Quantifying Water and Cost Savings from UCLA Turf Conversions

Irrigation Team
Sustainability Action Research

June 1st, 2023

Team and Stakeholder Introduction

Team Leads

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Team Members

Abby Giardina, Nalin Jayaswal, Kentaro Matsunaga, Hailey Sarmiento

Stakeholder

Greg Luna – Senior Superintendent of Grounds

Key Informants

Suzanne Gagliano – Irrigation Team Supervisor
Alex Gomez – Horticulturist and Landscape Architect
Chris Woo – Director of Health Grounds

UCLA FACILITIES MANAGEMENT

Current Irrigation Practices at UCLA

UCLA is converting areas of **natural turf** to **drought tolerant and native plants.**

UCLA does not currently track:

- Current water use of natural turf areas
- Future water use of landscaped areas
- Return on investment time for converted landscapes

Research Questions and Variables

How will water and maintenance savings for turf conversion projects...

- ❏ vary based on current irrigation type?
- ❏ offset the cost of conversion and affect return on investment (ROI) time?

Variables we are tracking:

Water Use of Turf Areas	Water Use of Native Landscapes	Costs and Saving of Conversion

Key Terms: Irrigation on Campus

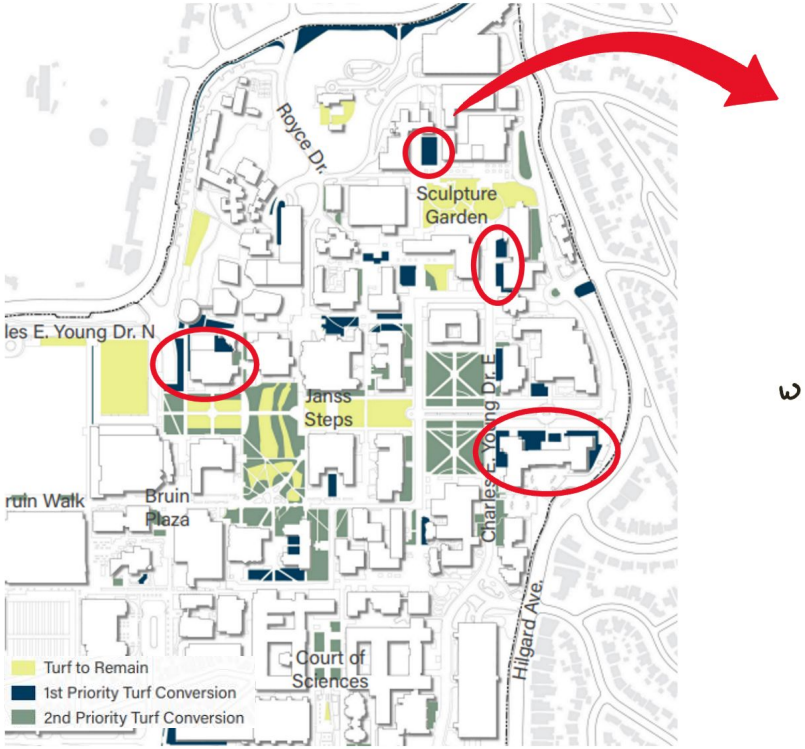
Pop-Ups

Rotors

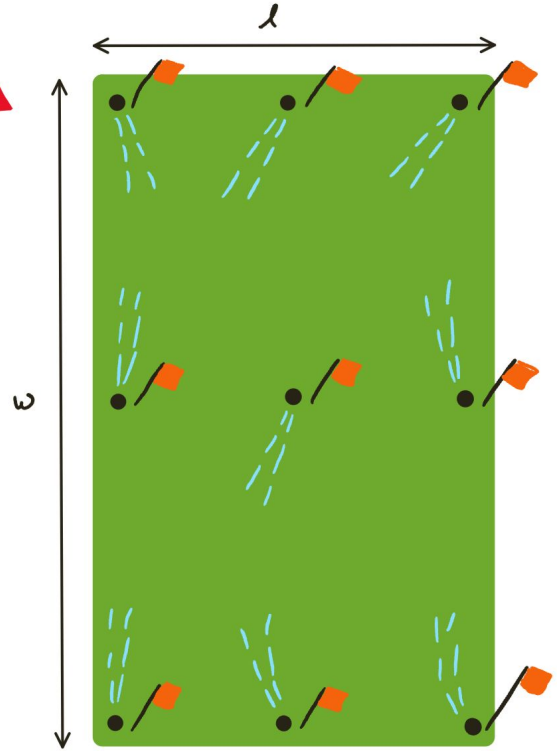
Dripline

Methods: Irrigation Output

Site Selection

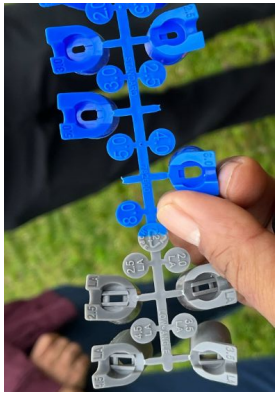


Field Data Collection



Methods: Irrigation Output

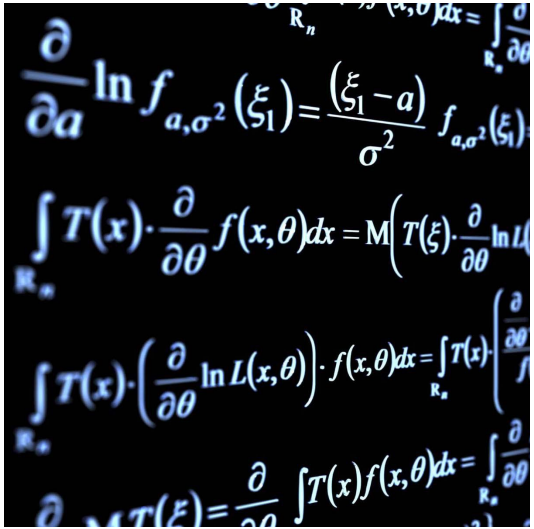
Manufacturer Data



PGP® ULTRA / I-20 BLUE STANDARD NOZZLE PERFORMANCE DATA

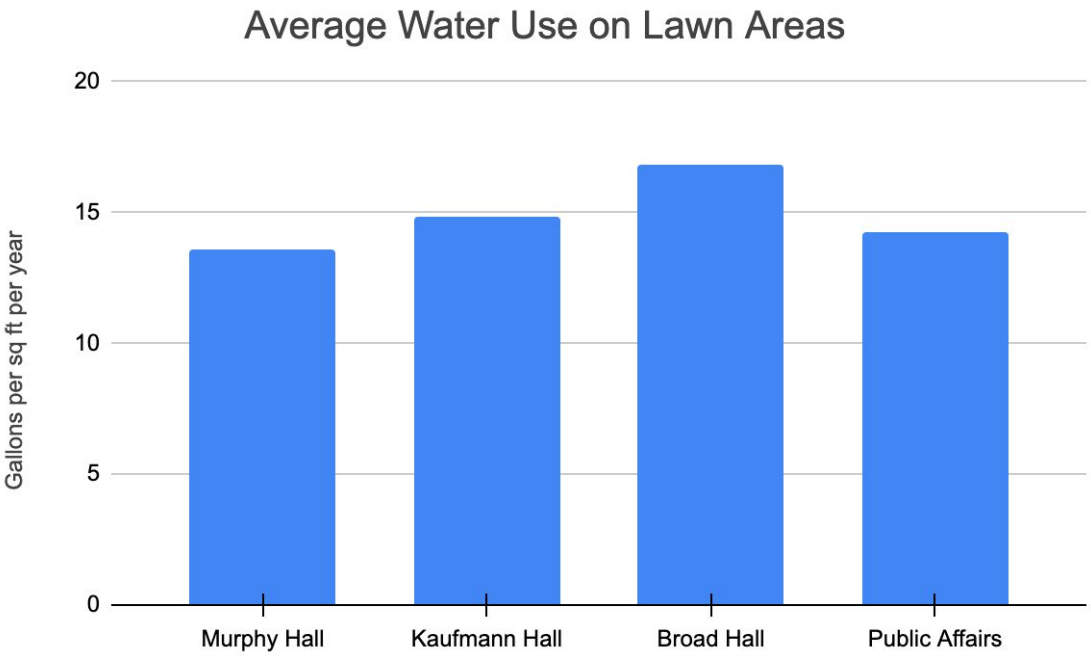
Nozzle	Pressure PSI	Radius ft.	Flow GPM	Precip in/hr ■	Precip in/hr ▲
1.5 Blue	25	29	1.2	0.27	0.32
	35	31	1.4	0.28	0.32
	45	**31**	**1.5**	**0.30**	**0.35**
	55	32	1.8	0.34	0.39
	65	32	1.9	0.36	0.41
2.0 Blue	25	33	1.4	0.25	0.29
	35	33	1.7	0.30	0.35
	45	**34**	**2.0**	**0.33**	**0.38**
	55	34	2.1	0.35	0.40
	65	32	2.3	0.43	0.50
2.5 Blue	25	33	1.7	0.30	0.35
	35	35	2.1	0.33	0.38
	45	**35**	**2.5**	**0.39**	**0.45**
	55	35	2.6	0.41	0.47
	65	35	2.9	0.46	0.53
3.0 Blue	25	35	2.2	0.35	0.40
	35	36	2.7	0.40	0.46
	45	**38**	**3.0**	**0.40**	**0.46**
	55	39	3.4	0.43	0.50
	65	39	3.7	0.47	0.54

Calculations



Use data to calculate water usage per square foot per year at each site

Irrigation Output by Building

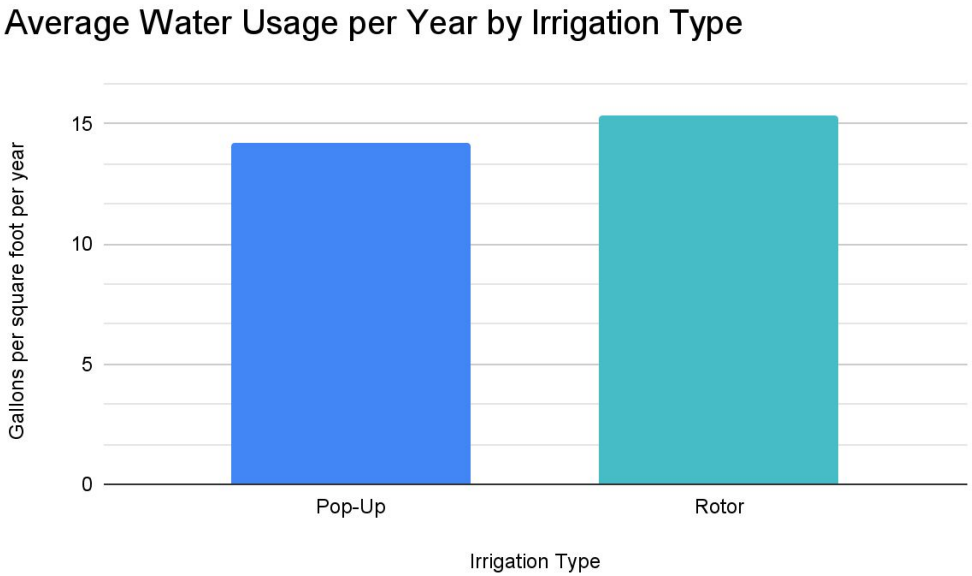


These buildings have a mix of pop-up and rotor heads.

All are **first priority areas** for conversion.

Buildings that **use the most** water should be considered the **highest priority for conversion**

Water Usage of Pop-Ups versus Rotors



Pop-Ups: Average of **14.189** gallons per square foot per year

Rotors: Average of **15.384** gallons per square foot per year

On average, pop-ups use less water than rotors

Locations irrigated by rotors can be considered the highest priority for conversion, but this **difference is marginal.**

Case Study: Moore Hall Turf Conversion

Methods: Cost-Benefit Analysis

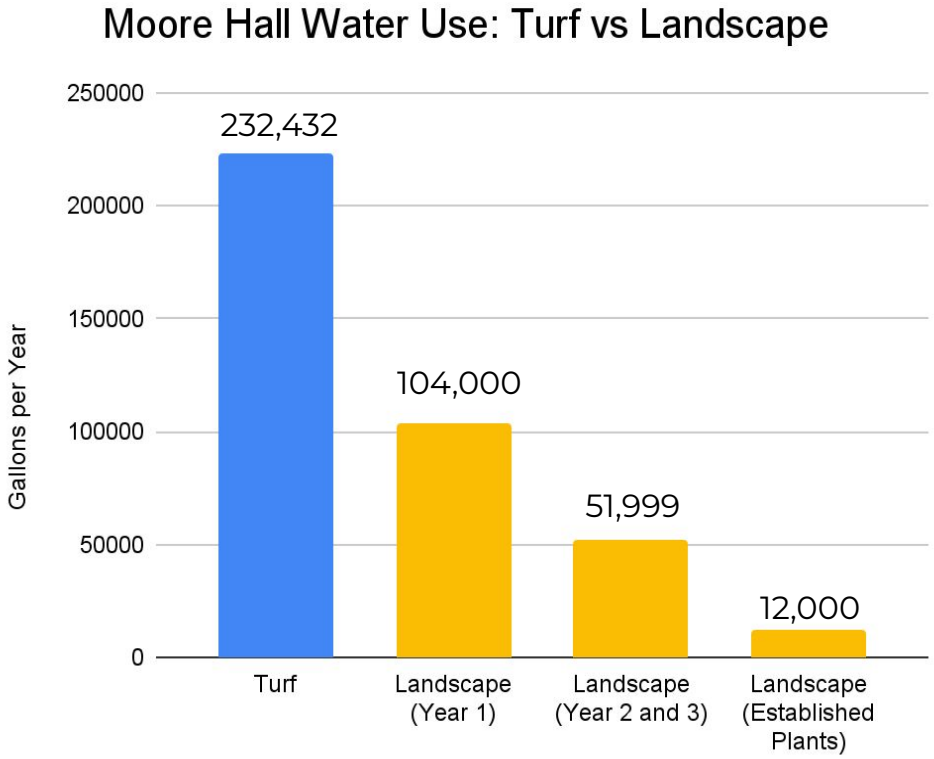
Information Gathering

Data collection on costs of conversion, maintenance, and watering schedules via informal interviews from the Landscaping Staff

Return on Investment (ROI) Analysis

Full cost-benefit analysis on costs and savings per square foot. Calculated time to reach return on investment.

Moore Hall Water Usage



Landscaped Plant Watering Schedule:

- Year 1: One hour weekly
- Year 2-3: Thirty minutes weekly
- Established Plants: Thirty minutes monthly

Yearly water savings for established landscape ≈ **220,432 gallons**

Reduction in Water Expenditures for Established Plants:

- Yearly savings = **$1812.96**
- Savings per square foot per year = **$0.12**

Costs of Turf Conversion: Fixed Costs

Expenditures	Cost
Plant Purchases	$38,000
Cost of Labor	$47,000
River Rock	$12,000
Irrigation Equipment	$10,000
Mulch and Other Material	$13,500
Total Cost	**$120,500**
Cost per square foot	$7.98

LADWP Conversion Rebate: $5 per square foot

Expenditure	Adjusted Cost
Cost per square foot	$2.98
Total Cost	**$44,960**

Moore Area = 15108 square feet

Moore Hall Yearly Maintenance Costs

Turf

Expenditure	Yearly Costs
Mulch and woodchips	$250
Tool repairs and replacement	$300
Irrigation repairs	$500
Aeration	$800
Fertilizer	$1625
Labor	$54,512.64
Total Cost	$57,987.64
Cost per square foot	$3.84

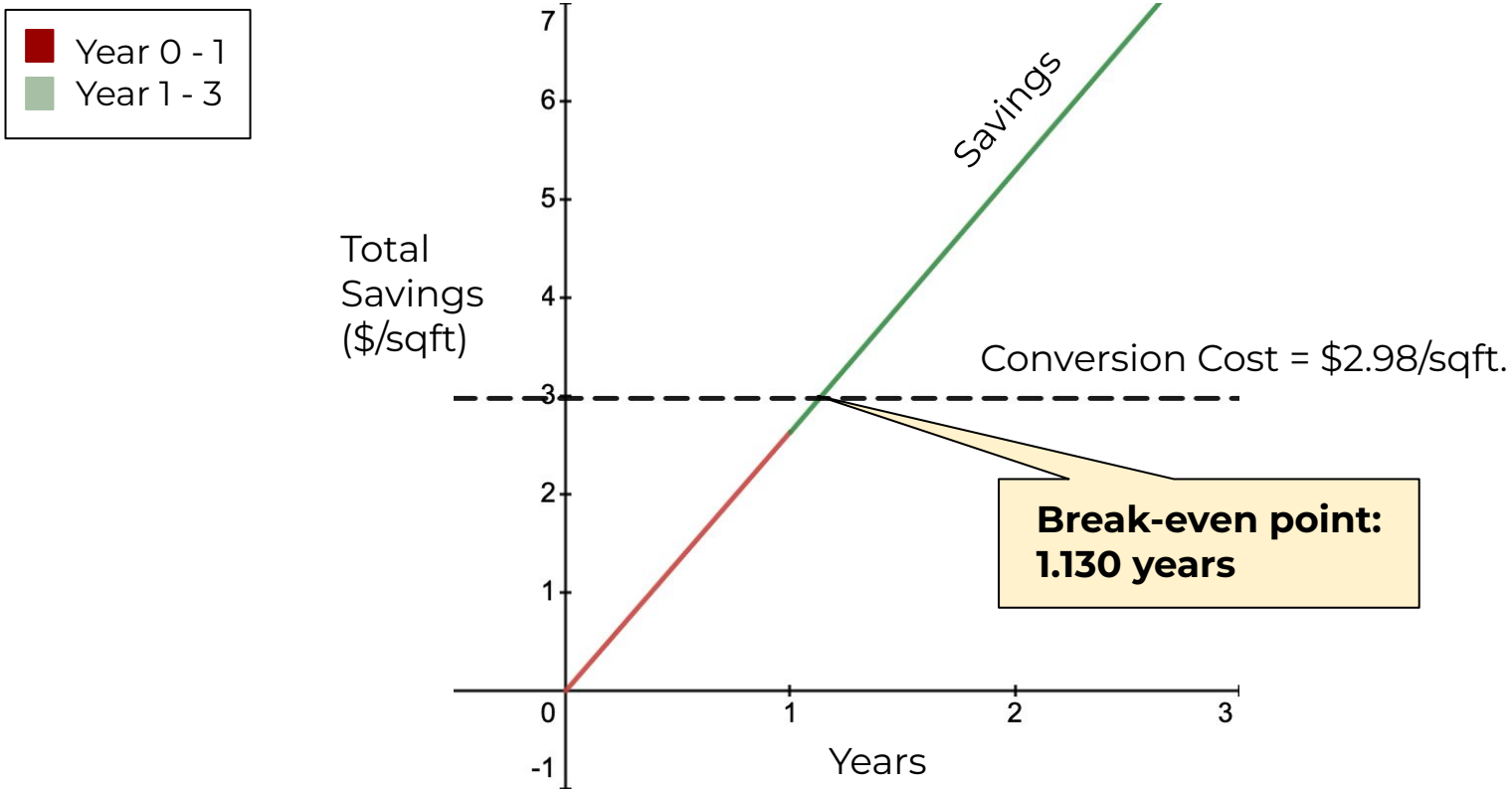
Landscaped

Expenditure	Yearly Costs
Mulch and woodchips	$500
Tool repairs and replacement	$50
Irrigation repairs	$500
Cost of labour per year	$18,170.88
Total cost	$19,220.88
Cost per square foot	$1.27

Yearly Maintenance Cost Savings = $38,767 ($2.57 per square foot)

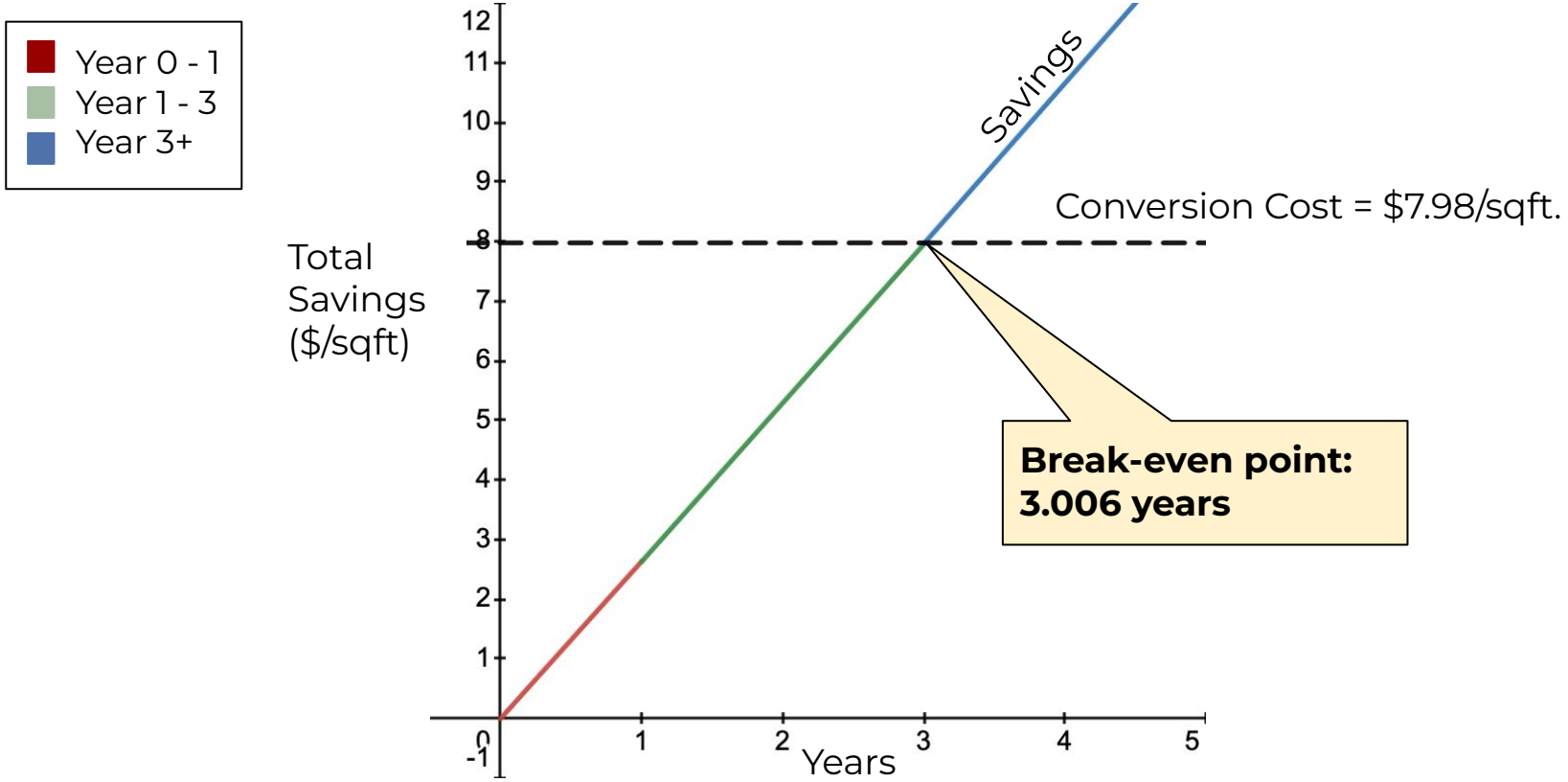
Return on Investment Timeline

From Tuf to Native Plant Beds, Including Rebate Value



Return on Investment Timeline

From Turf to Native Plant Beds, Excluding Rebate Value



Native Plant Species

Non-Monetary Benefits

Only **50%** of species planted at Moore are native to California.

EDI benefits of native species:
Native plants have medicinal and teaching purposes in indigenous communities.

Incorporating more endemic species on UCLA campus supports land recognition, promotes engagement with native histories, and provides educational opportunities.

Moving Forward

...the Moore you know!

Optimizing turf conversion locations

- Conversion site selection based on irrigation type

Benefits of turf conversion

- Turf conversion is extremely cost effective
- Significant yearly water savings

Looking towards the future

- Embrace native species

Thank You

To our stakeholders and program directors for your support!

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