

Performance standards in weed control—setting them and achieving them

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Performance standards in public open space landscape management

Setting performance standards involves consideration of customer demands, existing conditions and resource availability, which are analysed within a management/technical system to produce goals and then performance standards. Goals describe what the service is to do, the performance standard will describe how we measure what we are doing.

Performance standards will range from low to high quality as is appropriate to the outcome required. These will vary depending upon a wide range of parameters which in turn influence the factors mentioned above. There is no such thing as a universally valid idea. Generation of performance standards involves value judgments which address the dominant paradigms and possible shifts. The key to assessing both the performance standards for landscape management and their achievement is linked to the production of an end point which is aesthetically and functionally appropriate to the site. Fundamental to this proposition is the view that, in general, even if resources were unlimited, it would not be appropriate to apply the same performance standards for all landscape management works to all sites without producing unattractive homogeneity of landscape. It may be that weed control is a special case and, in a situation free of resource limitations, we would apply the same performance standard to all landscapes in order to achieve low weed levels and still be able to produce diverse and attractive landscapes. However, generally we will have to balance resource inputs across a range of quality outcomes and so need a range of performance standards. We will need to make decisions which require that some landscapes are virtually weed free, whilst others will tolerate relatively high levels of what elsewhere we would regard as weeds. For example, relatively low levels of broad leaf weed invasion are unacceptable in high quality turf due to its effect on surface performance, whereas the infestation of less intensively trafficked swards on roadsides with relatively high numbers of these same species will be acceptable.

Typically the level of performance standard required for any landscape management activity can be assessed utilizing the following criteria:

- The innate characteristics of the

landscape in question and the resources required by vegetation to achieve the design intent (a football field, a formal garden or a degraded river or creek corridor).

- The level of user impacts (sportsturf, grass in a playground or neighbourhood park).
 - The proximity of the landscape to the user, plus the users perception of what the resource is or should be (garden beds in a formal park, weed matted beds along a creek or on a road batter).
- In the past in local governments performance standards have often not been rigorously defined. This is at least due in part to the view that with day labour there is a lesser need to specify work and therefore to clearly articulate a performance standard. The idea was that we know what needs to be done and we will just go and do it; that it just requires common sense.

The lack of performance standards and specifications reduces our capacity to:

- satisfy customer demands,
- manage resources and
- develop improved strategies, specifications or performance.

Working without performance standards on large-scale landscape management may result in a misallocation of resources to tasks which appear urgent, but which do not address long term strategic issues in the management of the

landscape. For example, continuing to mow instead of controlling weed invasion.

Past practice has commonly been one of ad-hoc approaches which do not link practice with clearly articulated goals for our management of the landscape, and therefore for weed control. Some features of past practice are outlined in Table 1.

Performance standards which are linked to overall service goals and which are measurable are an essential component of any effective service activity. This fundamental must be part of our culture in managing the landscape and weed control which is probably one of the most important activities next to grass cutting in the management of broad scale landscapes.

To develop performance standards for weed control there is a need to:

- Articulate an overall service standard for the landscape. This is a policy decision but one which will be made most effectively by people who are fully aware of what is possible with available resource inputs.
- Determine what impact weeds have on the service standard. This is a technical decision which comes directly from the service standard.
- Articulate the weed control service standard for the site(s).
- Write specifications for this weed control.
- Determine the functional performance indicators which will show conformance or non-conformance with the specification and the service standard in terms of:

Output
Efficiency
Effectiveness

Table 1. Past practice in weed control

- Little understanding of the variable nature of what constitutes a weed, no clear rationale for weed control, no view that there are acceptable variations in level of intervention which can be matched to objectives
- Total elimination of weeds in all landscapes seen as the objective as part of a curative rather than preventative model
- No well developed strategies for management of plant groupings generally including weed control issues
- Inadequate specification, monitoring and evaluation of effectiveness of weed control techniques
- Customer service model not used to identify goals of work
- Limited skills and lack of ongoing training
- Weed control seen only as herbicide application
- Rapid increase in the availability and use of herbicides
- Manufacturers of products are the major source of information; practical experience of users and researchers is rarely published
- Limited or inadequate occupational health and safety strategies in relation to herbicide use, sometimes simply limited to the issue of basic personal protective equipment
- Low level of community interest and concern regarding herbicide use
- Non-selective application of non-selective herbicides, including off label uses of chemicals and illegal practices generally
- No performance standards or policy framework
- Technically unlawful business practice

Best practice

Best practice must be seen to be a means to an end and some key features are outlined in Table 2.

Implications of best practice for performance standards in weed control

- i. Weed control is integrated with other landscape management activities:
 - site preparation is undertaken to eliminate or reduce weed propagules,
 - design for simplified maintenance and reduced opportunities for weed invasion,
 - plant selection and planting design to minimize weed invasions, and to enable use of effective weed control strategies,
 - mulch as a weed control strategy needs regular monitoring,
 - herbicide selection and application needs to be under regular review,
 - staff require clear understanding of what is required and how it may be achieved,
 - staff require ongoing training and evaluation of skills to maximize effectiveness.
- ii. A high level of technical expertise needs be provided at some stage of the performance standard development, implementation and evaluation loop.
- iii. There is a need to utilize a more sophisticated definition of weed invasion for

Table 3. Types of weed damage

BIOLOGICAL	same as in commercial production crops; harbouring disease, competition for light, moisture and nutrients, loss of vigour, changes in morphology of amenity plants and/or populations in conservation areas
VISUAL	unique to amenity landscapes; low numbers of weeds can cause unacceptable visual damage
SOCIAL	poisonous or irritating plants in recreational areas
FUNCTIONAL	failure of vegetation to perform specified function due to weed invasion, e.g. low performance of intensively used turf
ECONOMIC	damage to structures, fire hazards, interference with services

particular landscapes and landscape uses and adjust performance standards in relation to these (Thoday 1980).

Specifications of qualities of good performance standards

- performance is measurable,
- performance describes product or outcome required,
- performance required is understandable and
- there is a capacity for the provider to control performance within the requirements of the specification.

Setting and achieving performance standards and quality assurance

Performance standards are based upon professional assessments linked to customer demands and resources available. Achieving performance standards requires that there is a management system

in place which enables effective setting, implementation and verification.

In the contemporary business environment performance standards are required as part of the quality focus of any effective and successful business. Performance standards are a fundamental part of quality systems which lead to continuous quality improvement. They must articulate clearly the management intent and may be very specific or provide the opportunity for flexibility in achieving an overall outcome. Setting and achieving performance standards requires focus on outcomes rather than inputs or processes (Table 4).

Quality assurance systems provide a basis for achieving performance standards through a system of identifying and specifying outcomes and processes where necessary, monitoring conformance with the required outcome and providing mechanisms for dealing with non-conformance. The achievement of performance standards for products or services is ultimately measured by how well that product or service meets the customers demands. Quality assurance systems are systematic management techniques which provide a high degree of confidence that customers demands will be met. They exist to provide models around which the necessary systematic management systems are constructed.

AS 3901 quality systems for design/development, production, installation and servicing is used in the construction industry and can be equally applied to landscape design, construction and management processes including that of weed control which as stated earlier is an integrated and multi-task activity. The standard merely provides a framework for the system. The performance standards, procedures and indicators must be developed and applied to suit each situation.

A quality assurance system is a management tool for achieving goals and integrating the work of various contributors to overall goals. This is achieved by providing a checklist for systems which must be in place to ensure such integration. These cover such issues as contract review, design control, purchasing control and verification and processes which manage non-conforming products or service.

Table 2. Best practice in weed control

<ul style="list-style-type: none"> • Lawful business • Policy feedback loop • High degree of performance standard development • High degree of attention to occupational health and safety issues and environmental/public health issues. • Understanding of variable nature of, and variable response to, weed damage: <ul style="list-style-type: none"> biological e.g. disease and competition visual e.g. out of place in landscape social e.g. impede play, poisonous, allergens economic e.g. root damage to structures (see Table 3) • Utilization of threshold concepts in assessing weed invasion • Improved specification (including a process for establishing shared vision), monitoring, evaluation • Weed control seen as a series of landscape management activities which includes consideration at design and construction • Plant selection to assist weed control includes selection for dense canopy, herbicide resistance, longevity and other functional ground cover characteristics • Site preparation to minimize weed invasion, including herbicide application, weedmat, mulch, solarization • Planting design (single species, density of planting), which enables us to adopt strategies developed in agriculture for the management of monocultures • Both establishment and maintenance mulching utilized • Well developed understanding of herbicide application strategies and matching of these to customer, plant and resource parameters; application; mode of action; successional effects; and blanket or spot treatments • Information from a variety of sources manufacturers, journals, research • Improved staff skills and ongoing training

Quality assurance systems function through the requirement to state who is to do what, where, how and, in some cases, why for all activities. Further, quality assurance systems make no fundamental distinction between internal and external factors which must be controlled in order to provide quality. This emphasizes the power of a quality assurance system for providing integration of various activities to ensure achievement of the specified performance at the required standard.

Quality assurance systems are based upon a general pattern of events for a large range of different activities: planning, procuring, buying, selling, etc. (p. 1115Q, Implementing A Quality Management System).

The achievement of performance standards, and hence quality, stems from adequate definition and communication of objectives. The development of a management system such as that described is a tool for dealing with existing conditions and enabling change and improvement.

Defining goals and the way that they will be achieved is a way of managing over-riding dominant cultures and turning input or process orientation into output orientation.

Developing such systems and enabling change requires a broad range of approaches dealing with many organizational issues apart from the front line technical ones such as in this case, weed control. These include:

- redefining and developing technical approaches,
- defining what business we are in,
- developing policy, strategic planning and specifications and procedures quality assurance,
- customer service philosophy,
- redefining relationship with employer or customers,
- human resource strategies including occupational health and safety, reward systems, training, restructuring and
- developing external relationships.

References

Thoday, P.R. (1980). Weed Control in Amenity Plantings. Conference Proceedings, University of Bath.

Table 4. Some examples of performance standards for weed control

Category	Feature	Performance standard for weed control
Sports field or formal gardens	Grass	<ul style="list-style-type: none"> • less than 5% broad leaf weeds by area and no broadleaf species emerging above the grass sward • greater than 80% turf type grasses
Formal gardens	Garden beds	Maintain 100% free of weeds by controlling them when their growth exceeds 10% of the area or 100 mm in height
Recreational park	Grass	<ul style="list-style-type: none"> • less than 15% broad leaf weeds by area and no broadleaf species emerging above the grass sward • greater than 50% turf type grasses

The professional image

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Introduction

For contractors to secure contracts in weed control and continue in the business they need to present a professional image.

Training

To undertake weed control now it is necessary to complete courses to gain the Herbicide Applicators Licence. There are also various short courses available at Burnley and TAFE Colleges where you can study weeds and their control.

If the service provided is not only applying herbicide but also supplying the herbicide, the Agsafe course must be completed. This is part of an industry accreditation program that requires all people who handle, store, recommend or sell agricultural chemicals to complete training and become accredited. (Further information is available from Agsafe Private Bag 6066, North Sydney, NSW 2059).

Informal training is also important and should be part of a planned program. This includes on-the-job training and, since conditions are always changing, this should be ongoing, not just initial training. Great benefit can be gained by spray operators working in pairs, not only for

safety's sake, but they can also learn from each other.

Reducing the risks

Common sense and planning will achieve this aim. Wearing the appropriate protective clothing, using well maintained and calibrated equipment, and spraying when conditions are suitable will all contribute to reducing risks associated with herbicide spraying.

Emergency procedures

It is essential to have thought out an action plan to deal with emergencies that may occur, such as a chemical spill when mixing and preparing the spray, a vehicle accident with chemical on board or an equipment malfunction.

Public relations

Handling questions from the public will reflect the general approach to any business and therefore its long term viability. Whatever concerns people have should not just be dismissed. People will bring up all sorts of things when they see someone covered in protective clothing, spraying some unknown liquid onto plants.

Concerns need to be identified and if the answer is not immediately known, an effort must be made to find it out.

There is a lot of information available on all registered products. A network of contacts in Government departments and companies should be set up and seminars by the Weed Science Society and other organizations attended regularly.

Equipment

Equipment is normally the largest capital outlay, so there should be a high incentive to look after it. Regular maintenance and calibration tests should be combined with routine start up and clean up procedures.

Getting the best results

Remember the STAR program: Stress, Timing, Application and Rate. For optimum results all of these need to be right! If one is not ideal good results will still be achieved, but the others need to be spot on. However, it should be remembered that when working in biological systems the conditions can vary and results cannot always be predicted. So good records should be kept along with a complaints handling procedure.