This presentation premiered at WaterSmart Innovations

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SOUTHERN NEVADA WATER AUTHORITY

SNWA Watering Group Assistant Study

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When are people really *inefficient*?

Relative Departure In Irrigation Application To Turfgrass From Reference ET

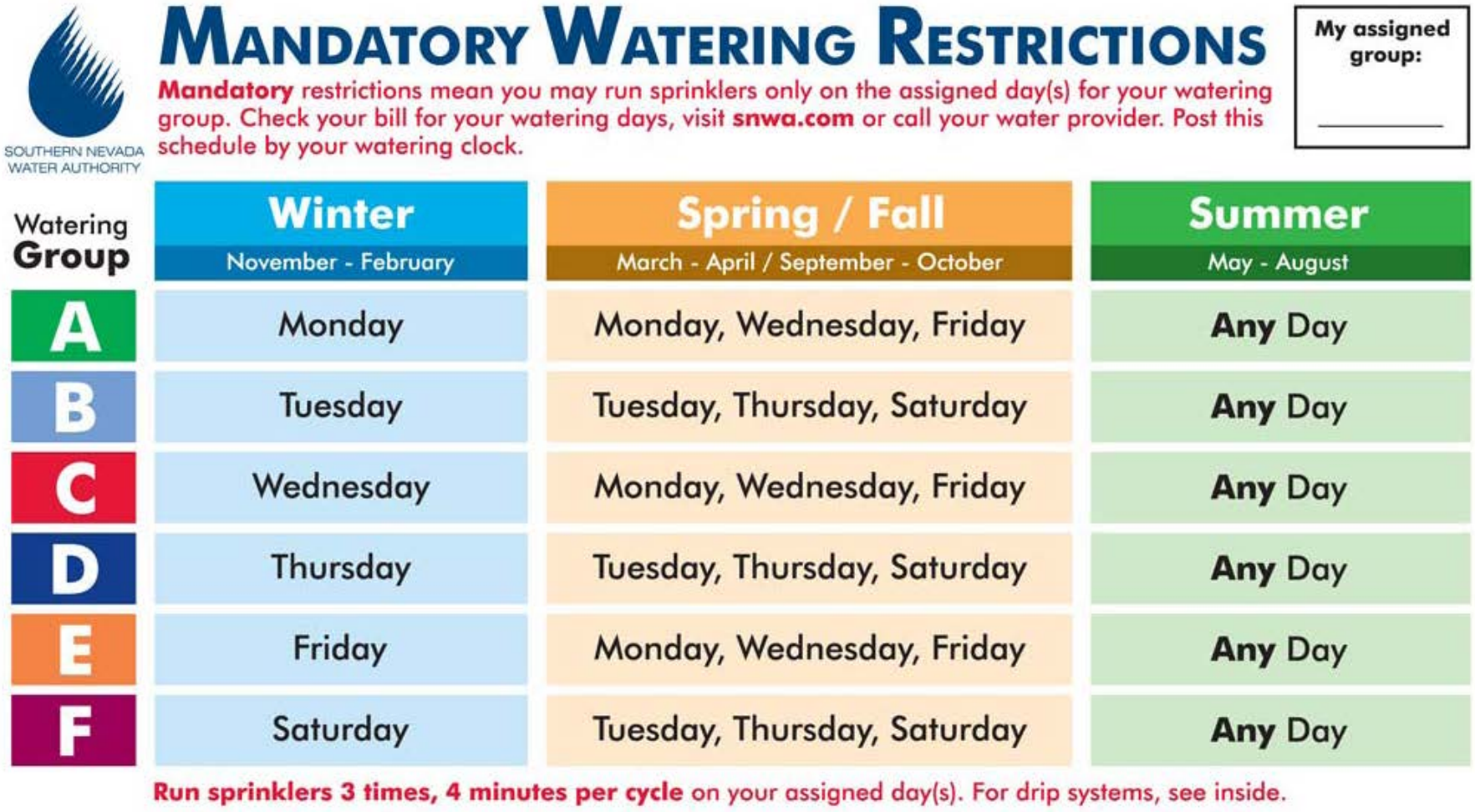
Irrigation application 120% or less of ET

Irrigation application 120-150% of ET

Irrigation application more than 150% of ET

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	163%	136%	87%	113%	125%	132%	145%	142%	151%	160%	203%	150%

Day-of-Week Watering Restrictions

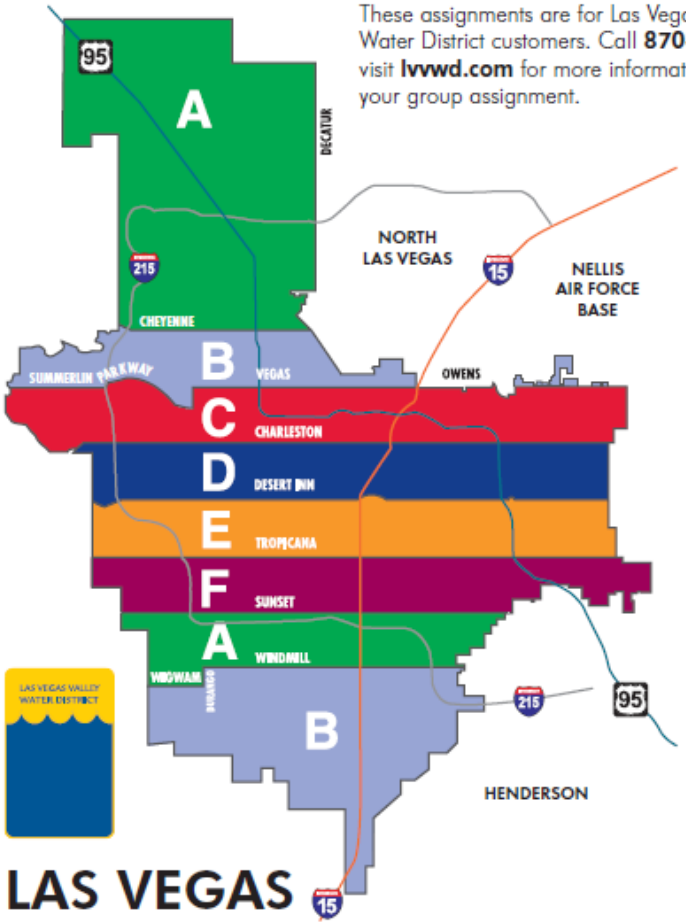


Watering Restrictions*

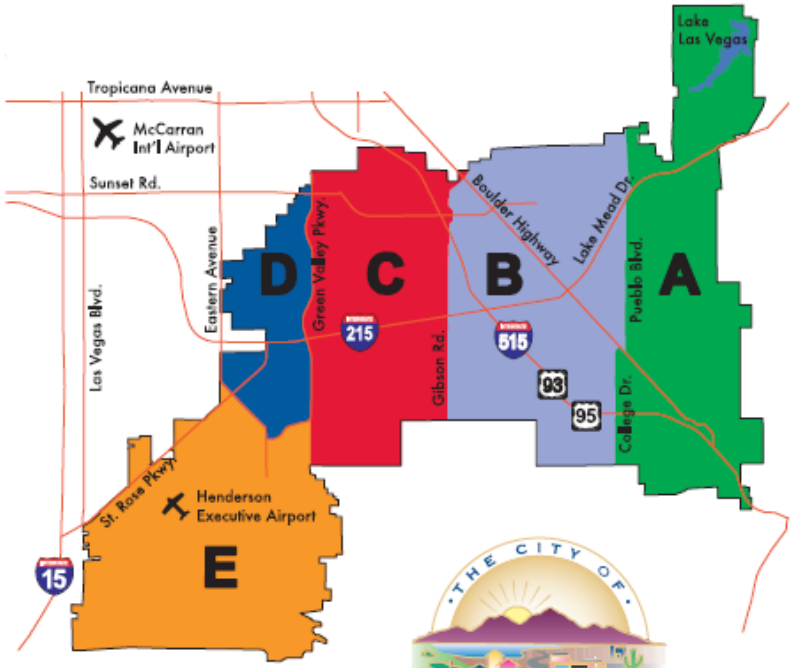
Watering Group Assignments

for Las Vegas, Henderson, North Las Vegas and Boulder City

These assignments are for Las Vegas Valley Water District customers. Call **870-4194** or visit **lvvwd.com** for more information about your group assignment.



For watering group assignments in Henderson, call **267-5900** or visit **cityofhenderson.com**.



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LAS VEGAS

THE CITY OF HENDERSON

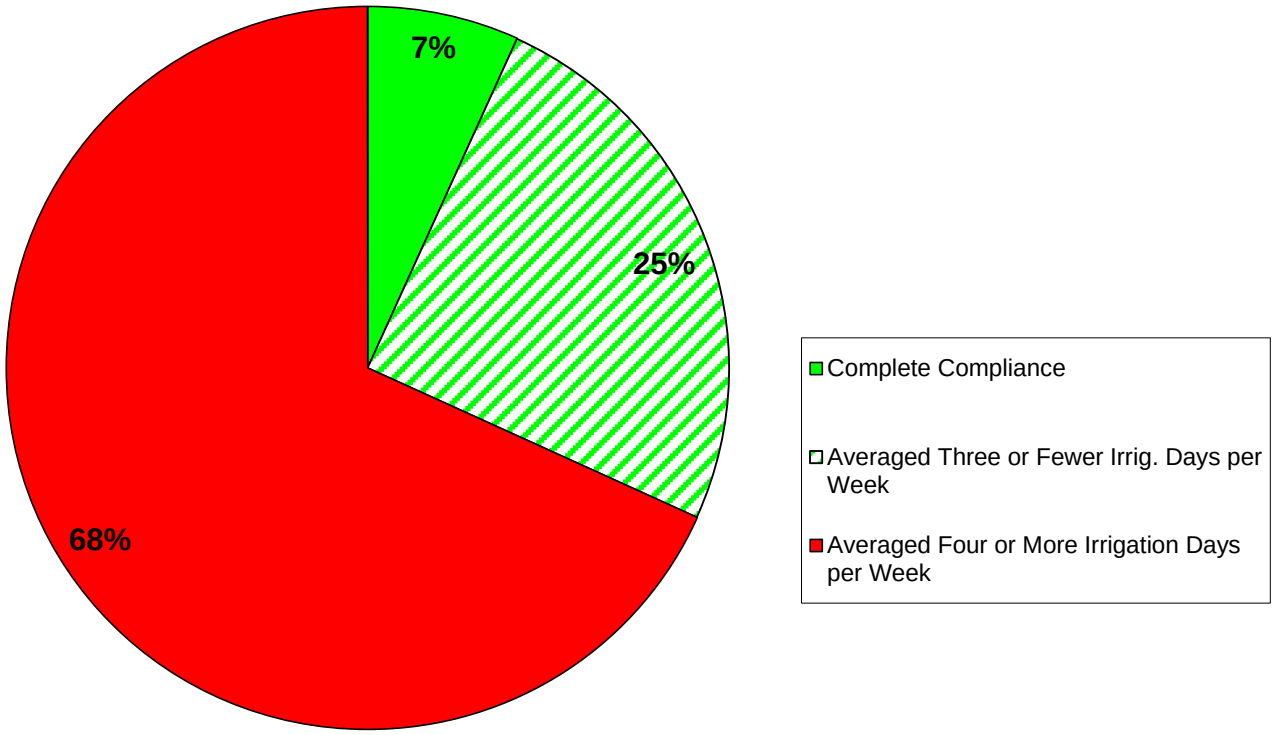
A Place To Call Home

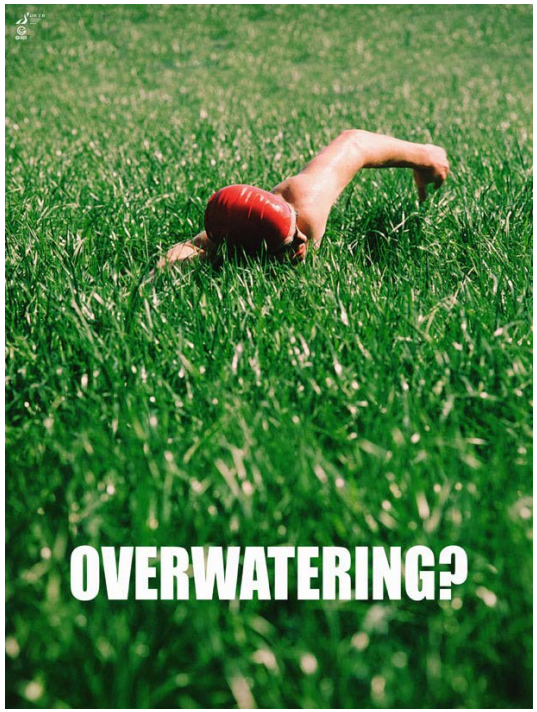
HENDERSON

* **Mandatory Southern Nevada watering restrictions are now in effect for customers in Las Vegas, Henderson, North Las Vegas and Boulder City. All water users may only run sprinklers on their group's assigned watering day(s).**

Water budgeted properties and designated Community Use Recreational Turf Areas may use modified schedules in all jurisdictions. Community Use Recreational Turf schedules must be posted for public viewing. Call **258-SAVE** or visit **snwa.com** for more information.

Compliance Model for Fall 2007





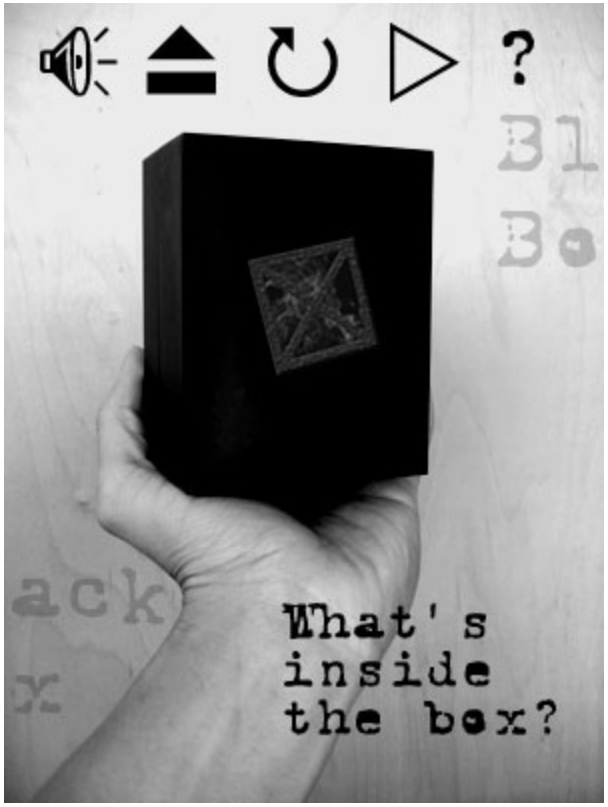
Background

- Seasonal research on mandatory watering restrictions reveals low rates of compliance and that the most water on a relative basis is wasted during the Fall.

- Messaging appears to have a positive influence on compliance, but difficult to sustain.

- SNWA Board in 2007 authorized $250,000 for RFP for development of a device that would assist residents in complying with watering restrictions – *The Watering Group Assistant.*

What is a Watering Group Assistant?



- A novel device that, properly used, keeps any common irrigation system in compliance with watering restrictions.
- Interrupts the common wire. Capabilities for both spray and drip stations.
- In theory, people can always be in compliance after installation. No more having to remember to change your clock.
- Compliance with both day-of-week and time of day restrictions throughout the year.

So, Let’s See them!

Alex-Tronix Model

Dig Indoor Model

Dig Outdoor Model

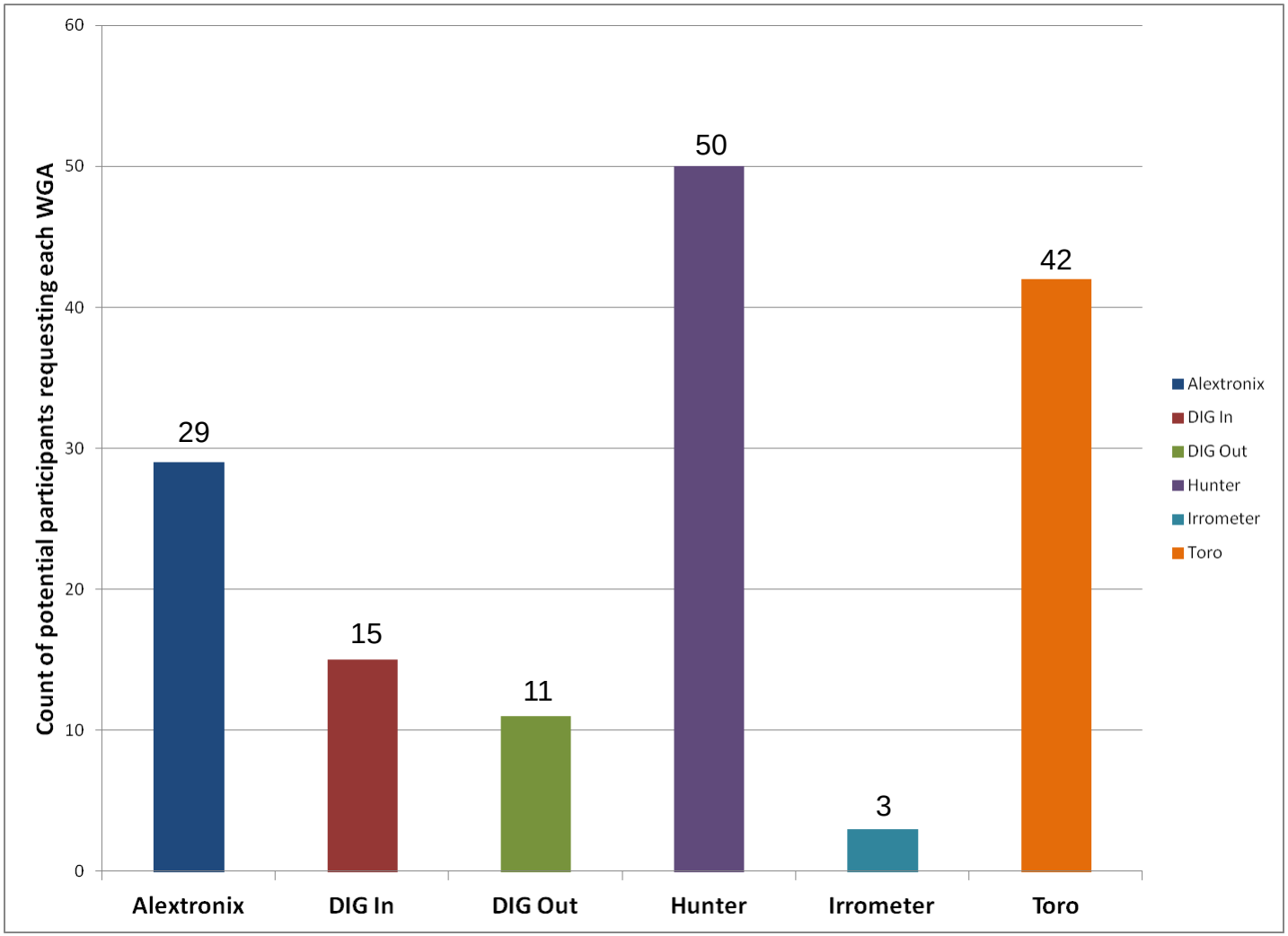
Irrometer Model

Hunter Model

Toro Model

Research Results

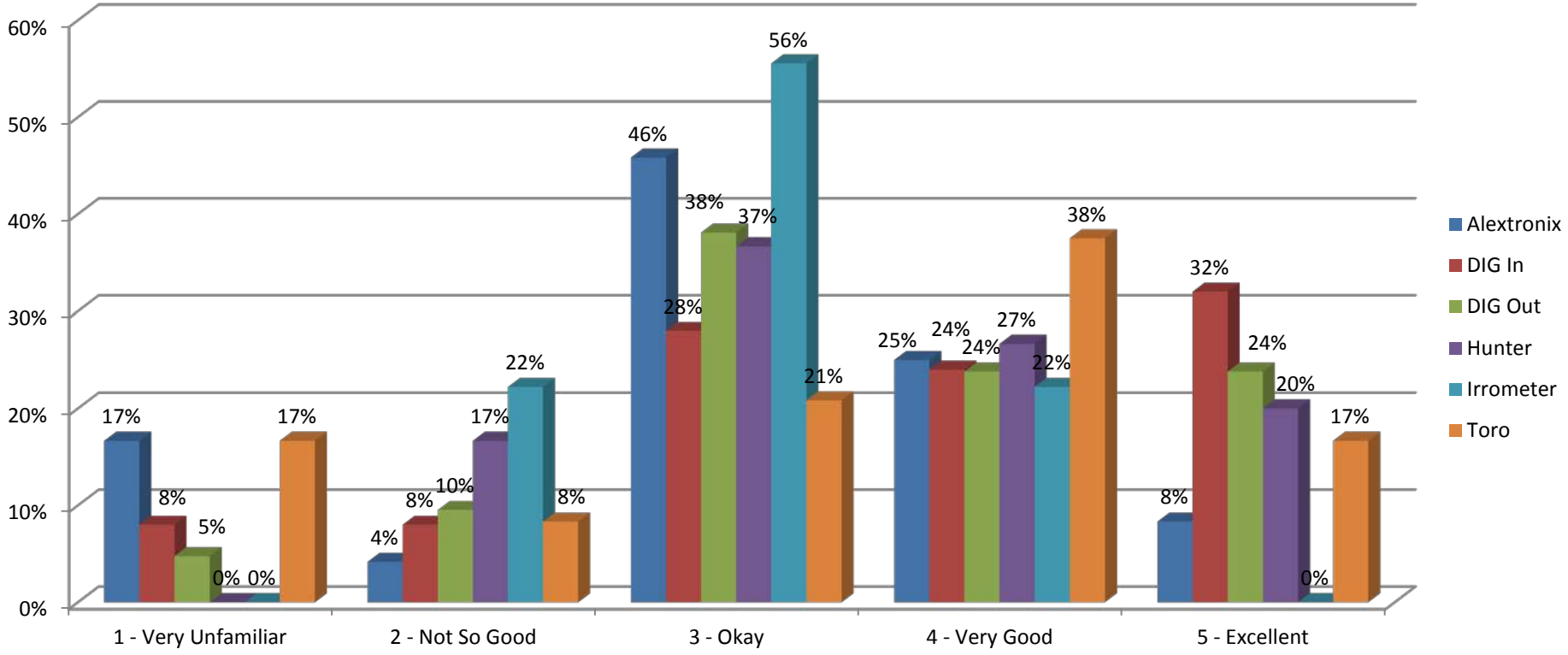
Initial Popularity based on 1st month's requests



Satisfaction Surveys

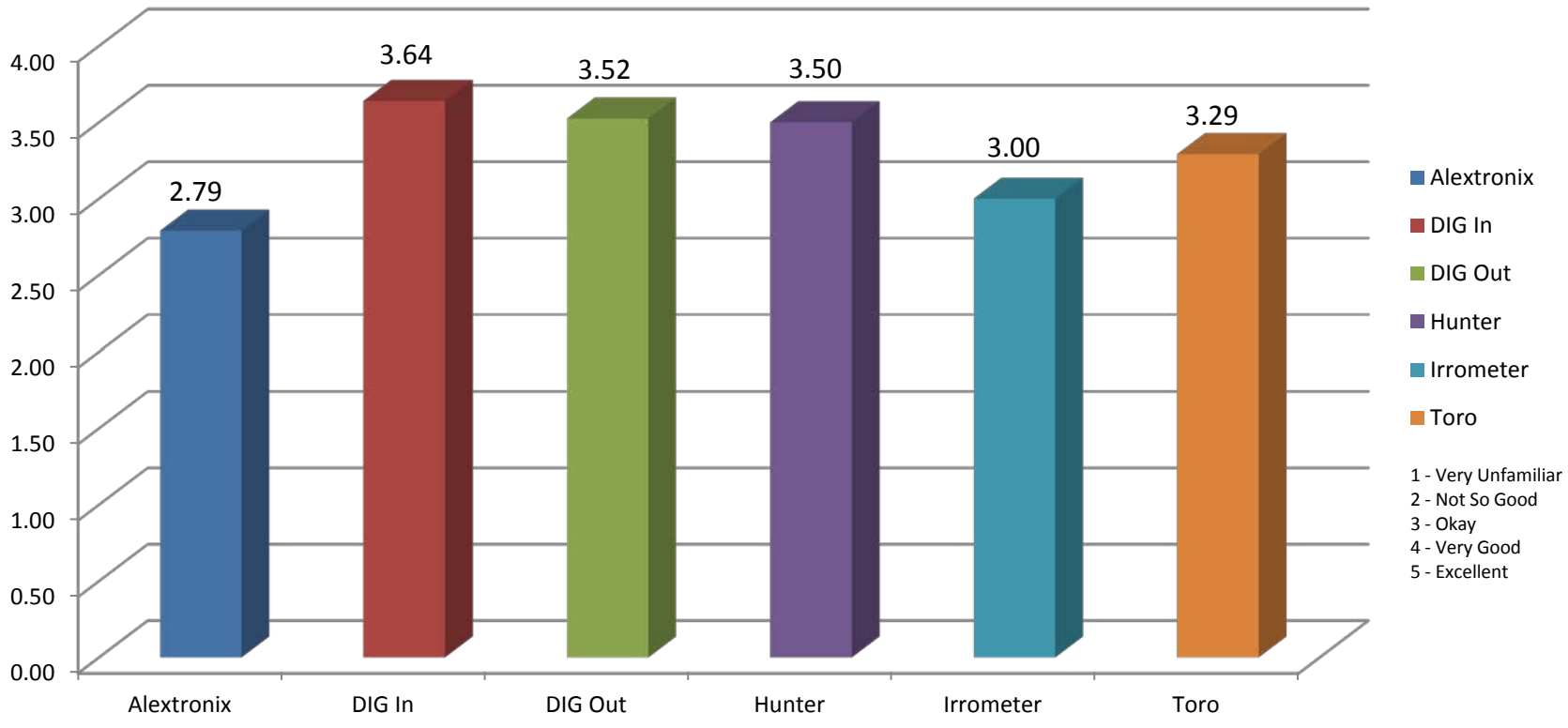
- At the end of 2010 Surveys were mailed out to all currently enrolled participants
  - 357 mailed out
  - 113 returned
  - 32% return rate
- Questions asked respondents to rate device(s), study, and other demographic factors

What Level of Familiarity do you have with the Watering Group Assistant (after a couple years use)?



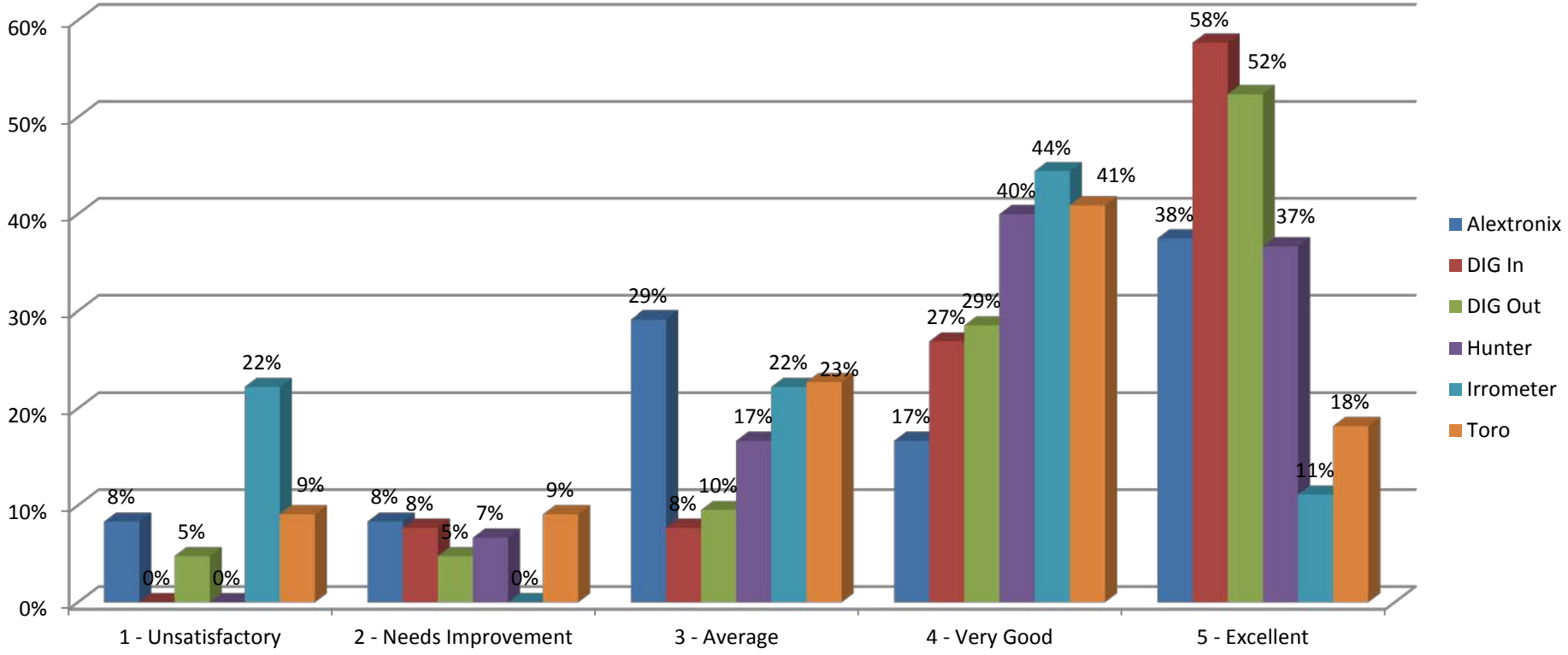
81% at least “Okay” level of Familiarity

Participant Average Familiarity with Watering Group Assistant Rating (after a couple years use)



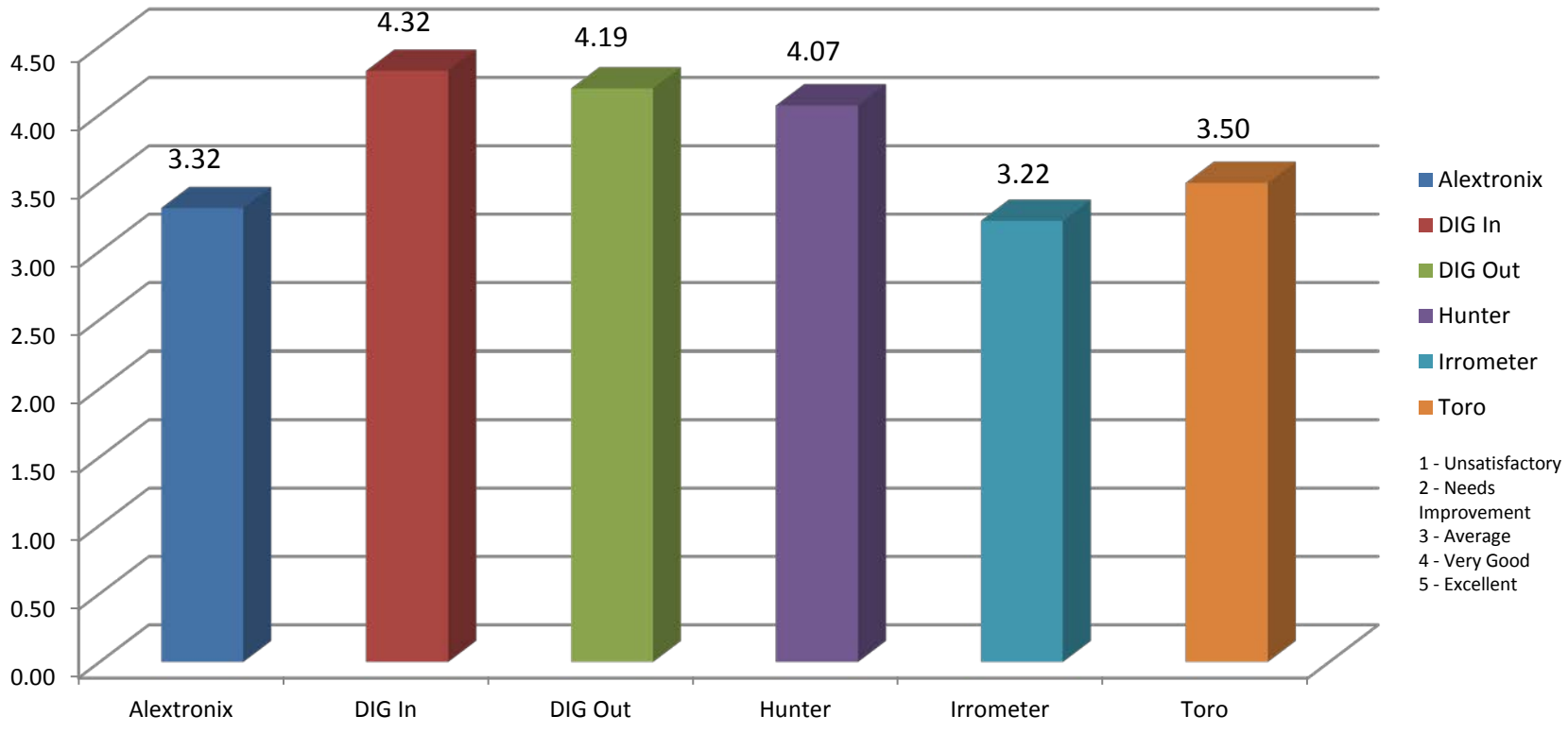
Differences Not Statistically Significant for this sample size

How Satisfied were you with the Watering Group Assistant?



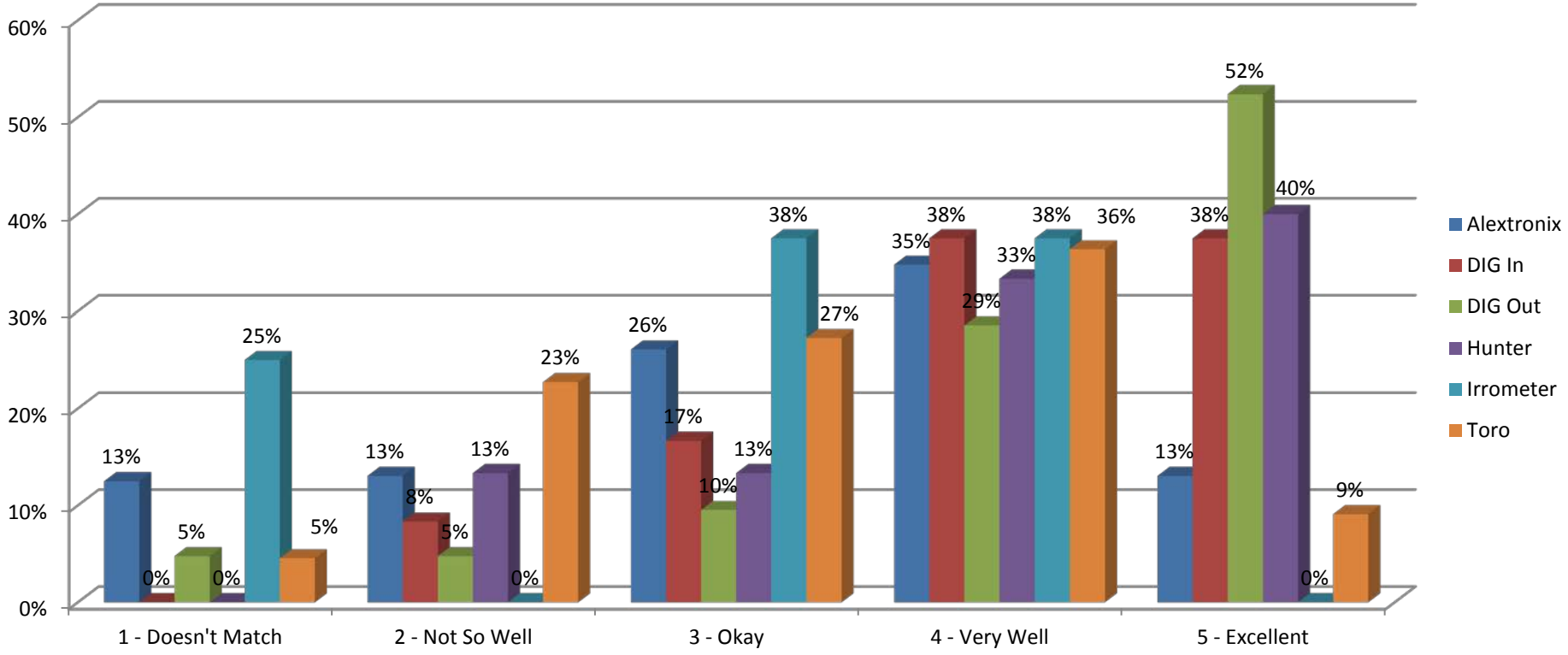
89% at least “Okay” level of Satisfaction

Participants Average Satisfaction with Watering Group Assistant Rating



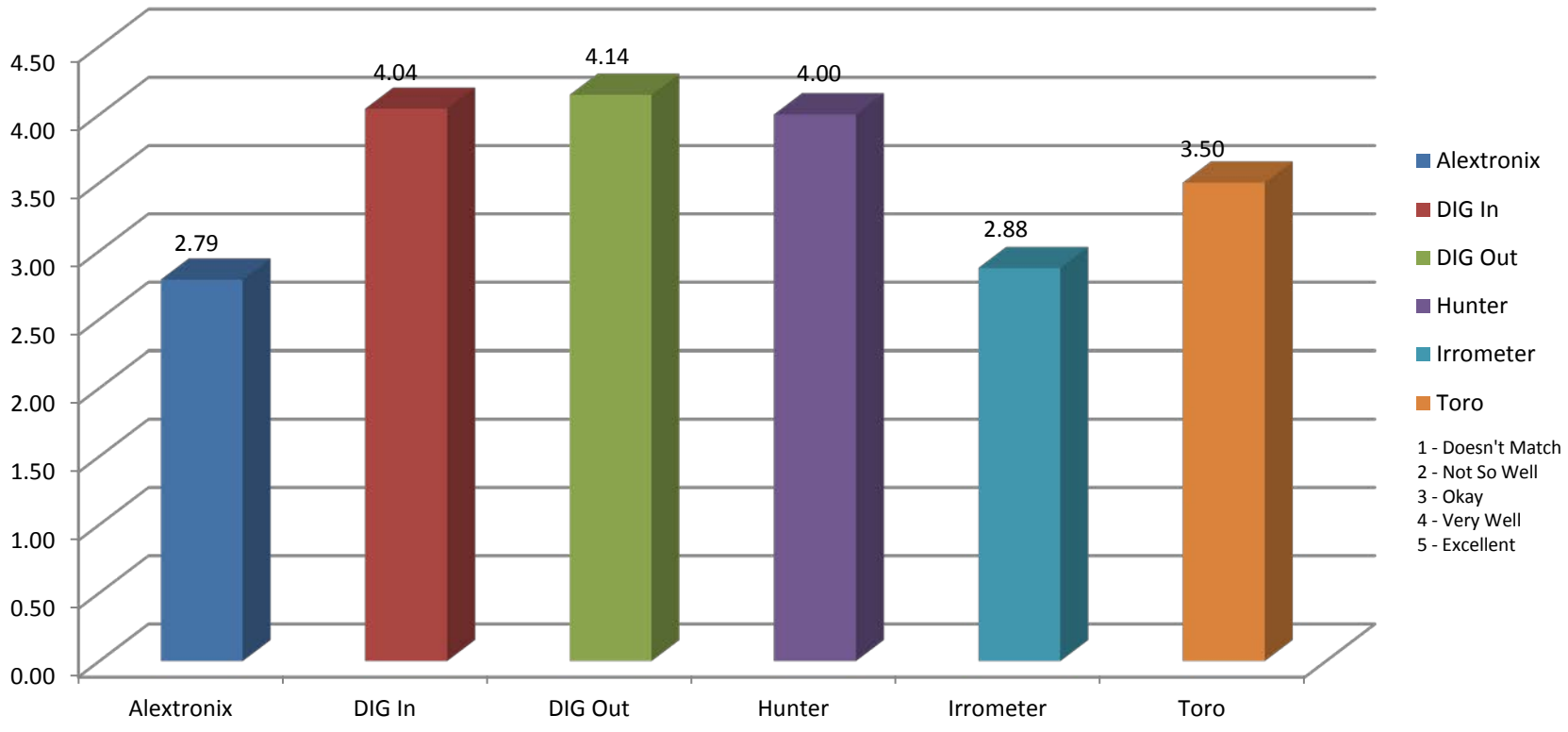
Differences Not Statistically Significant for this sample size

How well do you feel the Watering Group Assistant Matches Water Use with your Landscape?



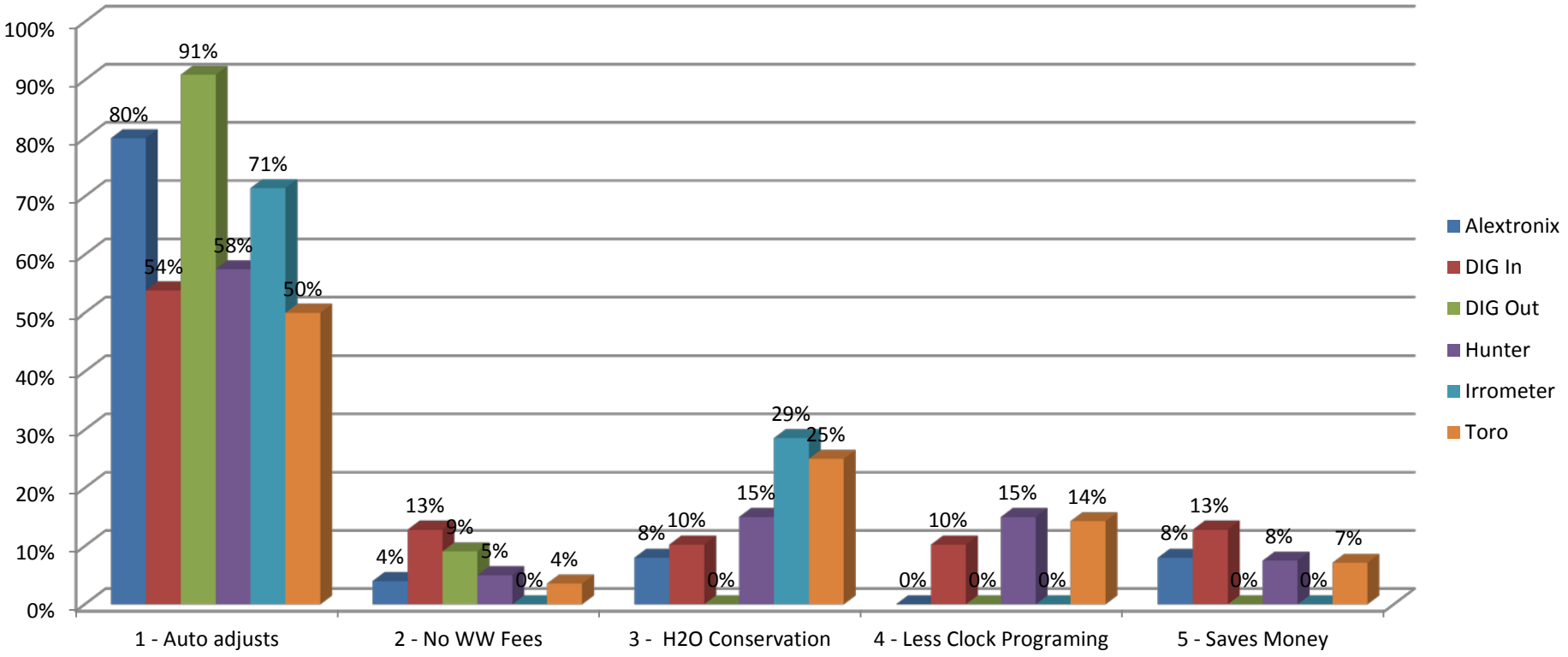
83% at least “Okay” level of Satisfaction

Average Watering Group Assistant Matches Water Use Rating

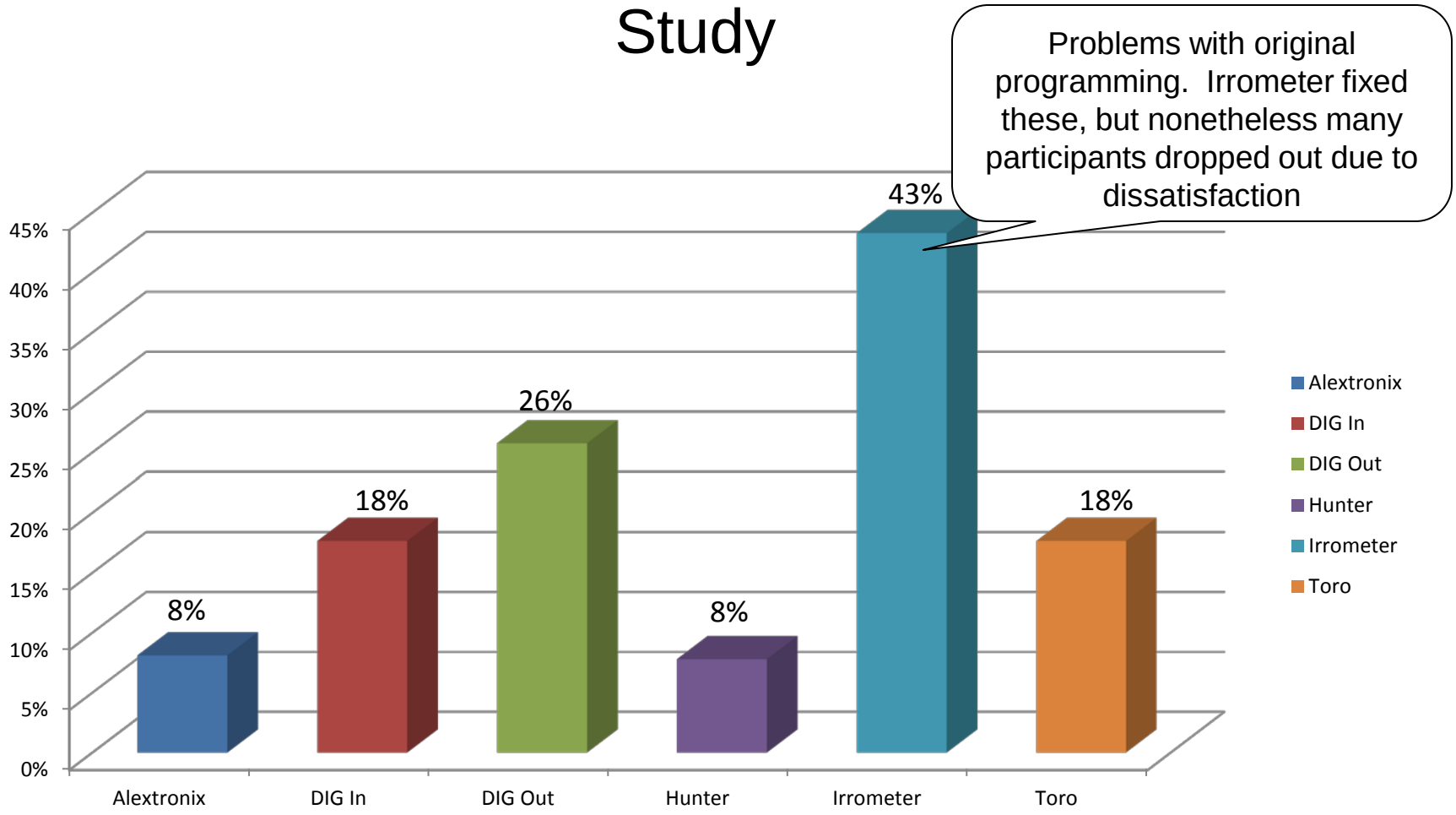


Differences Not Statistically Significant for this sample size

What Benefit do you find Most Pleasing about the Watering Group Assistant?



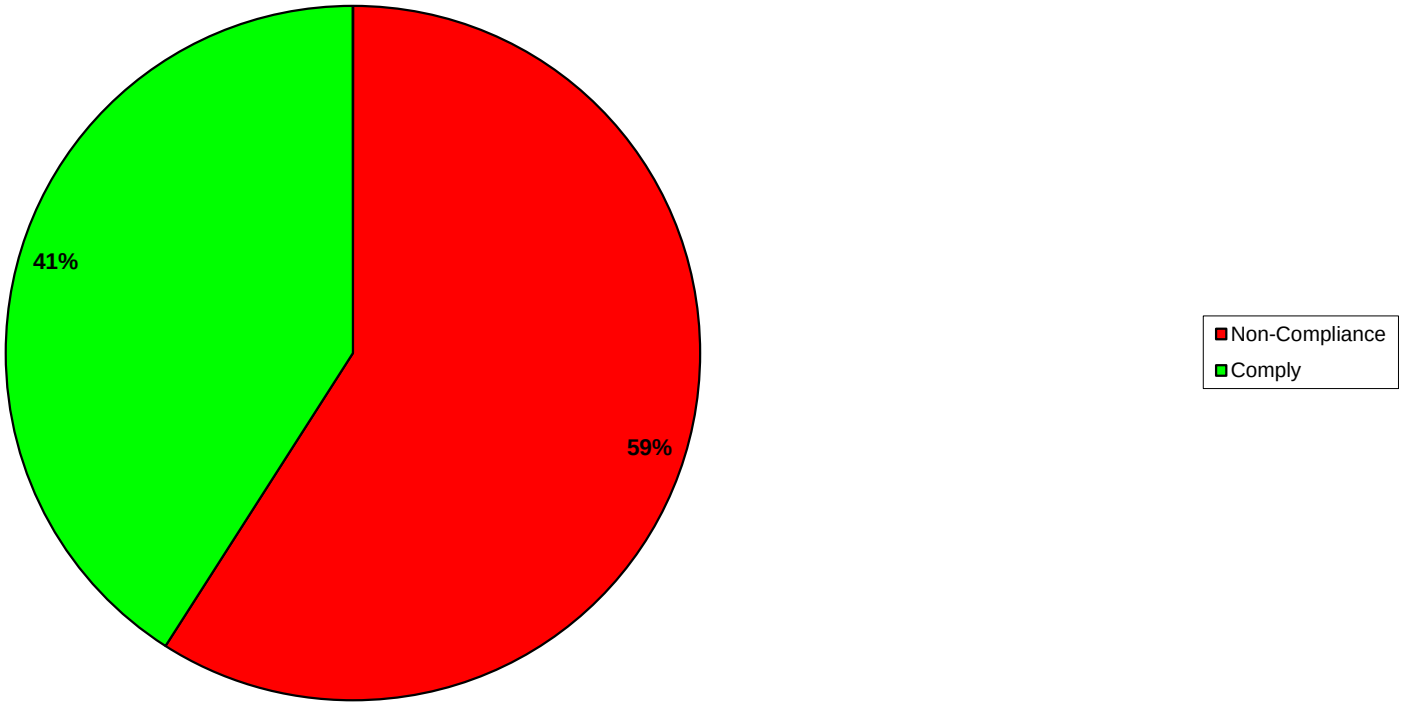
Percentage of Participants that Dropped out of Study



Early Study Group Observations

Fall-Winter Average Day-Of Week Compliance - Examination of 30 Days *before* installation

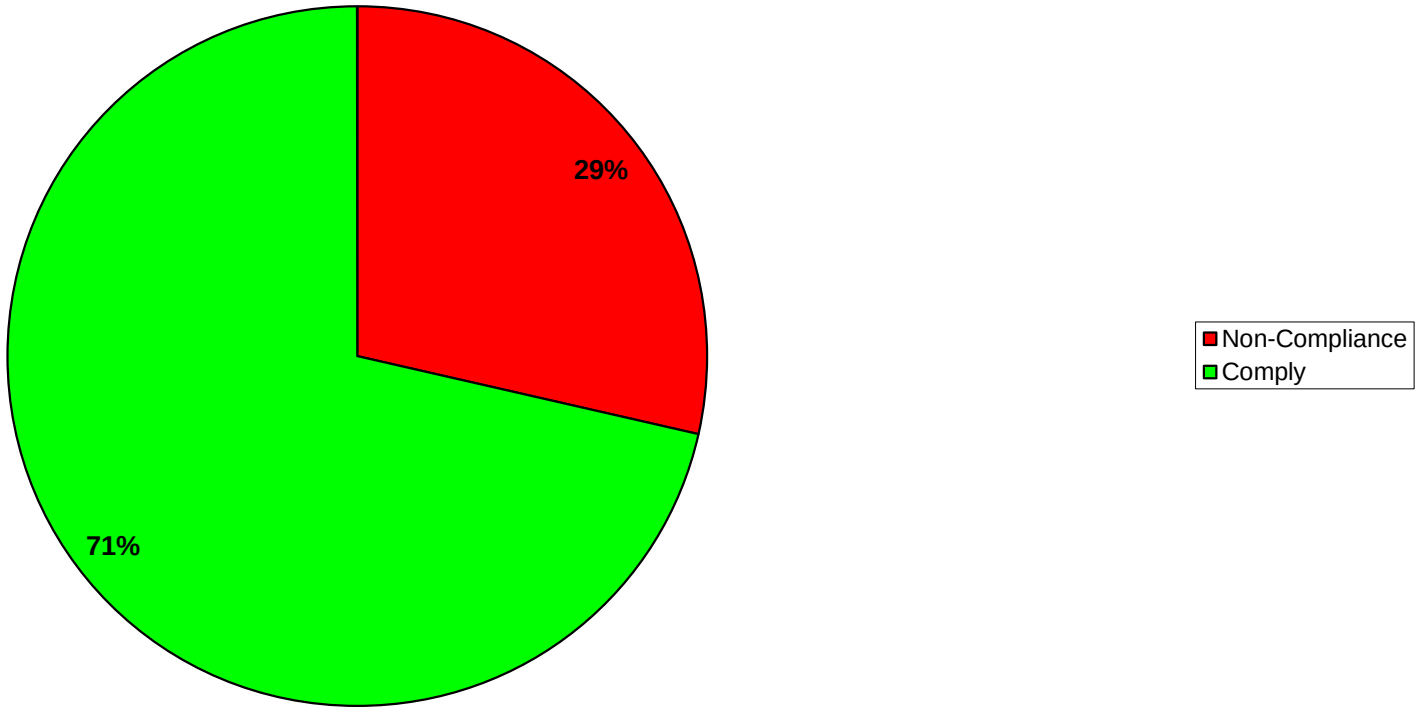
Sample Size = 105



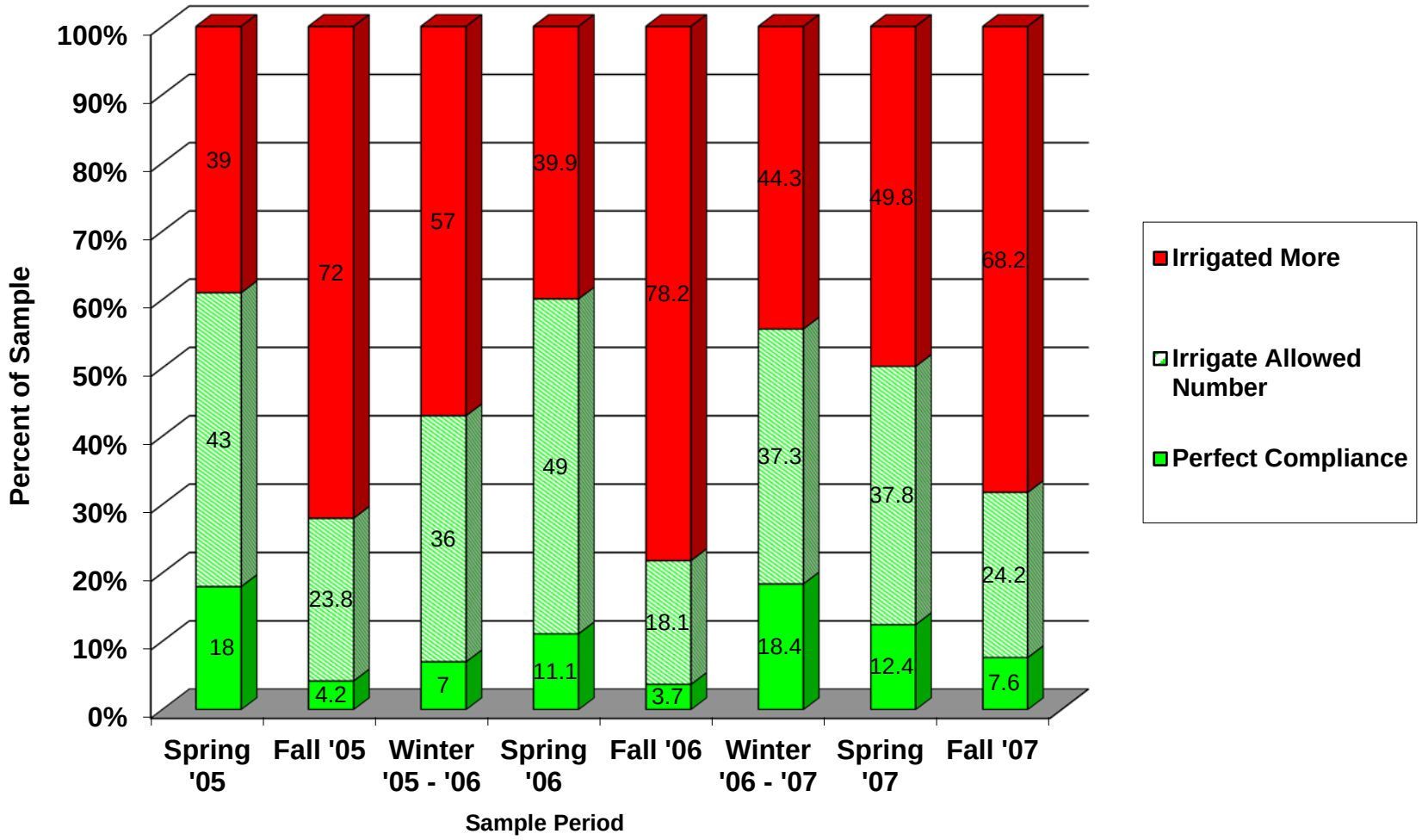
Early Study Group Observations

Fall-Winter Average Day-Of Week Compliance - Examination of 30 Days *after* installation

Sample Size = 105



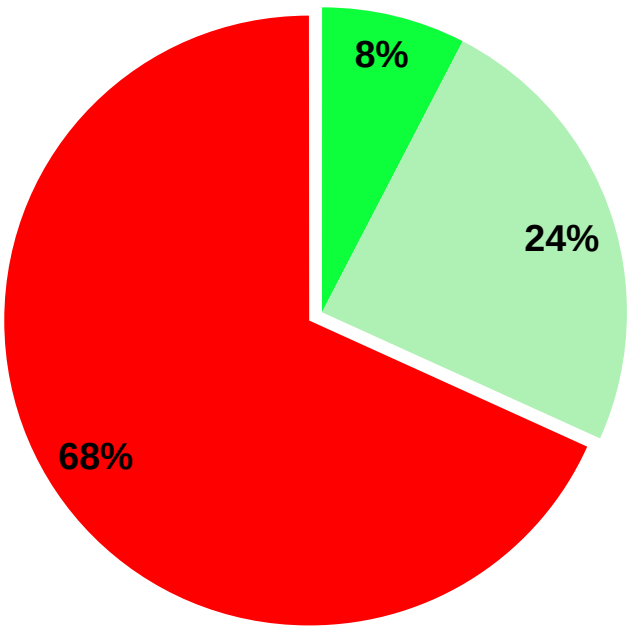
Historical Watering Day Restriction Compliance



Compliance Rates for Day of Week Restrictions Historical vs. Watering Group Assistant (WGA)

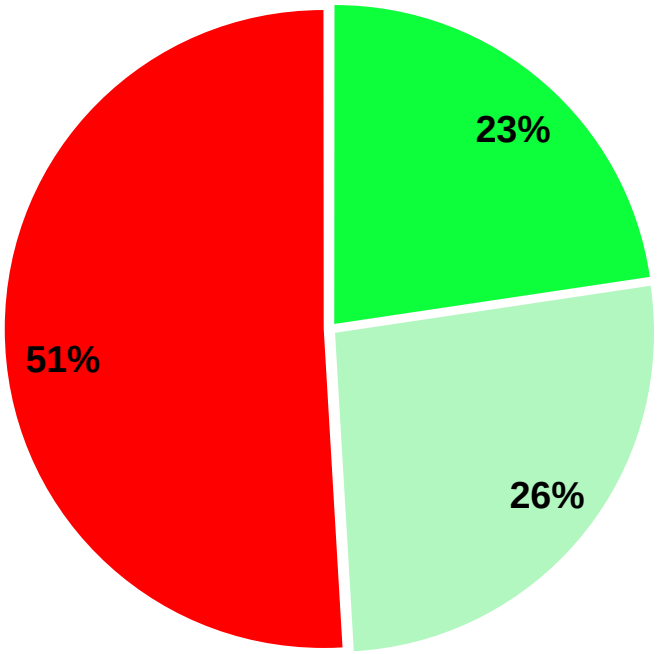
Historical

n=236



WGA Fall 2008

n = 53



- Complete Comply
- Averaged Allowed Days
- Averaged More Than Allowed

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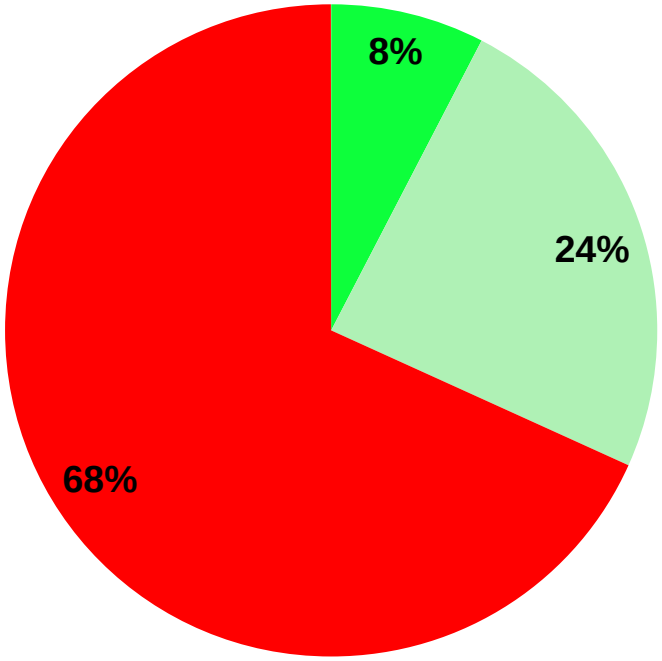
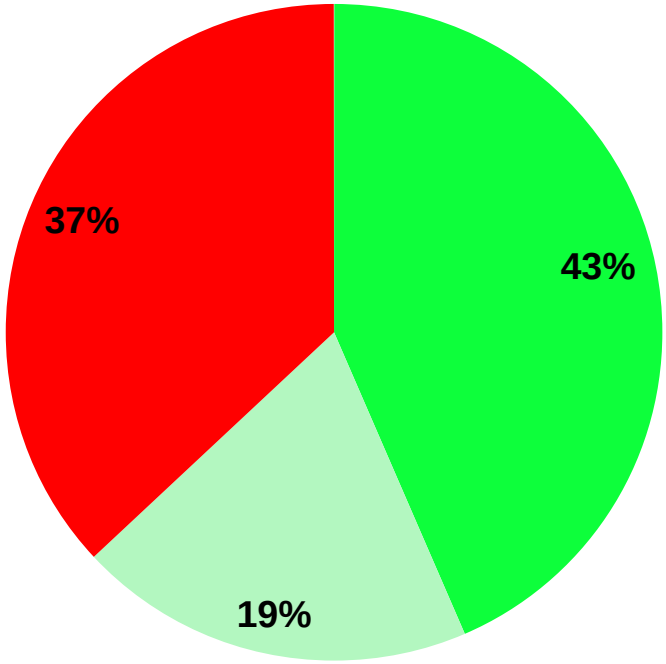
Historical

n=236



WGA Fall 2009

n = 139



- Complete Comply
- Averaged Allowed Days
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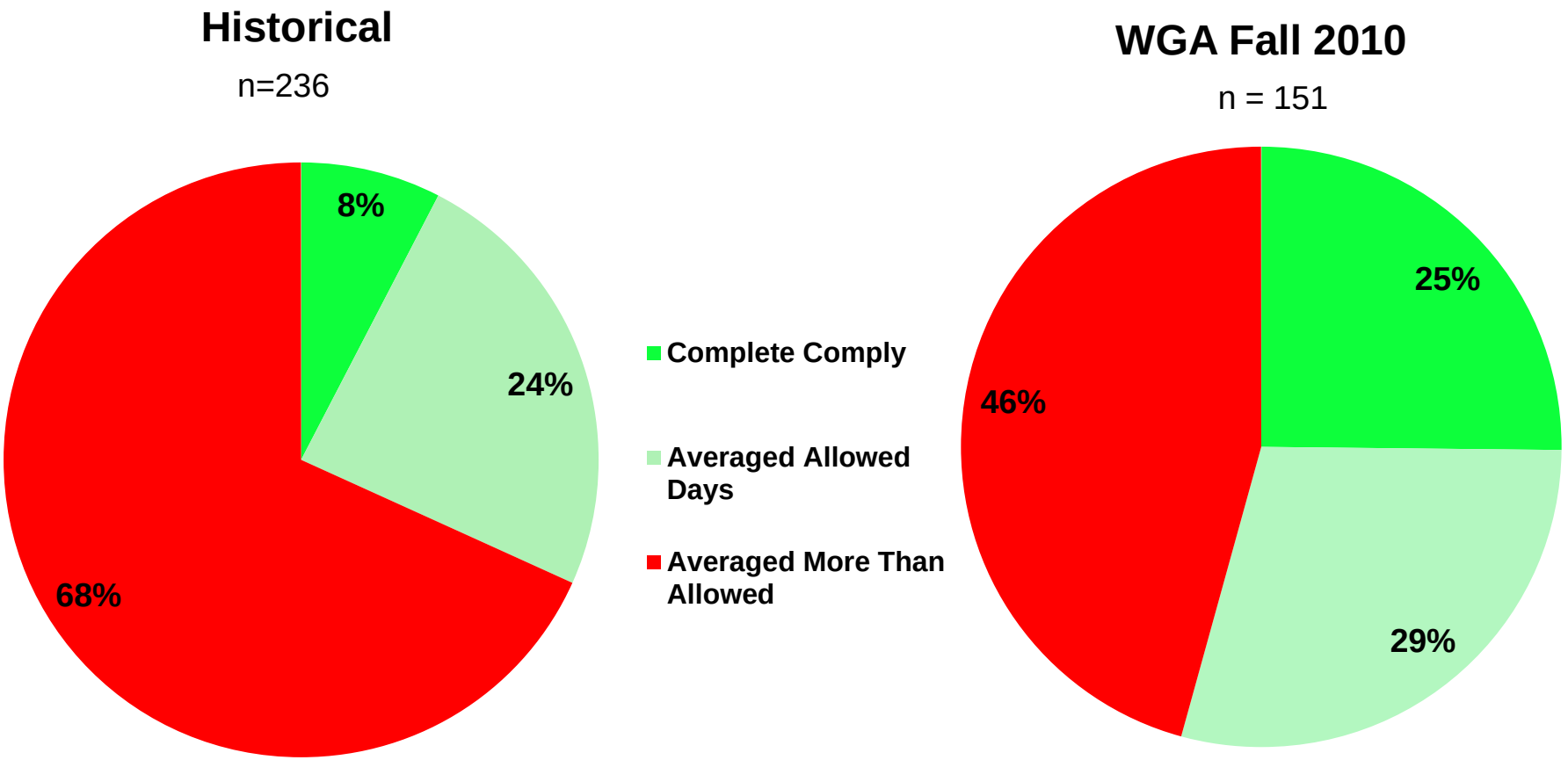
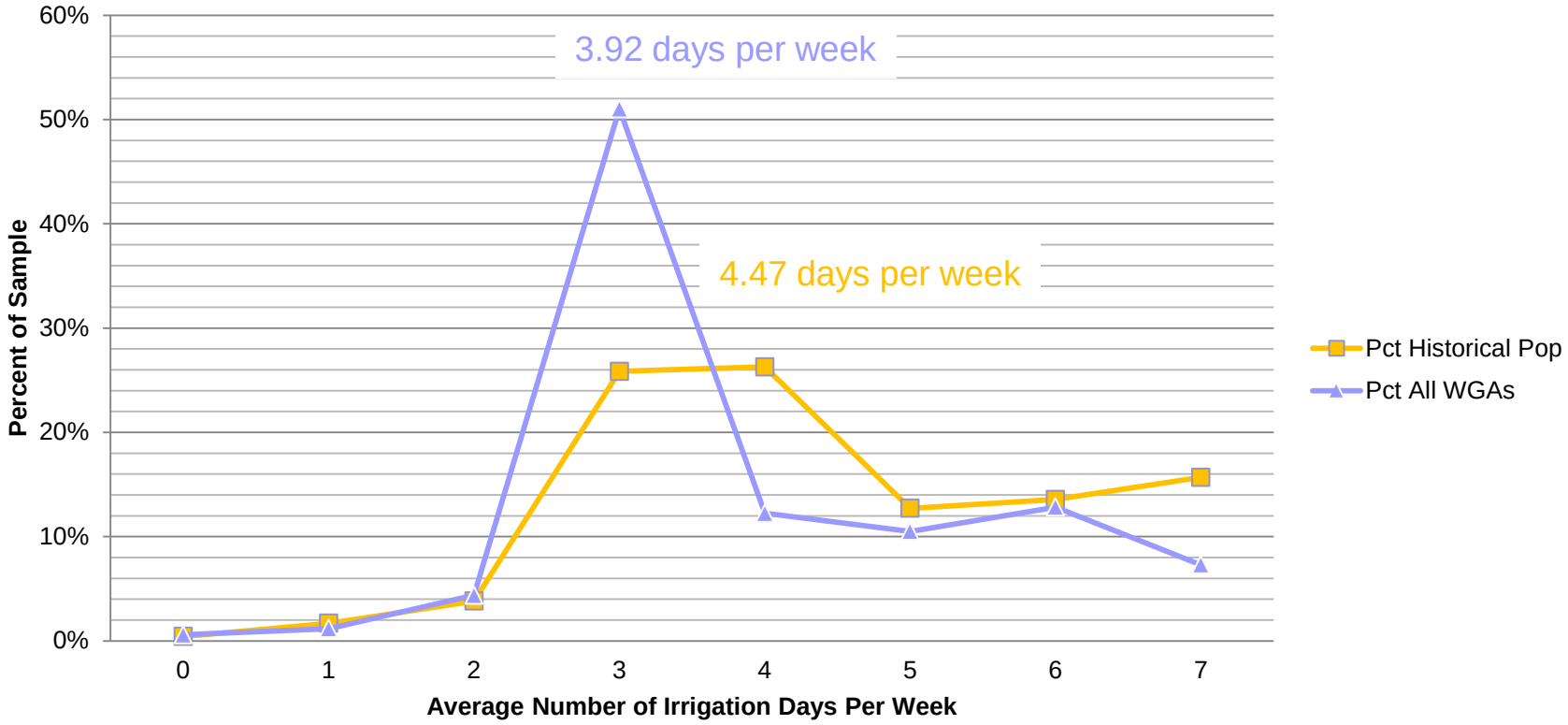
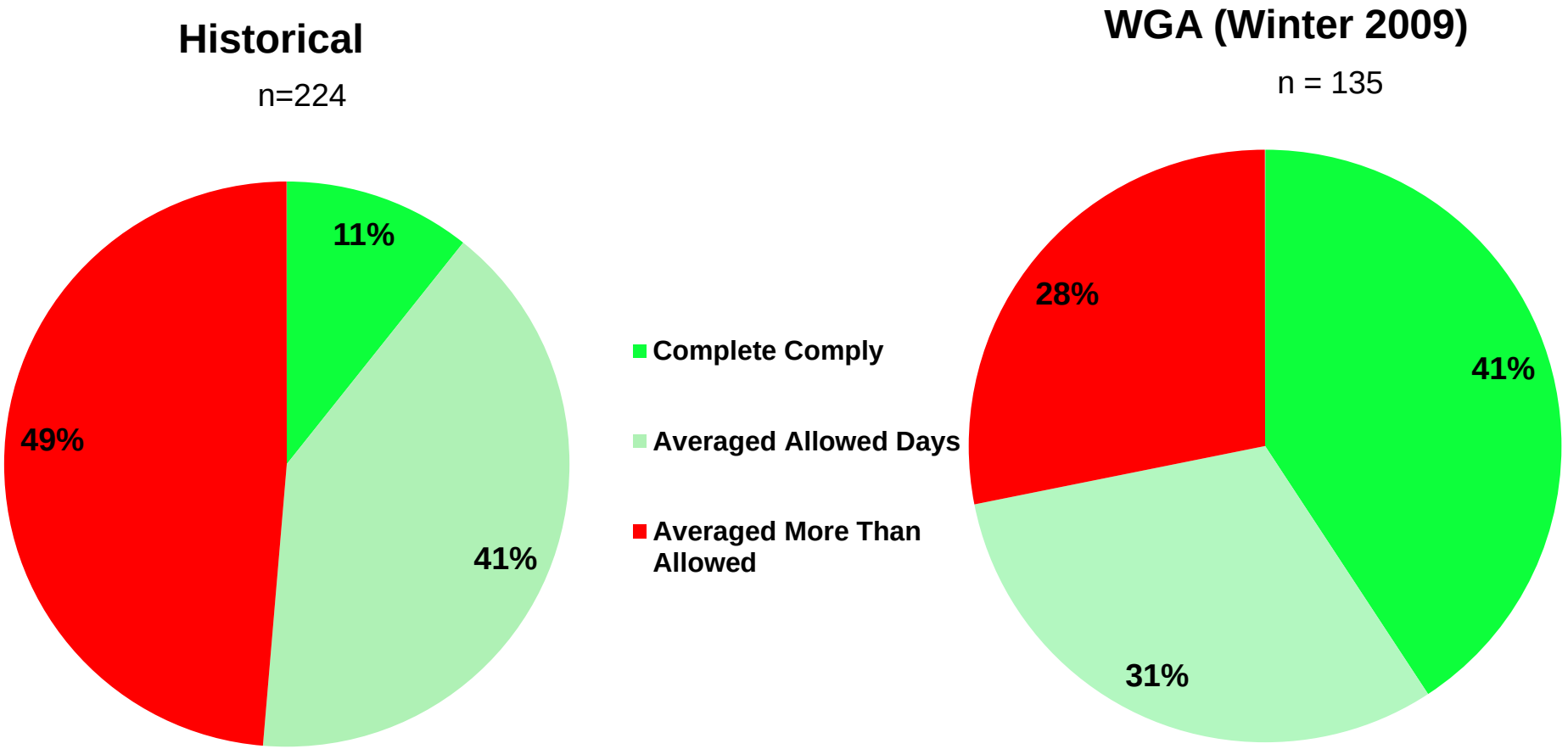
Compliance Rates for Day of Week Restrictions Historical vs. Watering Group Assistant (WGA)



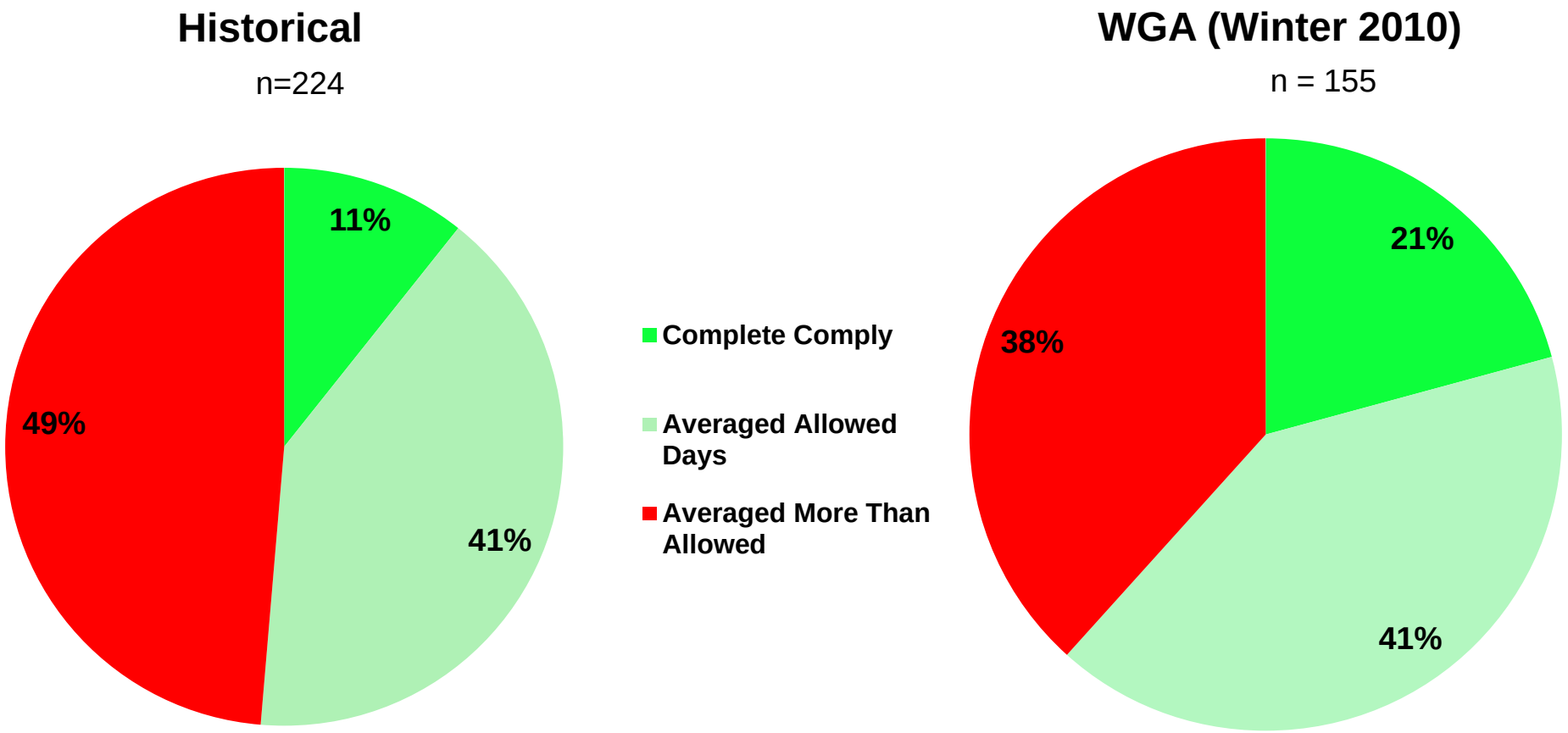
Average number of Irrigation Days per week – Fall



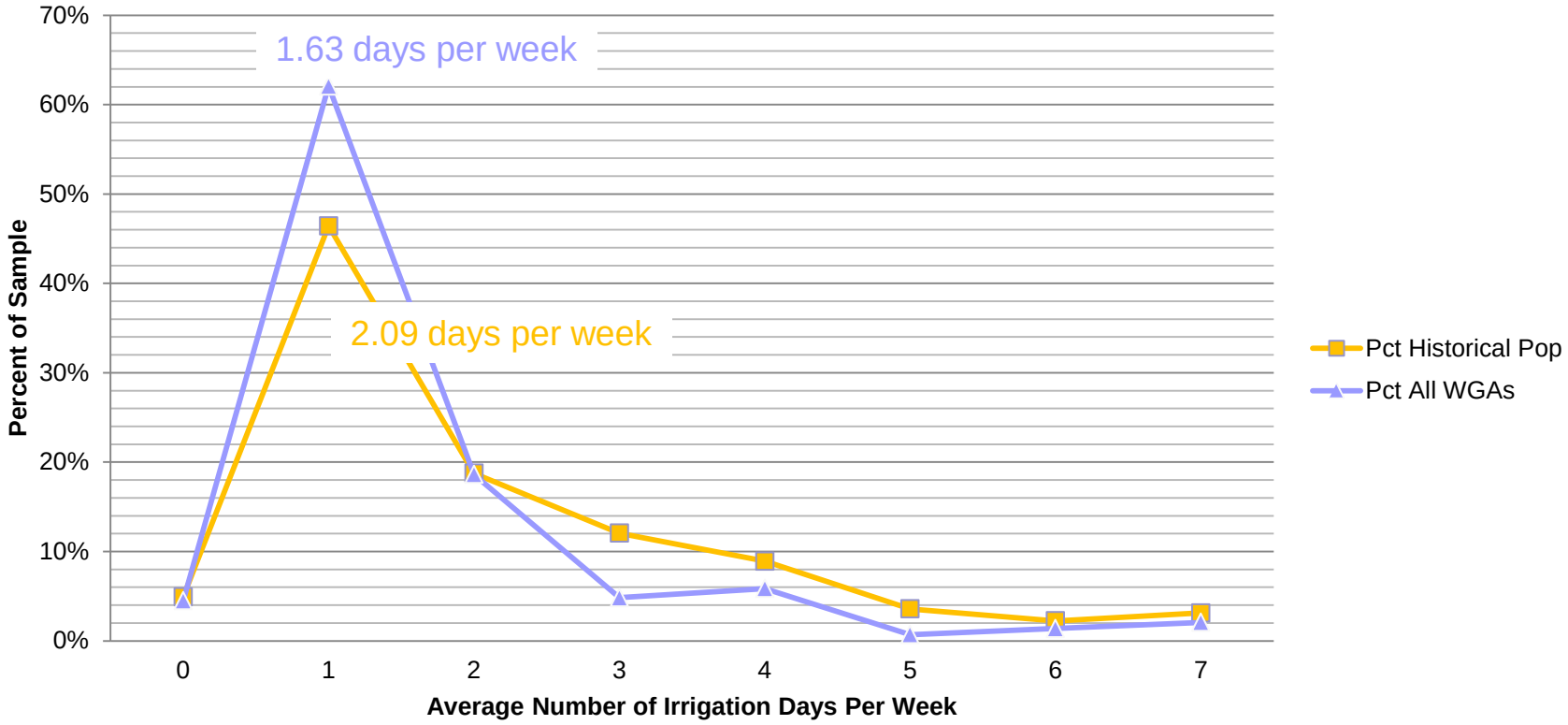
Compliance Rates for Day of Week Restrictions Historical vs. Watering Group Assistant (WGA)



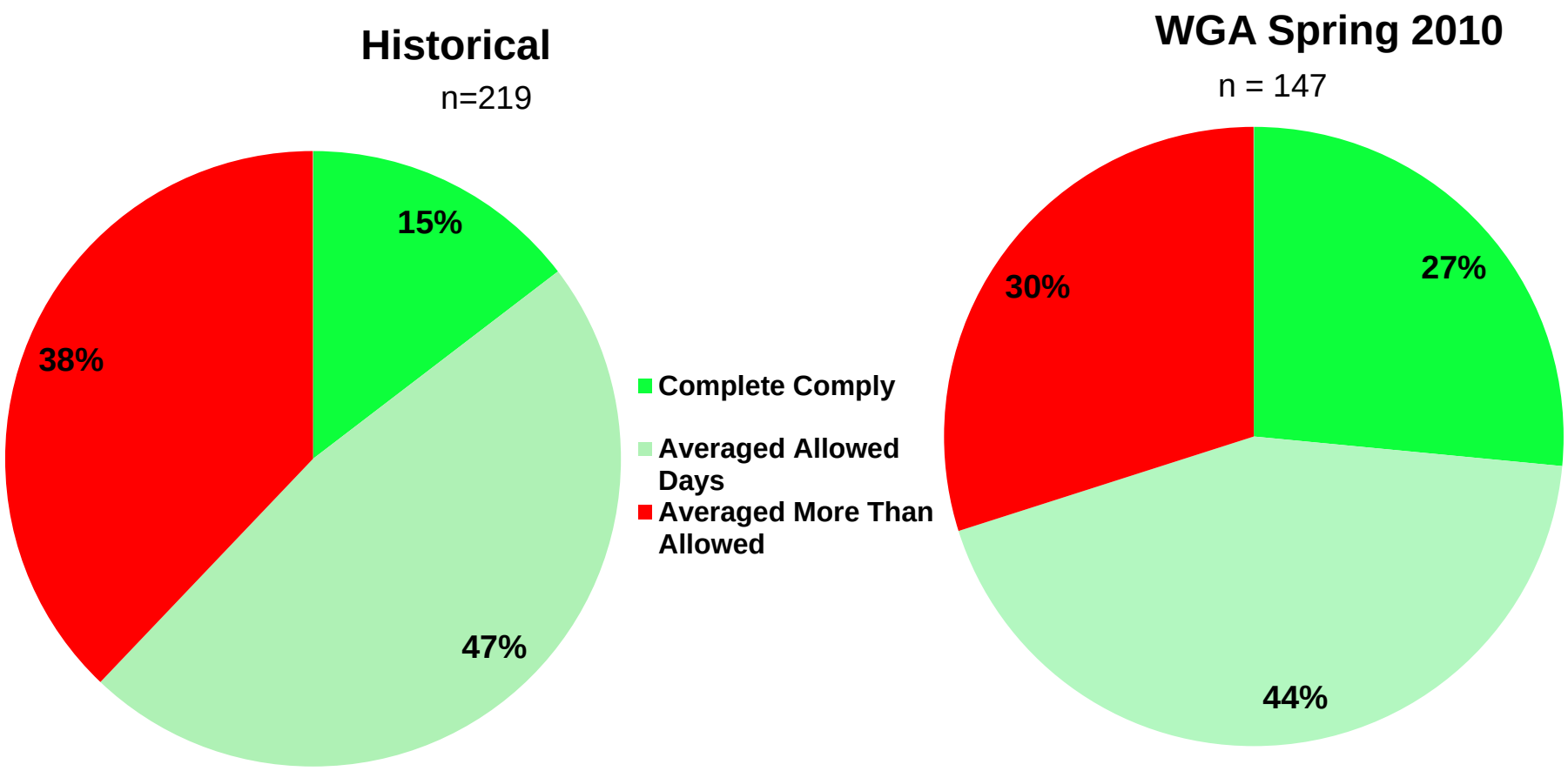
Compliance Rates for Day of Week Restrictions Historical vs. Watering Group Assistant (WGA)



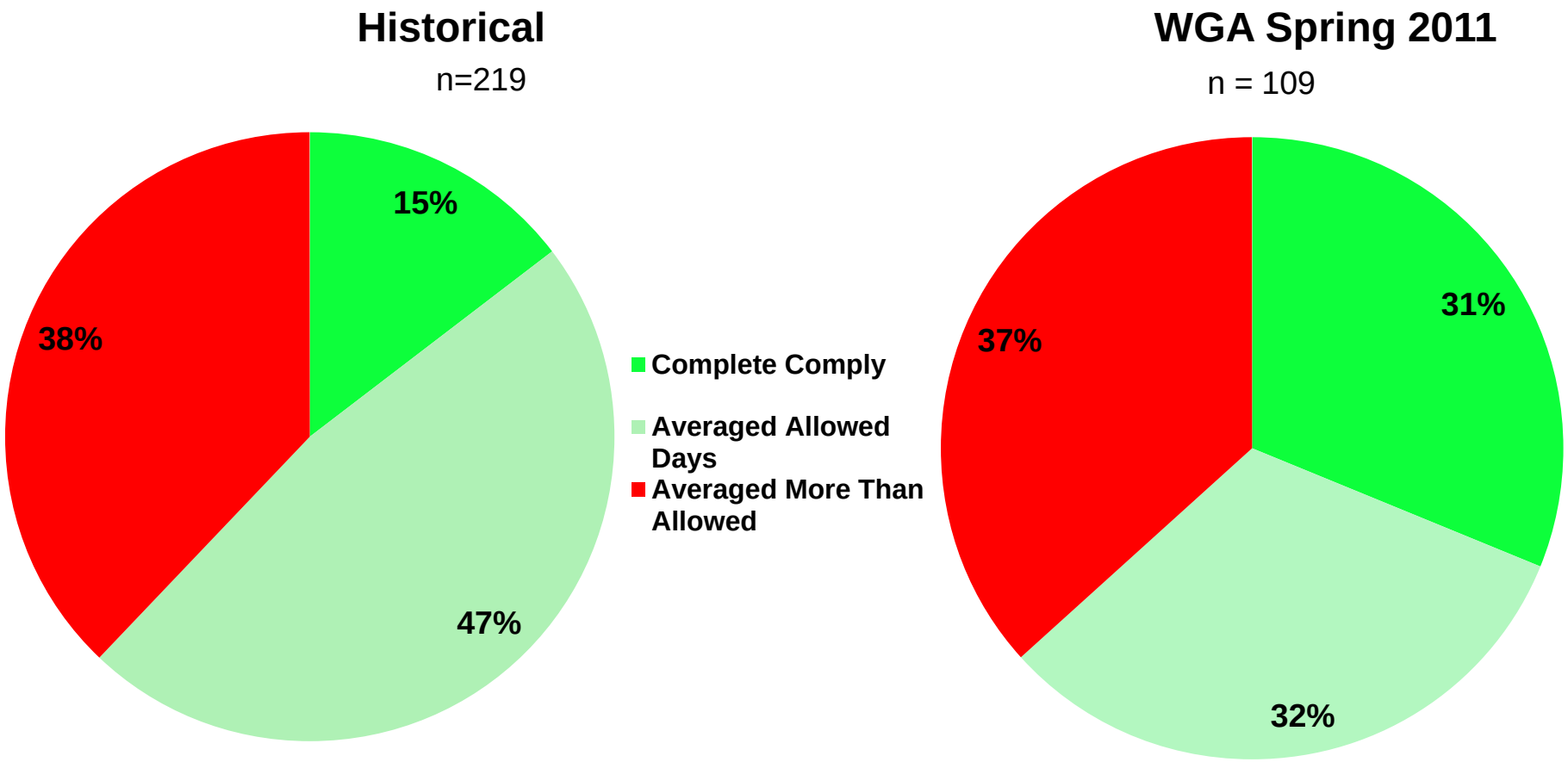
Average number of Irrigation Days per week – Winter



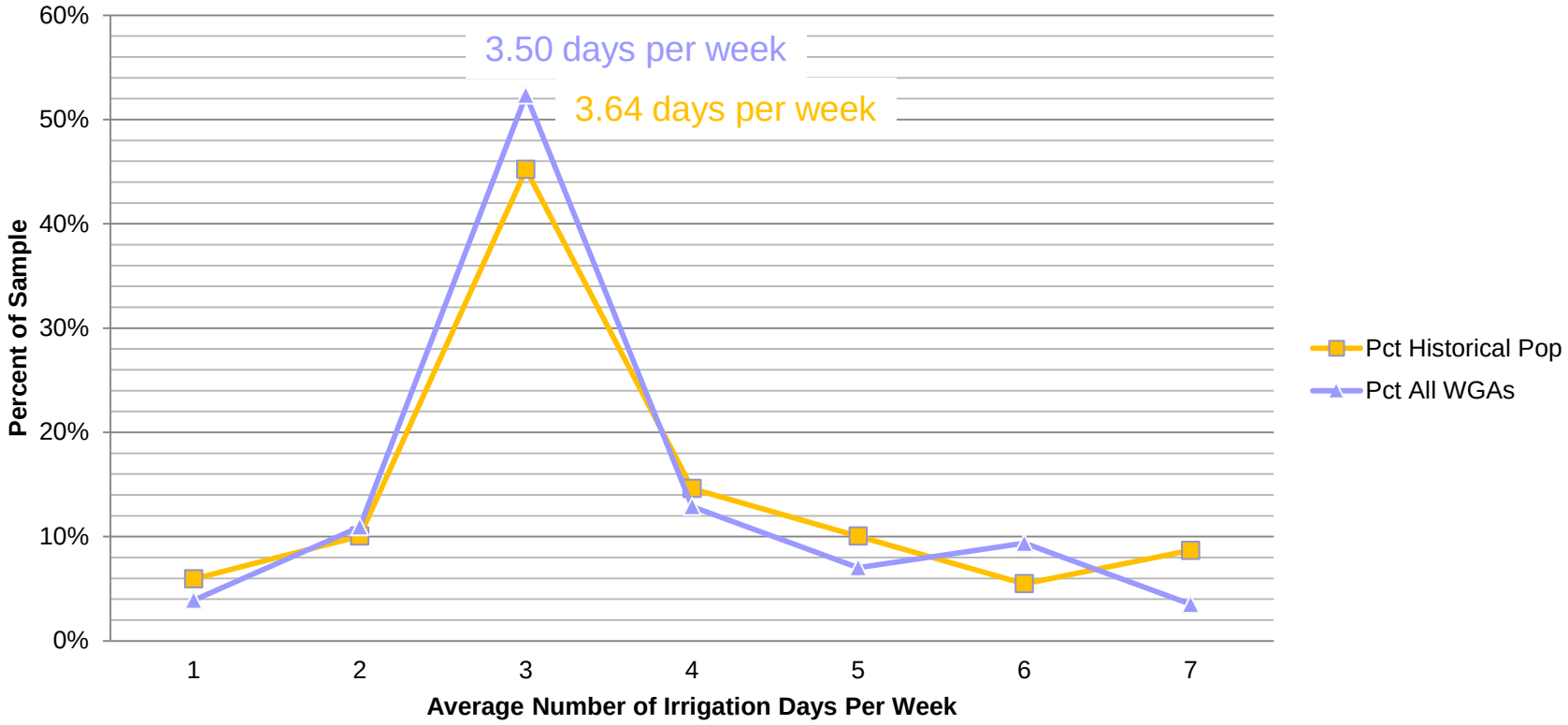
Compliance Rates for Day of Week Restrictions Historical vs. Watering Group Assistant (WGA)



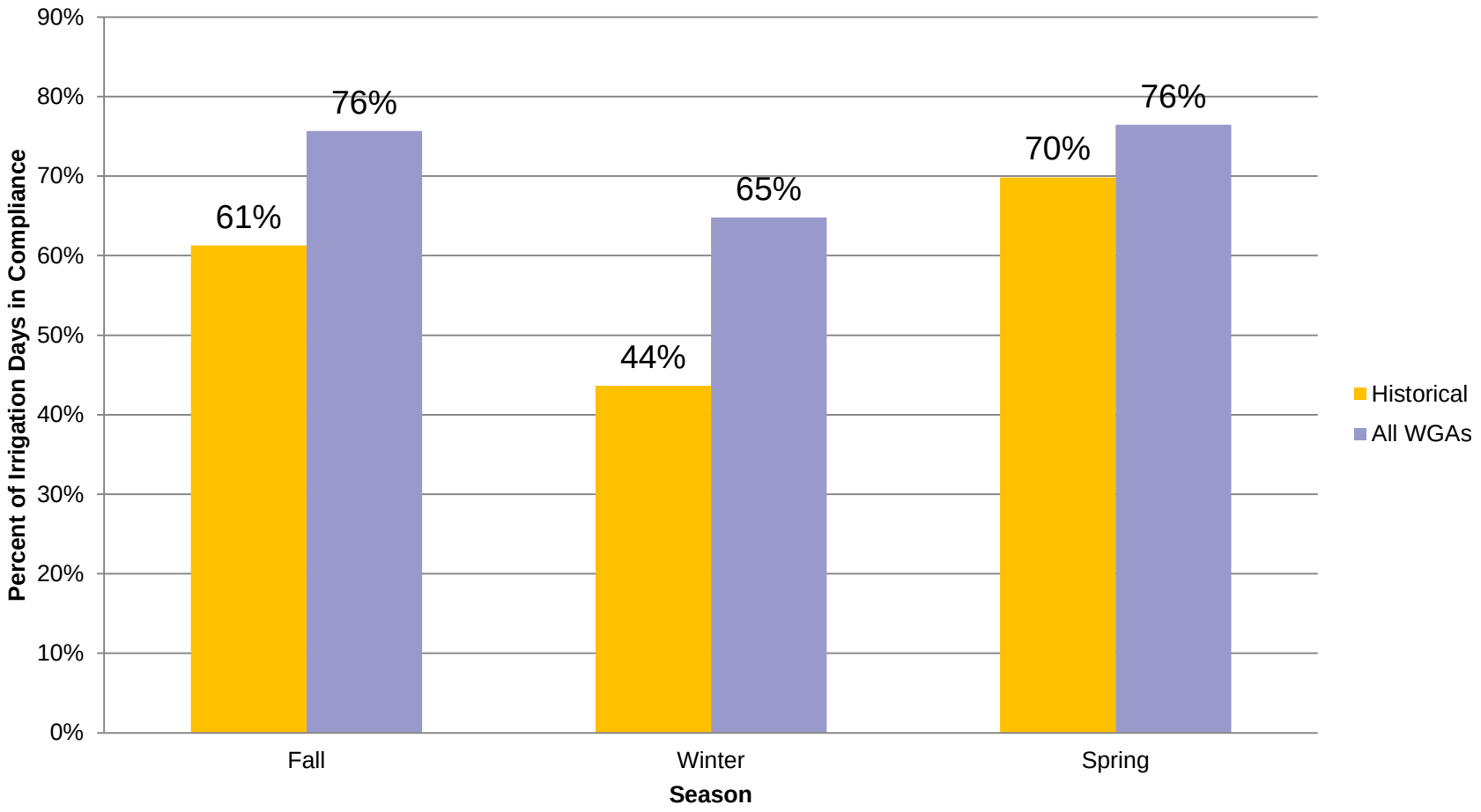
Compliance Rates for Day of Week Restrictions Historical vs. Watering Group Assistant (WGA)



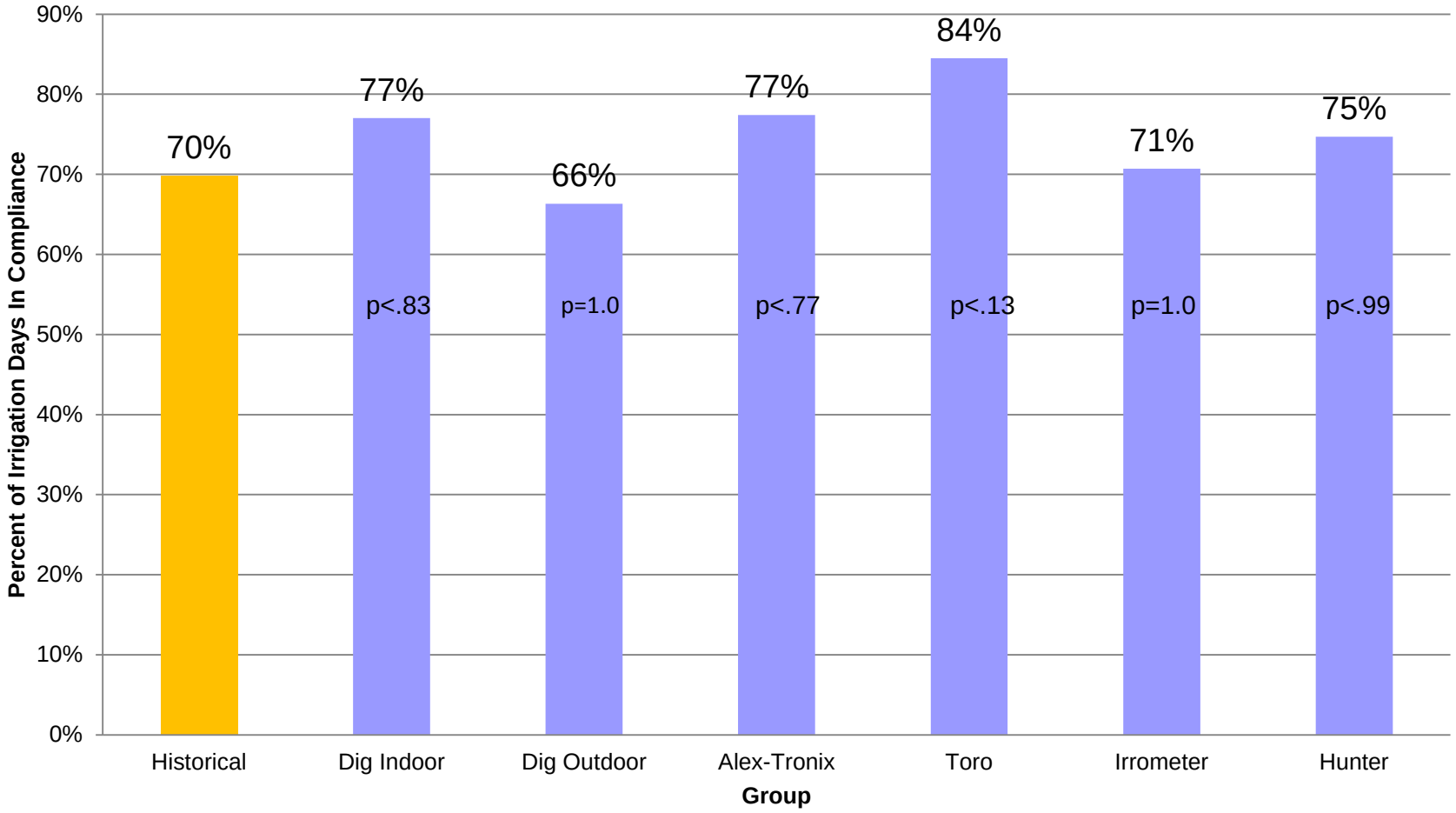
Average number of Irrigation Days per week – Spring



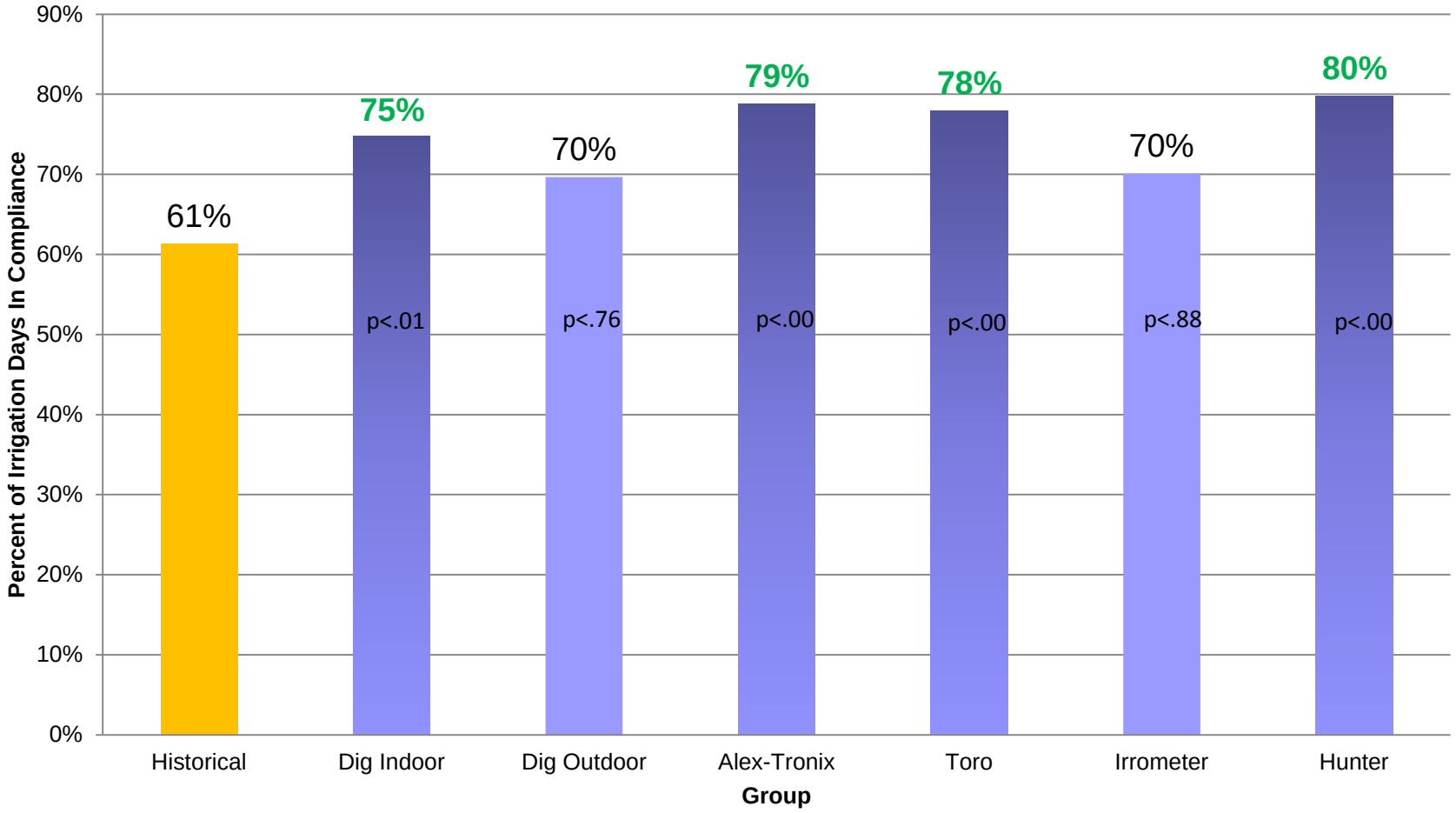
Compliance Rates for Day of Week Restrictions By Season Historical vs. All WGAs



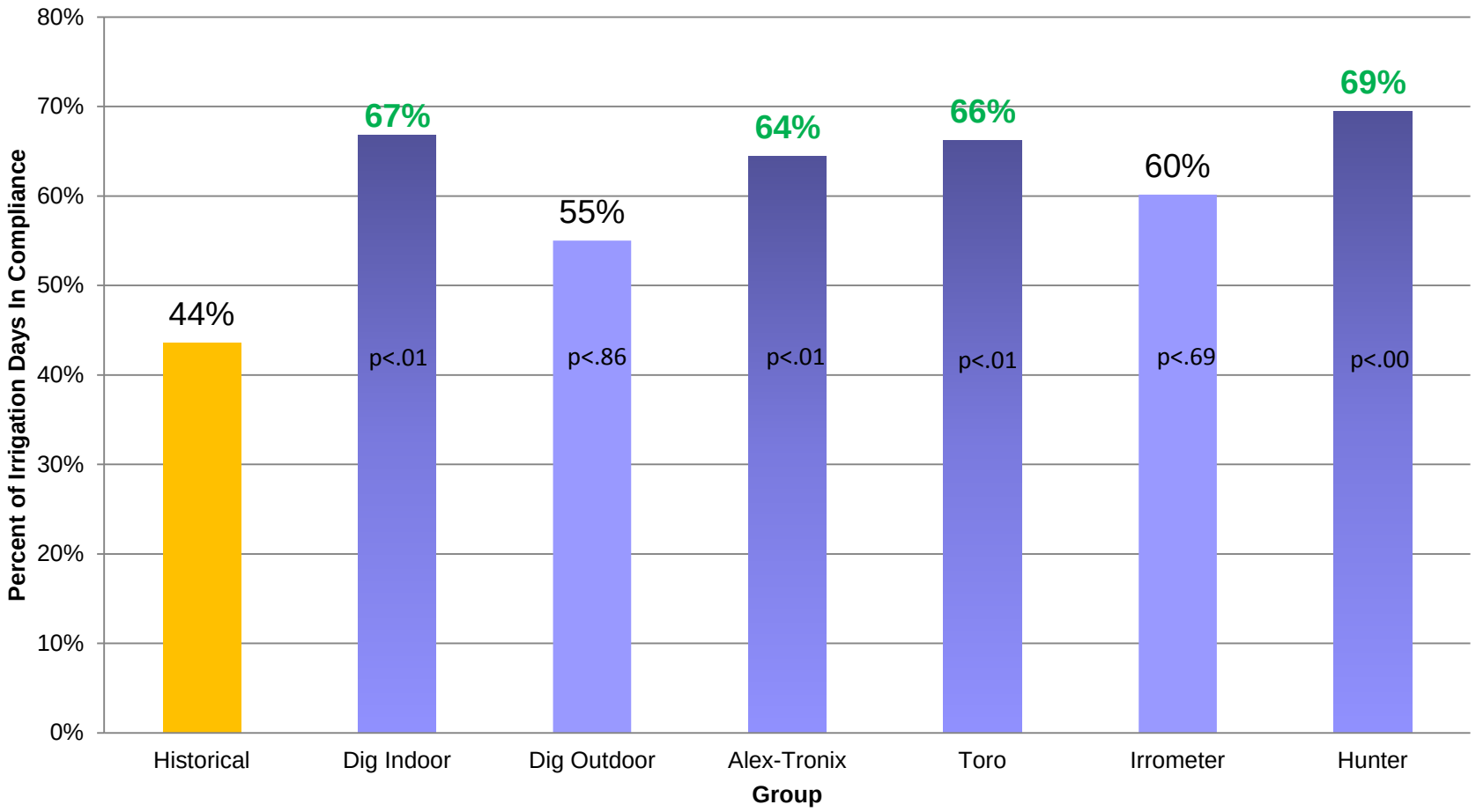
Compliance Rates for Day of Week Restrictions By Season Historical vs. Each WGA for Spring (green denotes statistically significant improvement relative to historical)



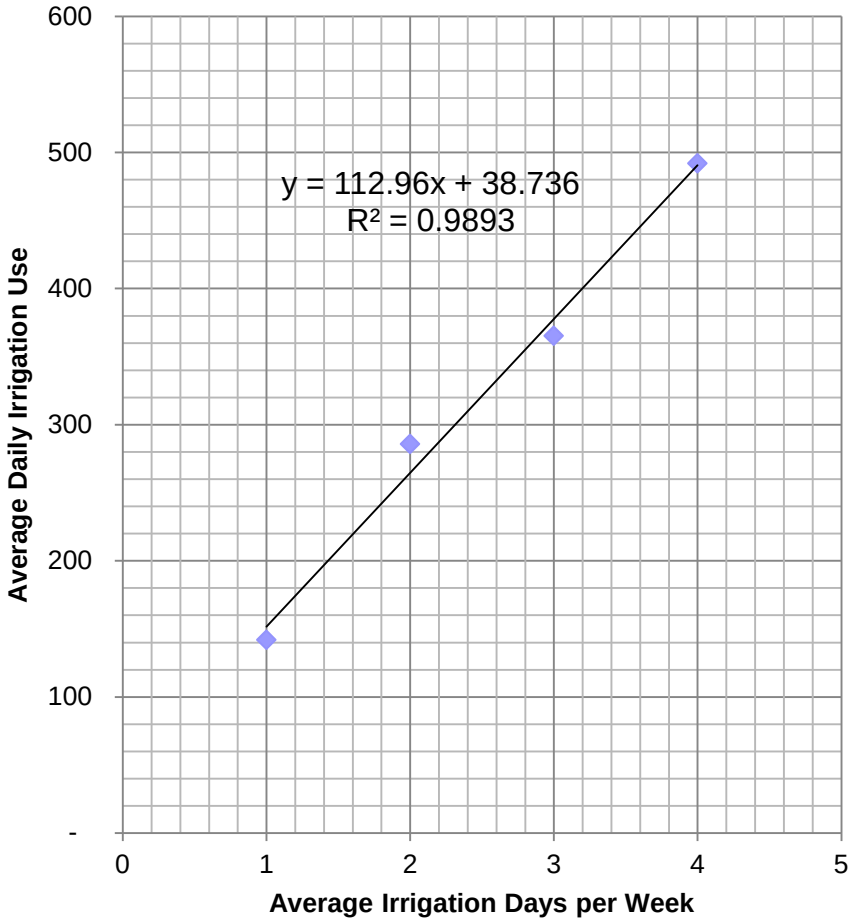
Compliance Rates for Day of Week Restrictions By Season Historical vs. Each WGA for Fall (green denotes statistically significant improvement relative to historical)



Compliance Rates for Day of Week Restrictions By Season Historical vs. Each WGA for Winter (green denotes statistically significant improvement relative to historical)



WGA Water Savings Calculation - Winter



- Historical Irrigation Days per Week = 2.09
- WGA Group Irrigation Days per Week = 1.63
- This represents a savings of 51.4 gallons per day.
- 51.4 X 120 days = 6165 gallons for Winter.

WGA Water Savings Calc

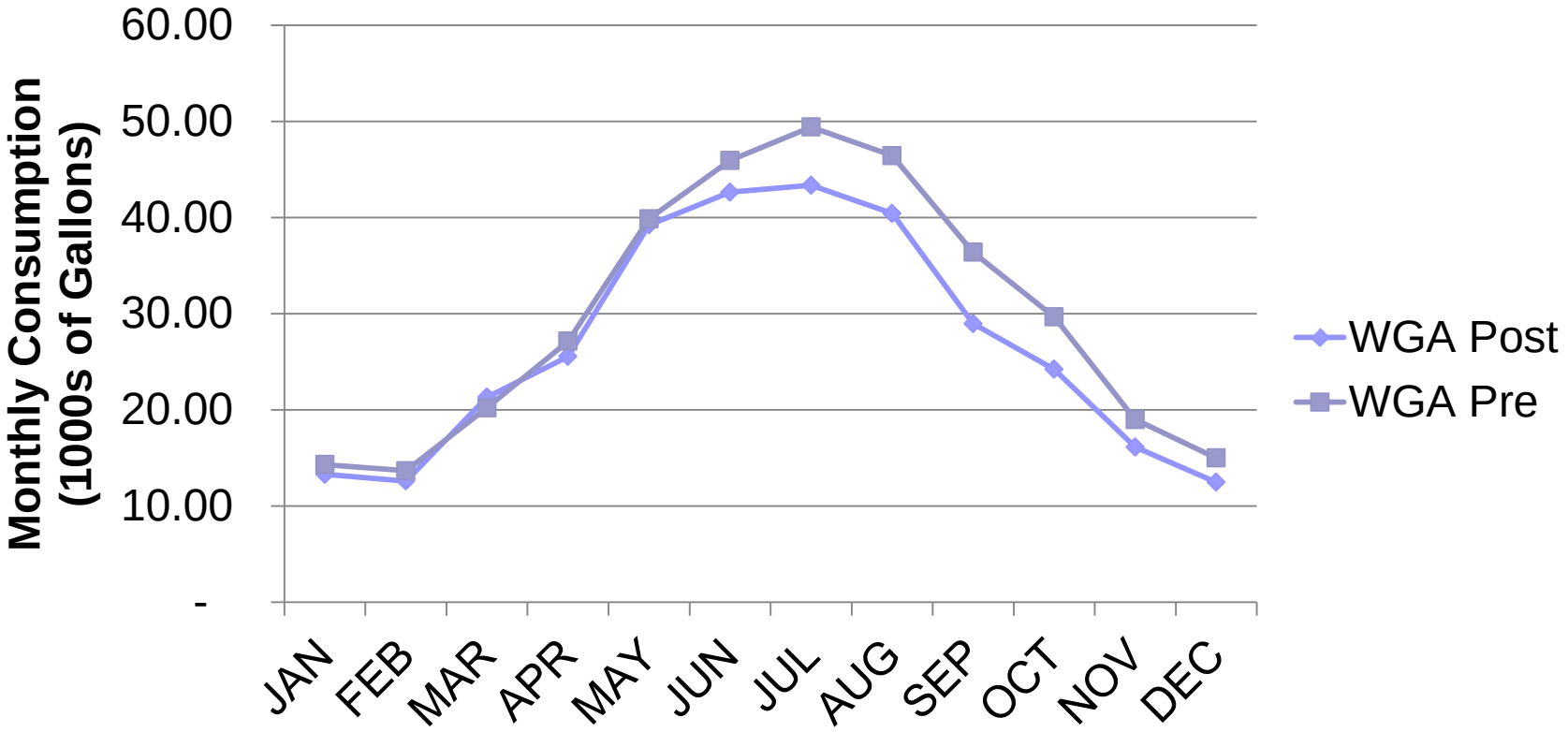
- Savings:
  - 1047 gallons per home average in Spring.
  - 6355 gallons per home average in Fall.
  - 6165 gallons per home average in Winter.

Potential Savings = 12,520 to 13,567 gallons per Home/YR on average

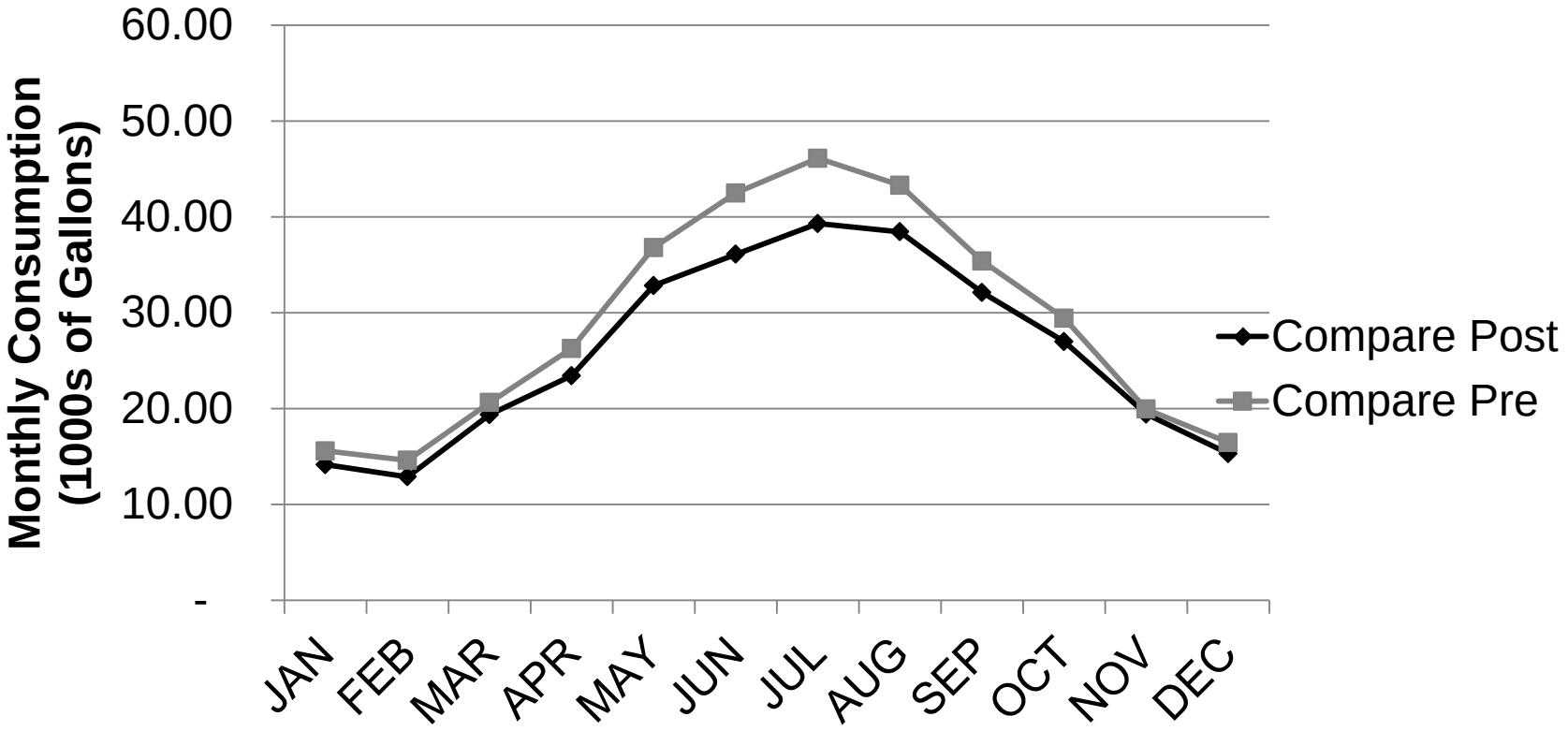
(13% of irrigation use during these seasons. 37%-39% of max theoretical savings)

Concerns about successful scaling of seasonal water savings to annual consumption

Treatment Group



Comparison Group



Both Groups

WGA Group Reduction = 7420 gallons

Comparison Group Reduction = 3280

Units = 1000s of gallons

Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	Differences
WGA Pre	14.32	13.67	20.22	27.15	39.88	45.95	49.43	46.45	36.40	29.68	19.01	15.00	**357.16**	
WGA Post	13.31	12.61	21.32	25.56	39.24	42.65	43.36	40.44	28.98	24.22	16.14	12.47	**320.30**	**36.86**
Compare Pre	15.58	14.60	20.62	26.26	36.80	42.48	46.11	43.31	35.39	29.43	19.94	16.45	**346.97**	
Compare Post	14.14	12.88	19.35	23.42	32.83	36.10	39.30	38.44	32.11	26.98	19.42	15.29	**310.28**	**36.70**

WGA Group Reduction = 3300 gallons

Comparison Group Reduction = 6390

Both the Treatment and Comparison Groups show essentially identical levels of reduced annual usage. Note though not a perfect comparison.

Conclusions

- Most people accepting of WGA and felt it matched water needs to landscape.
- Most liked feature is automatic adjustment to each watering season restriction (convenience).
- No clear evidence of differentiation by device in terms of acceptability though issue with initial Irrometer program was apparent.
- Much higher overall level of compliance with day-of-week watering restrictions at properties with WGA.

Conclusions

- Compliance greatly improved in Fall and Winter and may slightly be improved in Spring.
- Sustainment of savings over time could be an issue. Any savings potential from summer Time-of-Day compliance not yet evaluated.
- Evidence of statistically significant improvement in compliance in above seasons for Dig (Indoor), Alex-Tronix, Toro, and Hunter products.
- Evidence of **potential** for significant water savings. In Las Vegas this could be 12,520 to 13,567 gallons per year per home (13% of outdoor irrigation use in target seasons).

Conclusions

- Evidence of annual savings is elusive. Similar savings rate for comparison group as seen for treatment group.
- Changed seasonal distribution of watering may not necessarily equate to water savings.
- There may be a tendency towards over-reliance on the device, especially in non-target watering season (Spring/Summer). Speculation that people may not manage their irrigation as closely because they're reliant on the device.
- This may not favor the WGA approach as developed, but still more work needed to evaluate this.

SOUTHERN NEVADA WATER AUTHORITY

SNWA Watering Group Assistant Study

Questions