>0	0	>0	>0	>0	High moderate medium veg	12
>0	>0	>0	0	0	>0	High low veg	13
>0	>0	>0	>0	0	>0	High medium low veg	14
>0	>0	0	>0	0	>0	High medium veg	15
>0	>0	>0	0	>0	>0	High moderate low	16
>0	>0	>0	>0	>0	>0	Mixed	17



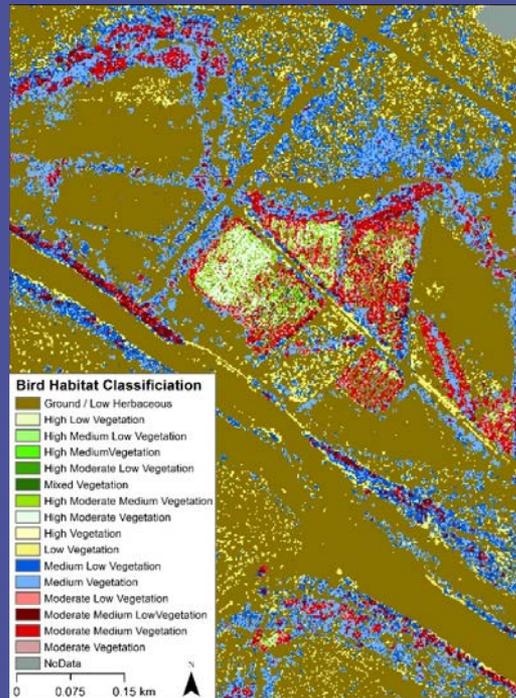
Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

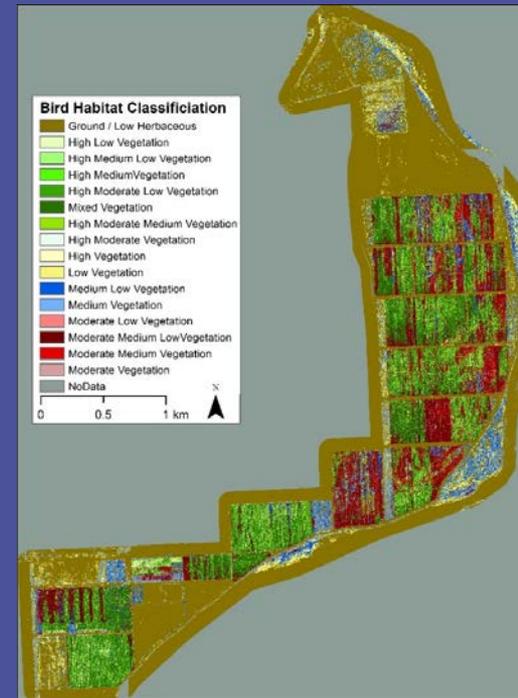
Habitat monitoring

a) Lidar – SWFL habitat metrics

Rockhouse



Palo Verde Ecological Reserve



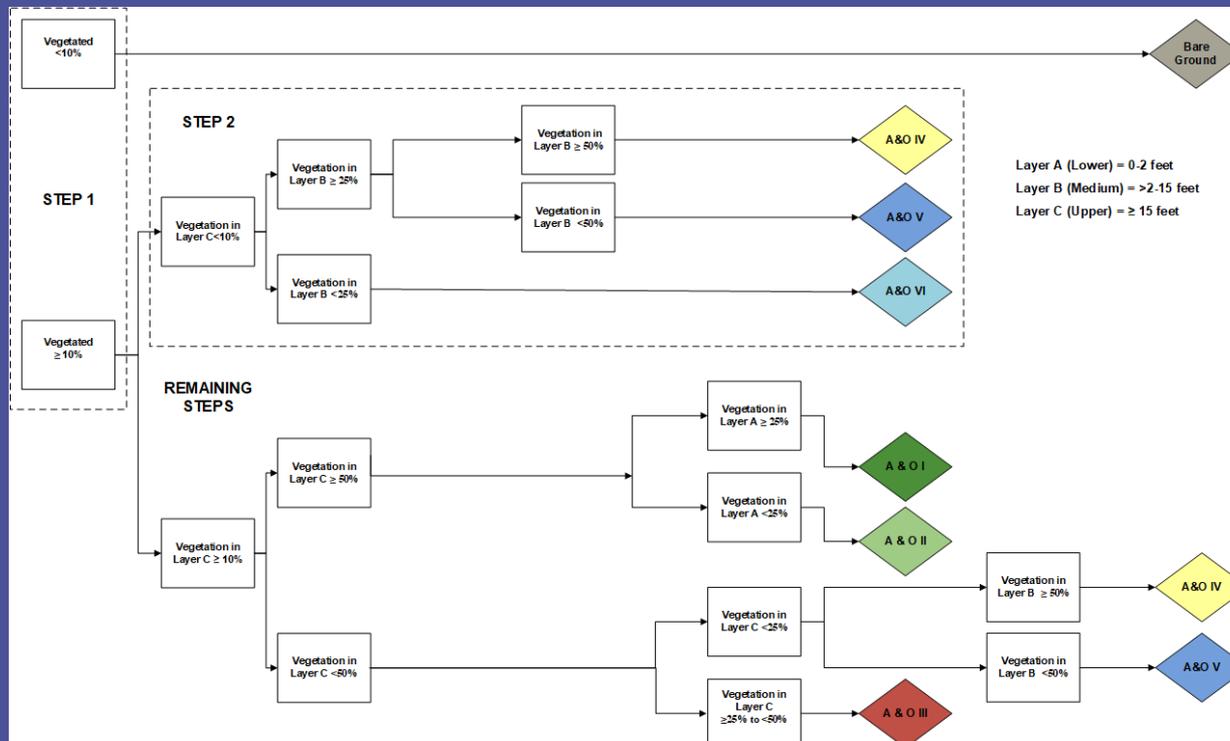


Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Habitat monitoring

a) Lidar – Anderson-Ohmart classification



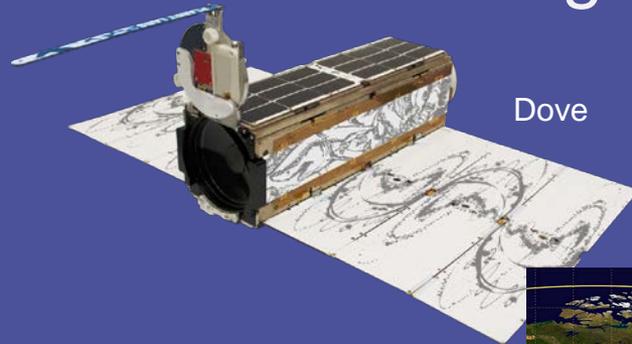


Lower Colorado River Multi-Species Conservation Program

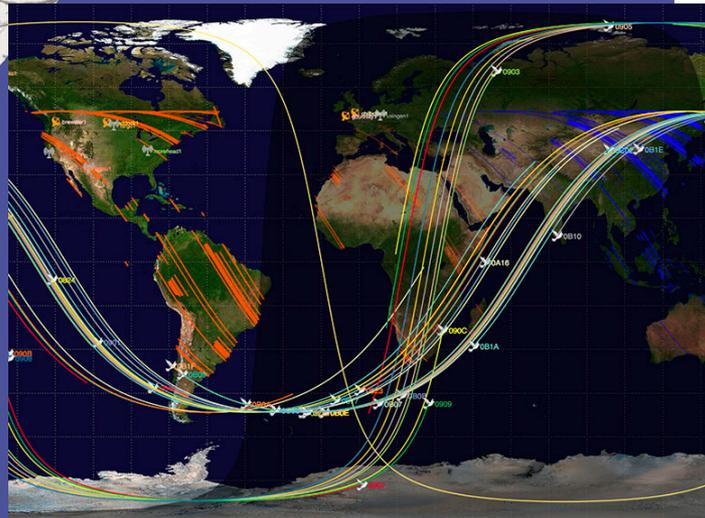
Balancing Resource Use and Conservation

Habitat Monitoring

b) Multispectral imagery – vegetation health monitoring



Dove



PlanetScope

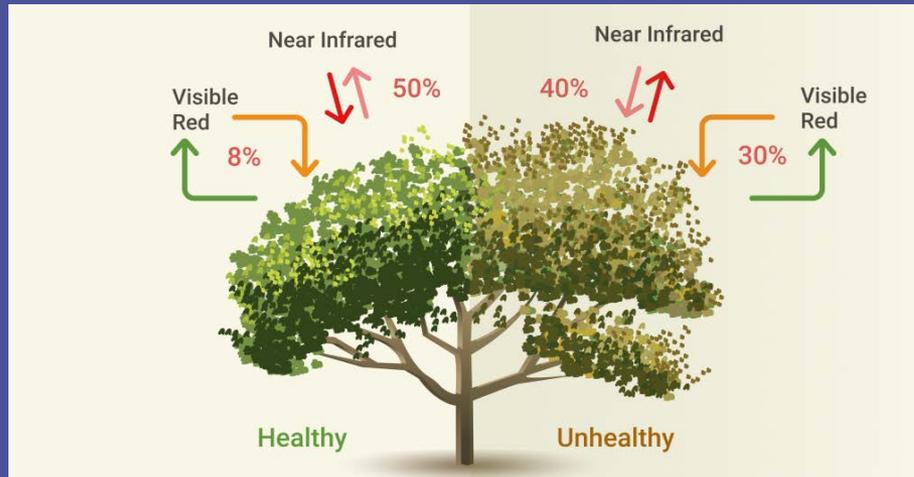
- ✓ Always-on monitoring, daily refresh
- ✓ 3.7 meter resolution
- ✓ RGB and NIR bands
- ✓ Archive since 2009

Lower Colorado River Multi-Species Conservation Program

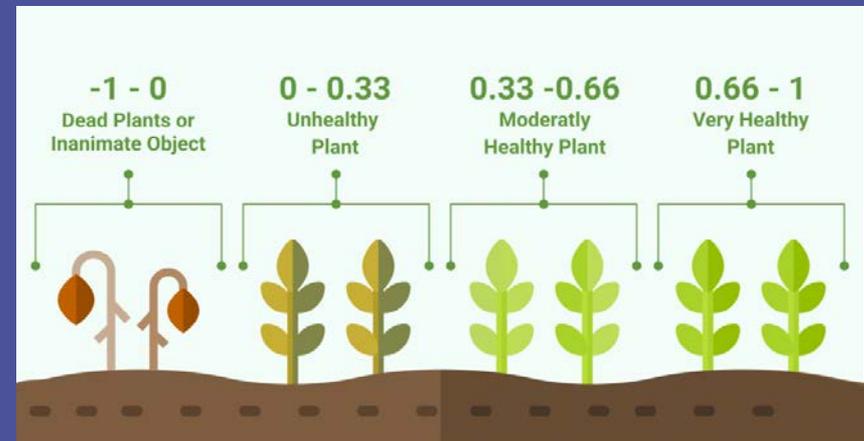
Balancing Resource Use and Conservation

Habitat Monitoring

b) Multispectral imagery – vegetation health monitoring



Normalized Difference Vegetation Index (NDVI)



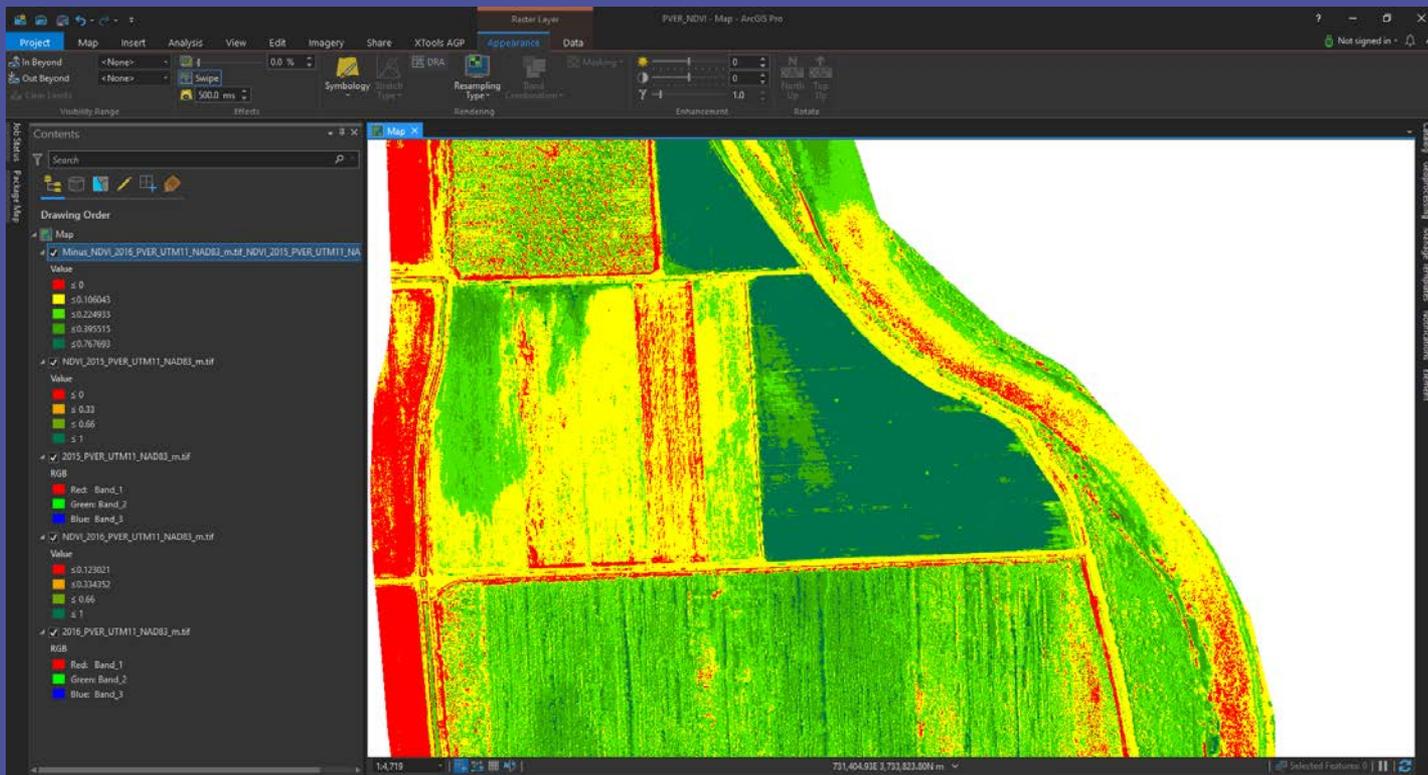


Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Habitat Monitoring

b) Multispectral imagery – vegetation health monitoring





Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Habitat Monitoring

c) Soil and groundwater monitoring

Objectives

1. Further identify the range of habitat characteristics (vegetation and soil moisture) present at areas occupied by breeding southwestern willow flycatchers,
2. Assess whether adequate soil moisture is being maintained during the nesting season at conservation areas being managed for southwestern willow flycatchers, and
3. Assess whether soil moisture and salinity conditions are adequate for sustained vegetation health.



Lower Colorado River Multi-Species Conservation Program

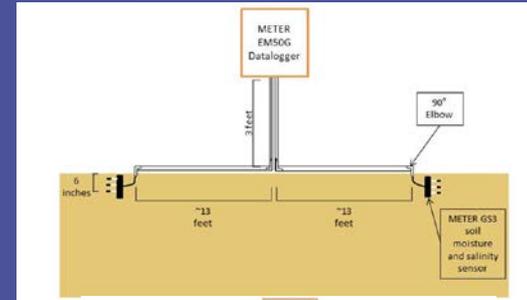
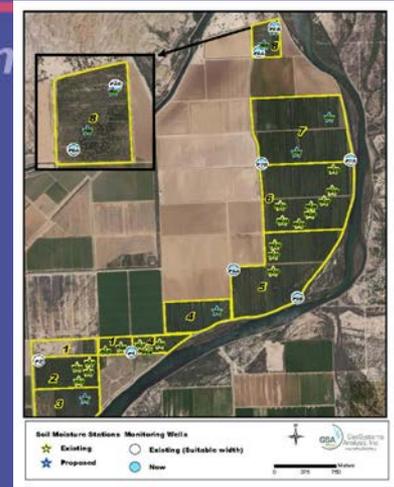
Balancing Resource Use and Conservation

Habitat Monitoring

c) Soil and groundwater monitoring

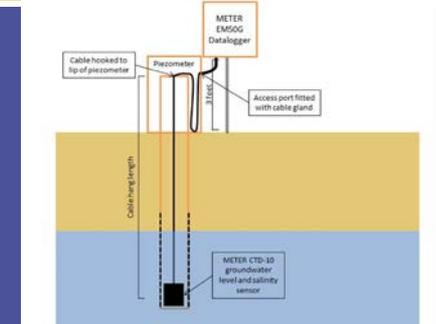
Established network at six conservation areas:

- Beal Lake Conservation Area
- Palo Verde Ecological Reserve
- Cibola National Wildlife Refuge Unit #1
- Cibola Valley Conservation Area
- Yuma East Wetlands
- Hunters Hole
- Imperial Ponds Conservation Area



Parameters:

- Soil moisture and salinity
- Groundwater level and salinity





Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Habitat Monitoring

c) Soil and groundwater monitoring

