



# LANDSCAPE PERFORMANCE SERIES

## **Yuma East Wetlands, Phases 1 and 2 – Yuma, AZ Methodology for Landscape Performance Benefits Prepared by:**

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### **Methods for Determining Landscape Performance Benefits**

Following appraisal protocol defined by Kondolf et al. [2011] we evaluated the effectiveness of Yuma East Wetland (YEW) and compared findings to other riparian habitat creation projects along the lower Colorado River. We relied primarily on monitoring data collected by MSCP staff and Fred Phillips Consulting, though we visited all restoration sites to familiarize ourselves with the projects. Because the scale of the projects is so vast (many sites are more than 1000 acres) reliance upon existing monitoring programs was essential. The results provide a scientifically credible basis to assess effectiveness of past projects, and to develop recommendations to increase effectiveness of MSCP restoration investments in the future.

### **Environmental**

**Created habitat for 330 species of wildlife, including 2 federally threatened and endangered species and 4 additional species of concern. Observations of the endangered Yuma Clapper Rail increased from <1 to 5 per year, and observations of the endangered Southwestern Willow Flycatchers increased from 2 to >4 per year.**

The MSCP and Fred Phillips Consulting biologists monitored and documented endangered species at Yuma East Wetlands as part of ongoing monitoring programs. Reports (Fred Phillips Consulting, 2009; Lower Colorado River Multi-Species Conservation Program, 2010) were reviewed and synthesized to document biological outcomes. Biological assessments (especially with endangered species) are challenging due to challenges in fieldwork and identification, strong seasonal and inter-annual variability, and potentially long periods required for biota to respond to restoration activities. Nonetheless, we used whatever monitoring data existed to extract as much information as possible.

**Reduced the project's water demand by 49-71% per year compared to other revegetation efforts in this extremely arid region through the use of innovative, site-specific irrigation techniques.**

Riparian plants in desert regions can utilize tremendous amounts of water. As such, vegetation projects in arid regions are largely limited by water availability. In order to contextualize water usage at the Yuma East Wetlands, we conducted a review of water usage at five other riparian

re-vegetation projects implemented under the MSCP. The other projects were the Cibola Valley Conservation Area, Cibola National Wildlife Refuge, Beal Lake Riparian Planting, Palo Verde Ecological Reserve, and Imperial Ponds Planting. In all cases, the total annual irrigation volume was known. By dividing the total irrigation volume by the total area planted, we were able to calculate the length of water (acre feet of water per acre of vegetation) used at each site each year. YEW used an average of 3.9 acre feet per acre per year whereas the other projects used from 7.7 to 13.4. For context, the acre feet per acre unit is presented since the plots are generally flood irrigated. One can also think of it as precipitation per year- in essence, YEW receives the equivalent of 47 inches and other sites from 92 to 161.

Site	Plantation Area (acres)	Average Irrigation (acre feet/y)	Area-scaled irrigation (inches)	Area-scaled irrigation (inches/yr)
Yuma East Wetlands	350	1354	3.9	47
Palo Verde Ecological Reserve	539	6037	11.2	134
Cibola Valley Conservation Area	317	2435	7.7	92
Beal Lake Riparian Planting	107	1434	13.4	161
Imperial Ponds Planting	132	1557	11.8	142

Percent difference from surrounding projects was calculated by subtracting the YEW acre-feet per acre per year from the second lowest and the highest water usage projects and then dividing the resulting numbers by the second lowest and the highest length of water used. For example:

$$\begin{aligned}
 & \frac{\text{Cibola Valley f/yr} - \text{YEW f/yr}}{\text{Cibola Valley f/yr}} \times 100 = \frac{\text{percent difference in YEW}}{\text{project water demand}} \\
 & \hspace{15em} \text{compared to nearby project} \\
 & \hspace{15em} = \\
 & \hspace{15em} \frac{7.7 - 3.9}{7.7} \times 100 = 49.4\%
 \end{aligned}$$

**Achieved 90% survival of more than 300,000 plants. A 90% plant survival rate is excellent in any region, and exceptional in the arid and saline conditions of the lower Colorado.**

Tree survival and habitat assessment at YEW were documented as part of ongoing monitoring programs of both the MSCP and Fred Phillips Consulting biologists. Reports (Fred Phillips Consulting, 2009; Lower Colorado River Multi-Species Conservation Program, 2010) were reviewed and synthesized to document biological outcomes. Biological assessments (especially with endangered species) are challenging due to challenges in fieldwork and identification, strong seasonal and inter-annual variability, and potentially long periods required for biota to respond to restoration activities.

**Social**

**Engages and educates over 200 volunteers a year, who in total provide more than 1,600 volunteer hours of assistance with the restoration process annually.**

Volunteerism was estimated from informal records kept by Fred Phillips Consulting.

Events tallied include volunteer planting days and the annual YEW Youth Cultural Festival (begun in 2002), which gathers over 80 students from over 12 countries, 4 Indian tribes and 3 communities each year to plant trees, celebrate the healing of this ecosystem and learn about other cultures. These volunteers are an integral part of the project's success, having helped restore 350 of the 1,400 acres slated for restoration in the Yuma East Wetlands to date. Individual volunteers log an average of 8 hours a year, resulting in 1,600 volunteer hours logged per year.

**Provided an educational space for 100-150 people to celebrate the region's biodiversity through the annual, week-long Yuma Birding and Nature festival (held from 2001-2012).**

Visitation was estimated from informal records kept by Fred Phillips Consulting.

**Provides recreational opportunities for approximately 220 people per day during the summer and 130 people per day during the rest of the year. 76% of spring, fall, and winter visitors and 90% of summer visitors swim each day, illustrating the importance of this project in providing the local community with safe, year-round access to the river.**

Visitation was estimated from informal records kept by Fred Phillips Consulting.

### **Economic**

**Employed over 150 people in full and part time jobs planning, building and maintaining the YEW project since 2000.**

Employment was estimated from informal records kept by Fred Phillips Consulting.

### **References**

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