# Non-herbicidal Weed Control Strategies Implemented by City Parks Staff in the Northwest: Maintaining Hardscapes and Fence Lines

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BAND CONCOURSE
GOLDEN GATE PARK
SAN FRANCISCO

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**Cover Photo:**
**Decomposed granite in the Band Concourse in Golden Gate Park, San Francisco**

# MAINTAINING HARDSCAPES AND FENCELINES

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# INTRODUCTION

## Purpose

Parks maintenance employees look to their peers for strategies that have worked well to control weeds. This report is one in a series that offers effective, non-herbicidal strategies used by city parks maintenance staff in the Northwest, in both wet and dry climates, to control weeds in and around the following park areas:

- shrub beds and landscaped areas
- hardscapes and fence lines
- tree wells
- turf (excluding golf courses and high profile athletic fields)

This report covers effective, non-herbicidal weed control strategies specifically for hardscapes and fence lines. All reports are posted on the NCAP website: www.pesticide.org. The material in these reports is also being presented in training sessions for pesticide applicators, featuring parks maintenance staff whose practices are described in the reports.

Definitions of "effective" weed control is subjective, varying not only among cities but also among employees within a single parks department. A particular strategy was deemed effective if the maintenance employee using it and his or her supervisor felt satisfied with the degree of weed control, safety, resources, and environmental impact involved. This research study was not exhaustive, meaning that other effective strategies may be used currently in the Northwest. Also, what works in one location may not work in another location because of differences in climate, soil type, budget, planning processes, public opinion, or level of volunteerism. Nevertheless, a strategy that works in one city may be adapted without too much effort elsewhere. The intent of this report is to share the expertise, innovations, and inspiration of other parks staff. We encourage you to experiment as resources allow.

## Methods

Cities from northern California, Oregon, Washington, Idaho, and Montana were selected to achieve variety in climate, geography, and size. Parks maintenance employees and their supervisors, who manage either developed parks or natural areas in the selected cities, were surveyed. Parks maintenance employees responded to an initial survey that asked which park areas they manage using herbicides and how often herbicides were applied in these areas. They were also asked for which areas in parks they are most interested in learning about effective, non-herbicidal weed control strategies. Upon receiving these responses, the five most problematic areas for weed control were identified: landscaped areas, fencelines, hardscapes, tree wells, and turf.

In a second survey, parks maintenance employees were asked to provide the names of weeds that are most problematic in these areas and to describe any effective, non-herbicidal strategies for these areas or to target a specific weed. Strategies that could be implemented by other parks staff with limited resources were selected from among these, with preference given to strategies that had been used over long periods of time or tested in an experimental setting. Also, strategies from both wet and dry climates were selected so that parks staff from both climates would benefit.

To witness the effectiveness of the strategies and document them firsthand, site visits were conducted during August and September of 2007 in the following cities: Eugene, Portland, and Bend, Oregon; Seattle, Washington; San Francisco, California; and Boise, Idaho. The results from the surveys and site visits are compiled in this and the other reports in this series.

# FENCE LINES

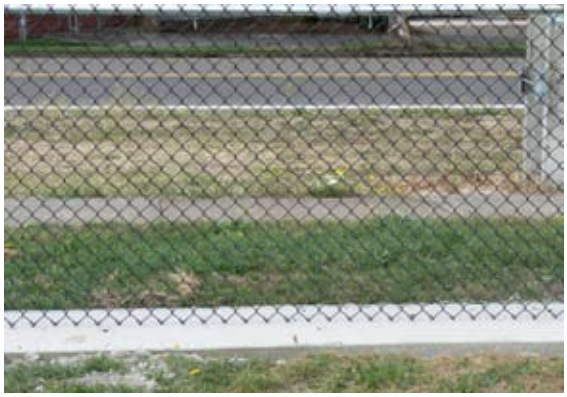
## Mow Strips Under Fence Lines

Installation of mow strips under or around fixtures, such as fences, garbage cans, and benches, minimizes the need for weed control and can reduce herbicide use. Mow strips reduce the surface area that supports weed growth and also provide mowers needed space to travel close to and around obstacles without bumping into them, thereby decreasing the risk of damage to equipment and structures.[1] Bob Fiorello, Gardener with the San Francisco Recreation and Park Department and Pest Control Advisor of the San Francisco Botanical Garden, points out that mow strips also limit the need for line trimmers or small mowers, thereby increasing the feasibility of using larger equipment, which saves departments money. Therefore, mow strips are a good investment, saving money in the long-term by allowing staff to maintain parks more efficiently.[1,2,3]

**Concrete mow strip is segmented into blocks, with expansion joints.**

Most durable mow strips are made of concrete, usually divided into segmented blocks with expansion joints to accommodate the movement of the earth below and reduce cracking, as Rob Hallett, Turf and Grounds Supervisor of Eugene Parks and Open Space, pointed out.[2]

A concrete mow strip under a fence along a sports field increased the cost of the newly constructed Ida Patterson Park in Eugene three-fold, but the savings on weed control will surpass this extra initial cost.



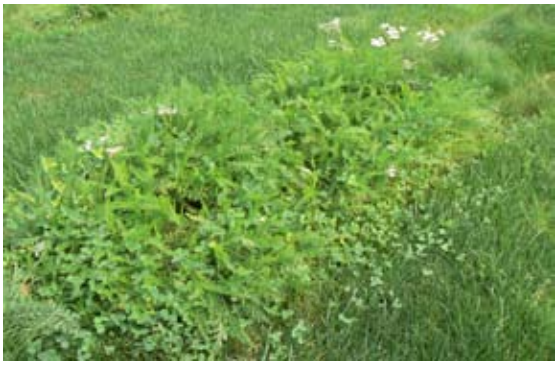
**A concrete mow strip under a fence along a sports field in Ida Patterson Park in Eugene.**

Steel strips are cheaper than concrete but are thinner and less effective, according to Barb DeCaro, Resource Conservation Coordinator, Horticulture Unit with Seattle Parks and Recreation.[3] Asphalt is also cheaper but may not be durable enough if not reinforced with metal or wood. Occasionally, other materials, such as cobble, brick, or "Belgian" block, are used to achieve a desired look.[1]

Another alternative, suggests Fiorello (San Francisco), is to construct temporary fenceline weed barriers for seasonal weed control.[1] Cardboard, roofing paper, or weed cloth cut in strips can be placed under fences, covered with mulch, wetted down, and tamped in. These strips may not be suited for large mowing equipment but can hold up well to small mowers, edgers, and line trimmers. Fiorello likes to use eucalyptus leaves and litter from the Botanical Garden because they are known to possess phytotoxic chemicals that are harmful to plants. The refuse from other phytotoxic trees, such as walnut may also be used this way.[1]

"Ecolawn" mow strips are another option for weed control along fences, according to Hallett (Eugene).[2] An "ecolawn" generally refers to a low-maintenance lawn that requires a minimum of care, water, chemical weed control,

and fertilization. "Ecolawn" mixes grow densely and out-compete weeds. They require some time to establish; therefore, "starting with a clean slate is important." Hallett (Eugene) explained that ecolawn mow strips require different management from most turf.[2]



**This dense ecolawn mix test plot, planted by Rob Hallett (Eugene), grows faster than the surrounding irrigated turf and out-competes weeds.**

The ecolawn mixes that Hallett has tried can tolerate being mowed once every two weeks to a two-inch height, the optimal mowing frequency depending on the mix,[3] but his ecolawn mixes grew too rapidly when the turf on either side was irrigated. Too many clippings were produced because of the rapid growth.[2] In order to be more manageable, irrigation must be minimal. Mary Preus, Senior Gardener of Seattle Parks and Recreation, remarked that she has tried growing "ecolawn" mixes in areas other than mowstrips but has found it difficult to get parks employees to change their mowing practices to accommodate the requirements of the ecolawn mix.[4] DeCaro mentioned that she used an "ecolawn" mix on a hillside that did not need routine mowing with desirable results, but, within a few years, the flowers were out-competed by rhizomatous grasses and disappeared.[3]

### Weedeating Along Fence Lines

In the absence of mow strips, weedeating and flaming are the two main, non-herbicidal strategies for weed control currently in use. While weedeating can be performed year-round in most cases, flaming is only recommended during the wet season.[1] The lighter weight the line trimmer, or "weedeater," the better in order to reduce the risk of injury to workers.[3] Eden Belanger, Horticulture Manager of Boise Parks and Recreation, insists that the bottom rail of new fences be at least two to three inches from the ground to allow line trimming.[5] Frequent trimming may, with persistence, permanently remove a particular weed, especially young annual weeds that are unable to photosynthesize when their green tops are cut off repeatedly.[3] Flaming is discussed in more detail beginning on page 5.

## HARDSCAPES

### Preventing Weeds in Cracks

According to Phil Rossi, IPM Coordinator, San Franciso Recreation and Parks Department, staff can prevent weeds from growing in hardscape cracks by sweeping or blowing the dirt out of them.[6] He adds that an alternative is to caulk cracks. To achieve a fairly durable, yet elastic, end-product in a cement hardscape, he recommends adding neoprene

**This hardscape crack, filled-in with soil, has become the perfect planter for weeds. (above) Caulking prevents hardscape cracks from filling in with soil. (below)**

to the crack, pounding it in, then adding caulk, and finally smoothing it out with mineral oil or thinner. However, both sweeping and caulking are time consuming, and caulking may not be realistic for very long or numerous cracks. [6]

## Mechanical Edging

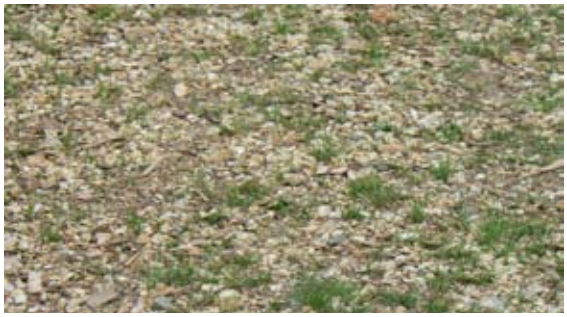
Stephen DeGhetto, Parks Operations Supervisor of Corvallis Parks and Recreation says that his employees use wire brushes to scrape the tops of weeds away.[7] Fiorello (San Francisco) sometimes gives volunteers hula hoes to remove weeds along dirt or crushed rock paths.[8] For areas where disturbance to the hardscape is not an immediate concern, like a gravel parking lot or path, dragging fencing, chains, or other heavy-duty material over the surface is a common way to scrape off the tops of weeds.

## Hardscape Materials

To create a unique or perhaps more natural appearance, compressed, crushed rock is sometimes used instead of concrete or asphalt under fences and as a pathway material, although the crushed rock can create a hazard when used with string trimmers.[6] Often referred to as "softscapes," the rock particles, such as decomposed granite (DG), are laid and then compressed, using a vibrating machine or roller to form a firm surface that is weed-resistant. Weed pressure does increase over time.[1]

**With his shoe, Phil Rossi points to a weed emerging from this fairly weed-resistant and fine decomposed granite softscape of the Band Concourse in San Francisco's Golden Gate Park. (above)**

**Decomposed granite acts as an attractive and firm path through the San Francisco Botanical Garden. (right)**



**Over time, as growing substrate fills-in the spaces between rock particles, weeds emerge from a coarse decomposed granite softscape in the San Francisco Botanical Garden. (below)**

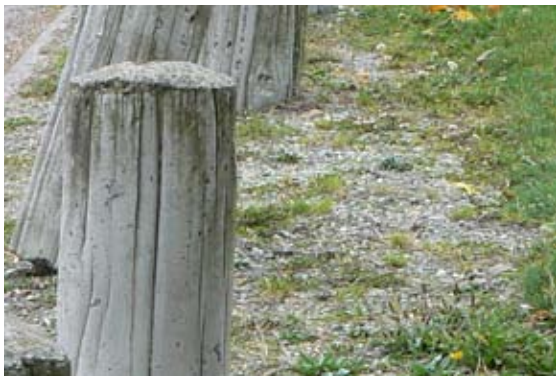
DG, in particular, has an appealing golden appearance favored by landscape architects, and San Francisco city departments in the past have used DG in many high-profile areas, such as the Botanical Garden and Band Concourse.[6] However, as Fiorello (San Francisco) notes, quality DG is difficult to find and increasingly expensive.[8] To conserve this material and reduce cost, its use is often limited to a thin veneer application over conventional compacted road base. However, this often leads to problems with coverage, erosion, and runoff of the granite. According to Fiorello, DG used to be coarse, permeable, durable, and suitable for wheelchairs and strollers, which was ideal. Now, as the supply runs out, a product that is labeled the same is actually quite different. It is finer and muddy when wet and does not suppress weeds as well. Commercial binders made from tree resins or polymers, marketed to firm up decomposed granite and similar materials, can be difficult to work with and can often lead to gouging and a breaking away of the paved surfaces over time.[8]

**Decomposed granite softscape adds contrast and sophistication to the Band Concourse in San Francisco's Golden Gate Park.**

Phil Renfrow, Senior Gardener, Seattle Parks and Recreation, suggests using "quarter-inch minus"-sized gravel instead. It is cheap, durable once compacted, and the ideal coarseness.[9] Weeds can grow in finer gravel, and dirt fills in the spaces between the coarser gravel particles. The use of "quarter-inch minus" gravel is also compliant with the Americans with Disabilities Act (ADA), allowing people in wheelchairs to pass over without difficulty.[9]

## Dealing with Weedy Gravel

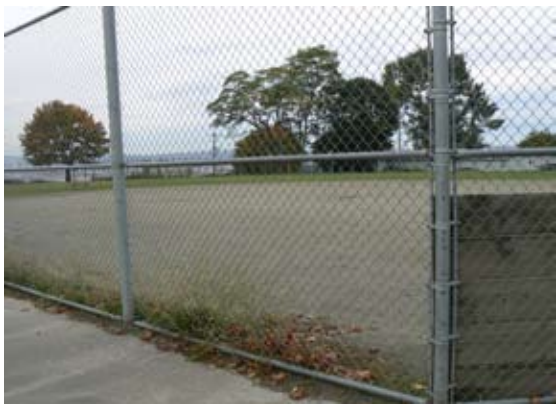
In some cases, gravel has been laid in a park in an attempt to reduce the area to be maintained but has unsuccessfully suppressed vegetative growth.[9] For example, in Alki Park, a pesticide-free park in Seattle, a gravel area surrounds 2-foot concrete columns that serve as barriers to vehicles. The gravel is coarser than the quarter-inch minus rock that Renfrow (Seattle) recommends. As a result, soil has settled in and weeds have grown. Removing all of the gravel would be a challenge, and the finished product would need to be level with the surrounding turf. As Phil explains, instead of removing the gravel, a layer of quarter-inch minus rock could be laid to smother the weeds over winter. In the spring, a 1-2-inch layer of quarter-inch minus rock could be laid and compressed to form a new hardscape. Another option would be to seed grass into the original loose gravel to gradually blend the area visually into the surrounding turf.[9]



**Over time, this gravel in Alki Park in West Seattle has filled-in with dirt and weeds because it was too coarse.**

## Grading Dirt Areas

Seattle uses a tractor attachment, called a Harley rake, to scrape away weeds in dirt paths and to level sports infields.[10] The machine can be set to cut to a certain depth for stripping weeds or grading. A roller at the rear leaves wind-rows of weeds behind for easy pickup and it grades as it goes, a "really elegant design," according to DeCaro (Seattle). The machine needs to be used every year to kill the weeds while they are young but cannot be used in the wet season, as it will not operate in the mud. Early fall is a critical time to use the Harley rake, DeCaro says. A versatile machine, the Harley rake can also be used for cutting sod and tilling.[10]

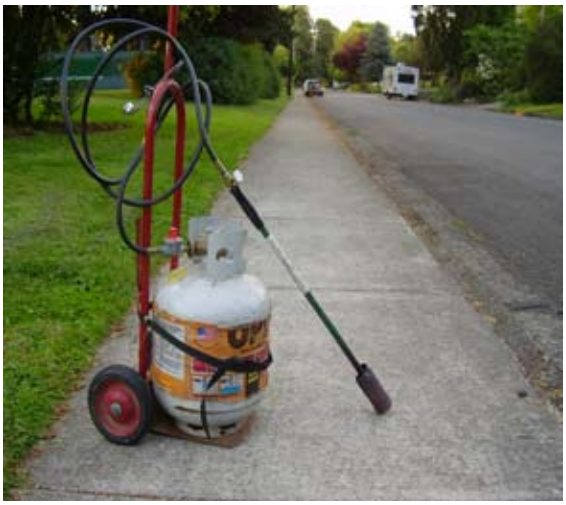


**A sports infield behind this fence in the park at Yesler Community Center in Seattle is kept weed-free using a Harley rake tractor attachment.**

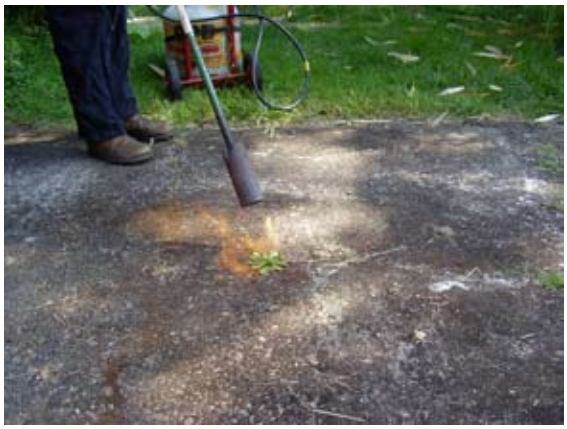
## FLAMING

Flaming, using a propane-powered flame weeder, is an effective, quick and widely used method for controlling weeds in hardscape cracks and gravel surfaces, as well as along fence lines. Fiorello (San Francisco) uses 10 pound (two and a half gallon) liquefied propane gas (LPG) canisters for this technique because they are easy to obtain, transport, and refill.[1] Josiah Sheehan, Landscape Crew Worker with Eugene Parks and Open Space,[11] and Martin Nicholson Pesticide-Free Parks Program Coordinator with Portland Parks and Recreation,[12] also use LPG.

According to Fiorello, 10-pound, backpack-mounted tank devices are more efficient than the dolly-mounted alternatives, but most users prefer to haul a dolly-mounted tank around because they are concerned about wearing explosive material on their backs.[8] The most appropriate type of flamer for hardscapes and fence lines is the kind that has a narrow nozzle and shoots a flame from the end, such as the Red Dragon.[8,11,12] Although the single-headed version is depicted, Nicholson recommends the more powerful and efficient double-headed version for use in parks.[12]



**Propane-powered flame weeder attached to a dolly-mounted tank**



**Flame from flameweeder passing over dandelion**

Although the propane-powered Red Dragon flame weeder produces a flame, burning the weeds is not actually necessary; rather, blanching with the heat radiating beyond the end of the flame is sufficient to kill weeds and does not produce a burned appearance. "Green flaming" involves a quick pass (a rate of about 1-2 seconds per foot) of the 2000˚ F heat from the nozzle over the weeds to sear them, Fiorello (San Francisco) says.[8] The short exposure to the intense heat is enough for plant cell walls to burst. Treated weeds will wilt and die, a process accelerated by warmer weather.[8] Fiorello evaluates green flaming efficacy by the "thumb print" test, in which a treated leaf is pressed firmly to leave a tell-tale print, indicating that cells are disrupted and the treatment will work.[1] Green flaming causes gradual death so that the plant is less likely to signal the roots to re-grow. [1,8,11] "Think of blanched weeds rather than blackened weeds," Fiorello suggests.[1] Green flaming also conserves fuel over weed burning. Even under ideal conditions, repeated treatments are needed to kill the weeds. Over time, flame-treated weeds will die because they are not able to photosynthesize when their green tops are knocked back repeatedly. Although some staff and some parks patrons feel that flaming is unsafe, the safety risks can be minimized when done at the proper time – when there are no patrons around and during the wet season

to avoid starting a fire.[8] Additionally, flame weeding generally requires formal training of staff and permits and/or permission from authorities, such as a local fire marshall.[1,3]

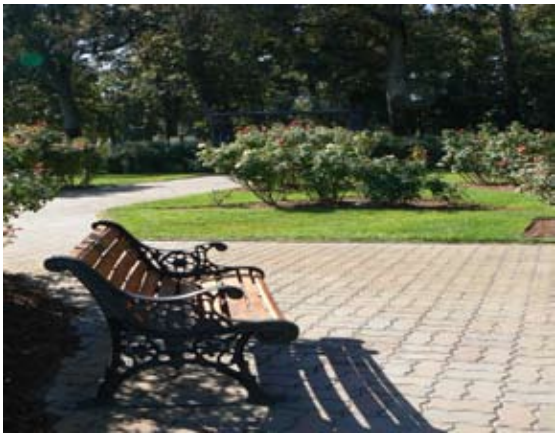
## PROPER PLANNING

In many cases, when planning input from parks maintenance employees and their supervisors is limited, excluded or undervalued, the results are more weeds and insufficient resources to control them. Of the city parks departments visited, only Boise Parks and Recreation Department has a planning process that requires written input from parks maintenance staff in every step of parks project design.[5] This more inclusive process is critical for reducing maintenance costs and headaches in the long-term. In place for 10 years, the process also involves urban foresters and infrastructure staff. Belanger (Boise) remarked that changing this planning process was "the biggest gap we've closed."[5] John Reed, Pest Management Program Coordinator of Portland Parks and Recreation, expressed a desire for a more formal, streamlined planning process in his department that gives greater weight to the recommendations of parks maintenance managers.[13]

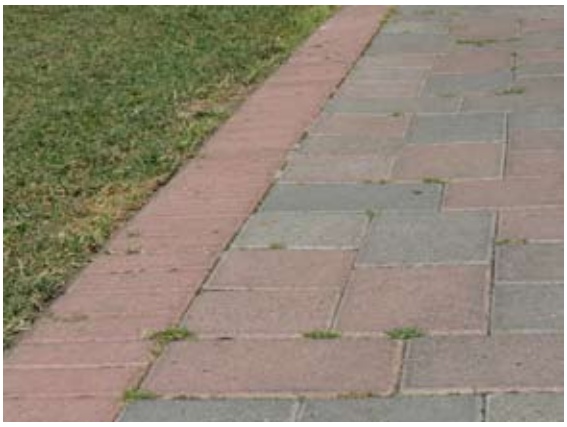
Sometimes a fixture, such as a fence, is unnecessary and can be eliminated from a project during the planning phase without reducing aesthetic, safety, or other values. If needed, minimizing the length of the fence and placing it only where needed can help to reduce cost.[13] Whenever a new fence is planned, Belanger (Boise) requests that the bottom rail be at least two to three inches above the ground to allow weed abatement with a line trimmer, or "weedeater."[5]

**Installed in Candelight Park in Eugene after the initial park design, the wooden fence with no mow strip underneath serves as a weed haven.**

Selecting appropriate hardscape materials and putting them in the right places is another way to reduce long-term costs. The more cracks there are in a hardscape, the more opportunities there are for weeds to grow. However, sometimes hardscapes designed with many cracks, such as unmortared brick or stone, have been selected by planners for a more formal appearance, notes Paul Stell, Natural Resource Manager of the Bend Parks and Recreation District.[14] The cost of weed control may be greater for brick or stone paths that are naturally full of cracks than the savings on repair, as compared to more standard path material, like asphalt. Therefore, although these materials may be attractive and permeable, they should be avoided from a weed control standpoint.[14]



**Hardscapes containing many cracks add a more sophisticated look to the the Boise Rose Garden, but its placement poses a challenge to weed control.**



**A long brick path in a park in Bend has weeds.**

A newer concept, installing mow strips when a new park is designed or old park is renovated, is an example of wise long-term planning. New ADA requirements are resulting in hardscape replacement in some cities, like San Francisco, where Fiorello is advocating for the addition of mow strips along the replaced paths.[8] Although mow strips add to the cost of construction, in the long-term the money saved on weed control will be greater than the initial cost. Clustering fixtures together, in order to minimize the number of mow strips needed, can save money.

**Installing this garbage can and lightpost side-by-side, rather than apart, in Julia Davis Park in Boise meant that only one mow strip was needed.**

Although increasing the ratio of hardscape to earthen surface area in parks is attractive from the standpoint of weed control, the look of the park may be less natural with a high percentage of hardscape surface area. Also, city governments are increasing requirements for stormwater management and bioretention systems. The permeable or pervious concrete that is now available can help with stormwater control. This material forms a solid, durable surface but allows for easy transport of water through and beneath it.[1] As Fiorello notes, the use of permeable concrete enhances water conservation, recharges groundwater, and diverts irrigation and rainfall runoff away from storm drains and sewer systems.[1] Permeable concrete can be stained to a variety of colors and is both functional and stylish. However, its relative high cost (on par with conventional concrete) has kept its implementation to a minimum in the Pacific Northwest. Before planning, consider first consulting city officials about upcoming policy changes regarding hardscapes, stormwater drainage, and bioretention areas.

Proper planning is essential for permanently reducing the resources needed for weed control and enabling staff to invest more in the work that they really intend to do — grow beautiful and healthy parks and open spaces. Changing the planning process is challenging but possible, as Boise has shown.

# CONTACT INFORMATION

The following parks departments were referenced in this report:

| | |
|---|---|
| Eugene Parks and Open Space | 541-682-4800 |
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| Seattle Parks and Recreation | 206-684-7250 |
| Bend Parks and Recreation | 541-388-5435 |
| Boise Parks and Recreation | 208-384-4190 |
| San Francisco Recreation and Parks Department | 415-831-6306 |
| Corvallis Parks and Recreation | 541-754-1738 |

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