

LANDSCAPE INDUSTRY EDUCATION PROCESS SUMMARY

INTRODUCTION

As part of an initiative aimed at enhancing landscape industry education, tailored to the needs of on-the-ground professionals, a group comprised of Colorado Springs Utilities, WaterNow Alliance, and Brendle Group developed and administered a survey to gather feedback on skills and knowledge needed to advance water conservation and landscape transformation across Colorado.

This survey was sent to 157 landscape professionals and included 72 skills and knowledge, organized into four categories:



Construction



Design



Maintenance



Irrigation

The 72 identified skills and knowledge were the results from information gathered at two work sessions where over 136 landscape professionals, water providers, municipalities, NGOs, and other relevant subject matter experts provided feedback and a series of 24 subject matter expert meetings.

The survey aimed to determine what skills and knowledge related to landscape professionals have the most benefit in terms of:



Water Savings



Landscape and Plant Health



Potential Co-benefit
(e.g., Air, Water Quality, Pollinators, Wildlife)

It also aimed to understand the difficulty of learning each skill, what type of employee need to know each skill, and how important it is to educate the public about each skill.

Results from this effort are summarized in the following pages.

***Thank you to generous funding provided by the
Colorado Water Conservation Board for making this effort possible.***

SKILL AND KNOWLEDGE BENEFITS

Of the 72 skills and knowledge:



Irrigation category scored the highest for water savings



Maintenance category scored the highest for landscape and Plant Health



Maintenance category scored the for Co-Benefits

The average overall score, which is the sum of the water savings, landscape health, and co-benefits score, is highest for maintenance, followed by irrigation, then construction, then design, however overall all four categories shared relatively close scores.

Category	Total Number of Skills and Knowledge	Average Water Savings Score ¹	Average Landscape and Plant Health Score ¹	Average Co-Benefits Score ¹	Average Overall Score ²
Construction	19	3.9	4.3	3.8	11.9
Design	18	3.9	4.0	3.7	11.7
Maintenance	15	4.2	4.8	3.9	13.0
Irrigation	20	4.6	4.5	3.5	12.5

¹Respondents were asked to rank the benefits of each skill & knowledge on a scale of one to five, with five being the highest.

²Sum of the averages of the water savings, landscape and plant health, and co-benefits score. Maximum possible score, signaling the highest overall benefit, is 15.

Below are lists of the top five skills and knowledge by category for each of the types of benefits, as well as a section summarizing the top skills and knowledge regardless of category.



Water Savings

Respondents were asked on a scale of one to five, with five being the highest, how much water will each skill/knowledge help save in the landscape. The top five in each category are described below (additional skills are listed in the case of a tie in scoring).



Construction

The top skills/knowledges for the construction category for water savings include:

- Developing and implementing a native grass establishment plan and educating customer on weed management (tie for 1st place)
- Ensuring turfgrass is functional, soil fertility is acceptable (tie for 1st place)
- Use mulch appropriately (tie for 2nd place)
- Verifying native seed selection corresponds to project parameters, using mulch appropriately (tie for 2nd place)
- Ensuring native grass installation caters to seed type and planting area characteristics

Design

The top skills/knowledges for the design category for water savings include:

- Selecting plants based on a water budget and fit within local conditions
- Understanding proper water requirements for hydrozones
- Identifying and replacing nonfunctional high water turfgrass (tie for 3rd place)
- Minimizing high water turf grass use to highly used areas with efficient irrigation and minimal slope (tie for 3rd place)
- Determining a water use goal or water budget (tie for 4th place)
- Assessing existing soil conditions (tie for 4th place)
- Using mulch appropriately (tie for 4th place)

Maintenance

The top skills/knowledges for the maintenance category for water savings include:

- Monitoring and addressing issues with turf health, soil moisture, and environmental conditions with help from an irrigation technician (tie for 1st place)
- Identifying areas to replace high water turfgrass that reduce maintenance costs and resources (tie for 1st place)
- Determining watering schedule based on plant health and environmental conditions and aesthetic goals, and setting schedule to water deep and infrequently (tie for 1st place)
- Understanding soil health and landscape management techniques that support water infiltration and healthy root system development (tie for 2nd place)
- Understanding methods for improving the soil including soil amendments (tie for 2nd place)
- Incorporating best management practices for high water turfgrass (tie for 2nd place)
- Creating a mowing and fertilization plan for native grass (tie for 2nd place)
- In planting bed areas, monitoring plant health, moisture, and environmental conditions to verify watering schedule (tie for 2nd place)

Irrigation

The top skills/knowledges for the irrigation category for water savings include:

- Dialing in irrigation schedule via weather and site conditions
- Integrating irrigation design best practices (tie for 2nd place)
- Comparing landscape water requirements to water budget (tie for 2nd place)
- Analyzing water use monthly compared to plan
- Making necessary adjustments, performing field checks to ensure efficient water application and plant health (tie for 4th place)
- Developing a water management strategy and plan for the site (tie for 4th place)

Water Savings Overall

The top skills/knowledges, regardless of category, are:

-  **Irrigation:** Comparing the weather and site conditions to the schedule. Dial in adjustments to maximize efficiency (tie for 1st place)
-  **Construction:** Creating a native grass establishment plan and educating the customer on weed management (tie for 1st place)
-  **Construction:** Installing high-water turfgrass only in functional areas, and ensuring soil fertility (tie for 1st place)
-  **Maintenance:** In high-water turfgrass areas, monitoring turf health, soil moisture, and environmental conditions to manage watering and work with an irrigation technician to solve problems (tie for 1st place)
-  **Maintenance:** Replacing nonfunctional, inefficient, and difficult to maintain high-water turf with solutions that minimize maintenance resources and costs (tie for 1st place)
-  **Maintenance:** Monitor native grass plant health, environmental conditions, soil moisture levels, and aesthetic goals to determine watering schedule, including watering deep and infrequently (tie for 1st place)



Landscape and Plant Health

Respondents were asked on a scale of one to five, with five being the highest, how well does this skill and knowledge support landscape plant health. The top five in each category are described below (additional skills are listed in the case of a tie in scoring).

Construction

The top skills/knowledges for the construction category for landscape and plant health include:

- Creating and implementing a native grass establishment plan and educating customer on weed management (tie for 1st place)
- Choosing a native grass installation practice according to seed type and site characteristics (tie for 1st place)
- Understanding aspects of healthy soils and their importance (tie for 1st place)
- Following correct planting and staking methods compared to hydrozones and watering well during installation (tie for 1st place)
- Installing high water turfgrass only in functional areas and ensuring soil fertility (tie for 2nd place)
- Verifying that native seed selection corresponds to project parameters and communicate germination expectations (tie for 2nd place)
- Using mulch appropriately (tie for 2nd place)
- Ensuring plants are suited to site conditions and field ready including checking roots and pruning branches prior to installation (tie for 2nd place)

Design

The top skills/knowledges for the design category for landscape and plant health include:

- Selecting plants based on a water budget and fit with local conditions, availability and project goals (tie for 1st place)
- Assessing existing soil conditions and understanding the importance of healthy soils (tie for 1st place)
- Understanding plant factors to calculate the landscape water requirement per hydrozone compared to the water budget
- Using mulch appropriately including living mulches
- Understanding long term maintenance requirements and confirm client's ability to conduct maintenance

Maintenance

The top skills/knowledges for the maintenance category for landscape and plant health include:

- Understanding soil health and how landscape management can support water infiltration and healthy root system development (tie for 1st place)
- Identifying if soil compaction is a problem and mitigation strategies (tie for 1st place)
- Understanding ways to improve the soil such as soil amendments (tie for 1st place)
- Creating an annual maintenance plan including type and frequency (tie for 1st place)
- Developing an integrated pest and pollinator management program (tie for 1st place)
- Monitoring turf health, soil moisture, and environmental conditions to manage irrigation of high water turf areas (5th place tie) (tie for 1st place)
- Incorporating best management practices of managing high-water turfgrass (tie for 1st place)
- Developing weed management strategies for native grasses (tie for 1st place)
- Monitoring plant health, soil moisture, and environmental conditions in planting bed areas to verify watering schedule (tie for 1st place)

Irrigation

The top skills/knowledges for the irrigation category for landscape and plant health include:

- Dialing in irrigation schedule via weather and site conditions
- Analyzing water use monthly compared to plan and making necessary adjustments
- Integrating irrigation design best practices to water efficiently (tie for 3rd place)
- Designing irrigation in accordance with long term project goals for maintenance, appearance, and water use (tie for 3rd place)
- Setting up an establishment schedule and planning for future schedule adjustments (tie for 3rd place)
- Understanding the available pressure, flow, type of water source, overall availability, and available incentives in the area (tie for 3rd place)

Landscape and Plant Health Overall

The top skills/knowledges, regardless of category, are:

-  **Maintenance:** Dialing in irrigation schedule via weather and site conditions (tie for 1st place)
-  **Construction:** Developing and implementing a native grass establishment plan and educating customer on weed management (tie for 1st place)
-  **Maintenance:** Monitoring turf health, soil moisture, and environmental conditions of high-water turfgrass to manage water effectively, working with irrigation technicians to solve any problems (tie for 1st place)
-  **Construction:** Choosing native grass installation practices according to seed type and site characteristics (tie for 1st place)
-  **Maintenance:** Understanding soil health and how landscape management can support water infiltration and healthy root systems (tie for 1st place)
-  **Maintenance:** Understanding the options, methods, and limitations for improving soil, including soil amendments (tie for 1st place)
-  **Maintenance:** Incorporating best management practices for high-water turfgrass (tie for 1st place)
-  **Maintenance:** Monitoring plant health, soil moisture, and environmental conditions in plant bed areas to verify accurate watering and coordinate changes with irrigation technician (tie for 1st place)
-  **Construction:** Understanding aspects of healthy soils and their importance (tie for 1st place)
-  **Construction:** Following correct planting and staking methods and verifying plant placement corresponds to correct hydrozones, and watering well during installation (tie for 1st place)
-  **Maintenance:** Identifying if soil compaction is a problem and determine mitigation steps (tie for 1st place)
-  **Maintenance:** Develop weed management strategies for native grass areas (tie for 1st place)
-  **Maintenance:** Create an annual maintenance plan that includes frequency and type (tie for 1st place)
-  **Maintenance:** Developing an integrated pest and pollinator management program (tie for 1st place)

Co-Benefits (e.g., Air, Water Quality, Pollinators, Wildlife)

Respondents were asked on a scale of one to five, with five being the highest, how well does this skill and knowledge support co-benefits, including air or water quality, pollinators, and wildlife. The top five in each category are listed below (additional skills are listed in the case of a tie in scoring).

Construction

The top skills/knowledges for the construction category for co-benefits include:

- Creating a plan for minimizing and managing pollution related to construction
- Catering native grass installation practices to seed type and site conditions
- Creating and implementing a native grass establishment plan including educating the customer on weed management options (tied for 3rd place)
- Understanding aspects of healthy soils and their importance (tied for 3rd place)
- Verifying that native seed selection corresponds to project parameters and communicate germination expectations (tied for 3rd place)
- Identifying strategies to control invasive and problematic weed species (tied for 3rd place)
- Providing erosion and sediment controls (tied for 3rd place)
- Using locally sourced plants and materials (tied for 3rd place)

Design

The top skills/knowledges for the design category for co-benefits include:

- Understanding stormwater and low impact design solutions
- Selecting plants based on water budget and local conditions
- Avoiding using landscape fabric under mulch (tie for 3rd place)
- Using mulch or ground cover appropriately considering project goals (tie for 3rd place)
- Identifying and considering replacement of nonfunctional high water turf with native grass (tie for 3rd place)
- Documenting site hydrology and considering where effective drainage and water management systems can be incorporated (tie for 3rd place)

Maintenance

The top skills/knowledges for the maintenance category for co-benefits include:

- Developing and integrated pest and pollinator management plan
- Developing weed management strategies for native grass areas (tied for 2nd place)
- Creating a mowing and fertilization plan for native grass areas (tied for 2nd place)
- Monitoring native grass plant health, environmental, and soil moisture conditions and aesthetic goals to determine watering schedule, including watering deep and infrequently (tied for 2nd place)
- Creating a snow removal map and plan to manage snow (tied for 2nd place)
- Identifying high water turfgrass to remove that lowers maintenance and resource needs (tied for 2nd place)
- Identifying native grass types and understanding best management strategies (tied for 2nd place)



Irrigation

The top skills/knowledges for the irrigation category for co-benefits include:

- Comparing weather and site conditions to the watering schedule and making necessary adjustments (tie for 1st place)
- Integrating irrigation design best practices to water efficiently (tie for 1st place)
- Comparing the landscape water requirement to the water budget and understanding impacts of hydrozones and plant factors on water budgets
- Designing irrigation with maintenance, appearance, and water use in mind
- Developing a water management strategy and plan for the site.

Co-Benefits Overall

-  **Maintenance:** Developing and integrated pest and pollinator management program
-  **Construction:** Creating a plan for limiting and managing potential sources of pollution related to construction activities
-  **Construction:** Choosing a native grass installation practice according to seed type and site conditions
-  **Construction:** Creating and implementing a native grass establishment plan and educate the customer on weed management (tie for 4th place)
-  **Construction:** Understanding the aspects of healthy soils and their importance to the built landscape (tie for 4th place)
-  **Construction:** Verifying that native seed selection corresponds to project parameters and communicate germination expectations (tie for 4th place)
-  **Construction:** Identifying and developing strategies to control invasive and problematic weed species (tie for 4th place)
-  **Construction:** providing effective erosion and sediment controls (tie for 4th place)
-  **Construction:** using locally sourced plants and materials (tie for 4th place)

TOTAL BENEFITS

The top skills/knowledges overall across all categories are listed below. The overall benefit ranking was determined by adding up the sum of the average scores in water savings, landscape and plant health, and co-benefits.

-  **Construction:** Create and implement a native grass establishment plan
-  **Construction:** Choosing a native grass installation practice according to seed type and site conditions
-  **Irrigation:** Dialing in watering schedule via weather and site conditions
-  **Construction:** Understanding the aspects of healthy soils and their importance to the built landscape (tie for 4th place)
-  **Construction:** Verifying the native seed selection corresponds to project parameters and communicate germination expectations (tie for 4th place)
-  **Maintenance:** Monitoring native grass plant health, environmental conditions, and soil moisture and aesthetic goals to determine watering schedule, including watering deep and infrequently (tie for 4th place)

EASE OF LEARNING

To understand how easy or hard it is to learn each skill and knowledge, **skills and knowledge were ranked on “ease of learning.”** The easiest skills and knowledge by category are summarized below.

Construction

The easiest to learn skills/knowledges for the construction category include:

- Understanding the advantages and limitations of installing landscape fabric
- Using mulch appropriately
- Following correct planting and staking methods and verifying placement corresponds to hydrozones (tie for 3rd place)
- Installing high water turfgrass only in functional areas and ensure soil fertility through soil testing and amendments as well as proper soil preparation (tie for 3rd place)
- Providing effective erosion and sediment controls (tie for 4th place)
- Ensuring plants are suited to site conditions and field ready including checking roots and pruning branches prior to installation (tie for 4th place)
- Identifying an approach to staging and storing project materials to ensure plant health, quality, promote safety, manage environmental impacts, and overall efficiency (tie for 4th place)

Design

The easiest to learn skills/knowledges for the design category include:

- Avoiding using landscape fabric under mulch
- Using locally sourced plants and materials
- Minimizing high water turfgrass only to highly used areas that are efficient to irrigate and have minimal slope
- Using mulch or living mulches
- Select mulch or ground cover type and placement based on project goals and conditions and plant preferences (tie for 5th place)
- Researching and incorporating local regulations and incentives (tie for 5th place)

Maintenance

The easiest to learn skills/knowledges for the maintenance category include:

- Monitoring turf health, soil moisture, and environmental conditions in high water turfgrass areas to manage water effectively (tie for 1st place)
- Incorporating best management practices for high water turfgrass (tie for 1st place)
- Understanding the options, methods, and limitations for improving the soil including soil amendments (tie for 2nd place)
- Identifying if soil compaction is a problem and identifying mitigation strategies (tie for 2nd place)
- Creating a snow removal map and plan (tie for 2nd place)
- Creating an annual maintenance plan including type and frequency (tie for 2nd place)
- Understanding the components of fertilizer and how they impact plant growth and health, as well as determining what fertilizer would work best for the site (tie for 2nd place)



Irrigation

The easiest to learn skills/knowledges for the irrigation category include:

- Performing field checks
- Following proper winterization procedures
- Performing a walk-through with the customer and maintenance contractor
- Testing the system after installation and at startup or contract start
- Reviewing system parameters, verifying local regulations, and checking all irrigation controller settings.

Ease of Learning Overall

The easiest skills and knowledge to learn, regardless of category:



Construction: Understanding the limitations and advantages of installing landscape fabric



Construction: Using mulch appropriately



Design: Avoiding using landscape fabric under mulch



Maintenance: Monitoring turf health, soil moisture, and environmental conditions in high-water turfgrass areas to manage water effectively, working with an irrigation technician to fix problems (tie for 4th place)



Maintenance: Incorporate best management practices for high-water turfgrass areas (tie for 4th place)

REGULATION

Participants were asked to rank which, if any, of the skills and knowledge should be regulated. Skills and knowledge for which at least 50% of respondents said the skill/knowledge should be regulated are include:



Construction

- Understanding healthy soils
- Proper contour and grading.



Design

- Understanding plant factors to calculate the landscape water requirement per hydrozone
- Avoiding using landscape fabric



Irrigation

- Integrating irrigation design best practices
- Testing the system after installation to ensure performance and limit water waste



Maintenance

- N/A – category did not have any skill or knowledge that surpassed the 50% threshold of votes for regulation.

WHO SHOULD KNOW

Participants were asked to rank each skill and knowledge on how important it is for different groups to know these skills, as well as how important it is to educate the public. Skills with at least 50% labeled extremely important to know for each group are summarized below.

Group	Construction	Design	Maintenance	Irrigation	Total
Entry level employee	7	0	0	6	13
Supervisor/ manager	18	12	15	20	65
Landscape designer	6	16	4	10	36
Advanced Irrigation Technician	<i>Not Surveyed</i>	<i>Not Surveyed</i>	<i>Not Surveyed</i>	19	19
Public	1	7	2	3	13
Total	32	35	21	58	-

