

Use of Native Species in  
SMCRA - Regulated  
Revegetation in the Western U.S.

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Surface Mine Control and  
Reclamation Act of 1977  
(SMCRA)

# Surface Mine Control and Reclamation Act of 1977 (SMCRA) (30 USC 1265, Sec. 505 (19))

“establish on the regraded areas, and all other lands affected, a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the area of land to be affected and capable of self-regeneration and plant succession at least equal in extent of cover to the natural vegetation of the area; except, that introduced species may be used in the revegetation process where desirable and necessary to achieve the approved postmining land use plan”

# Code of Federal Regulations

(30 CFR 816.111(a) (2))

(a vegetative cover shall be established that is) “Comprised of species **native** to the area, or of **introduced species** where desirable and necessary to achieve the approved postmining land use and approved by the regulatory authority”

Out of SMCRA language emerged four revegetation performance standards:

- Percent Ground Cover
- Livestock forage production
- Woody Plant Density
- Species Diversity

Early (pre-law) revegetation commonly had used non-native forage species because of 1) ready availability 2) low cost and 3) they worked to the degree of making a vegetation cover of some sort.

# Domesticated Forage Grasses

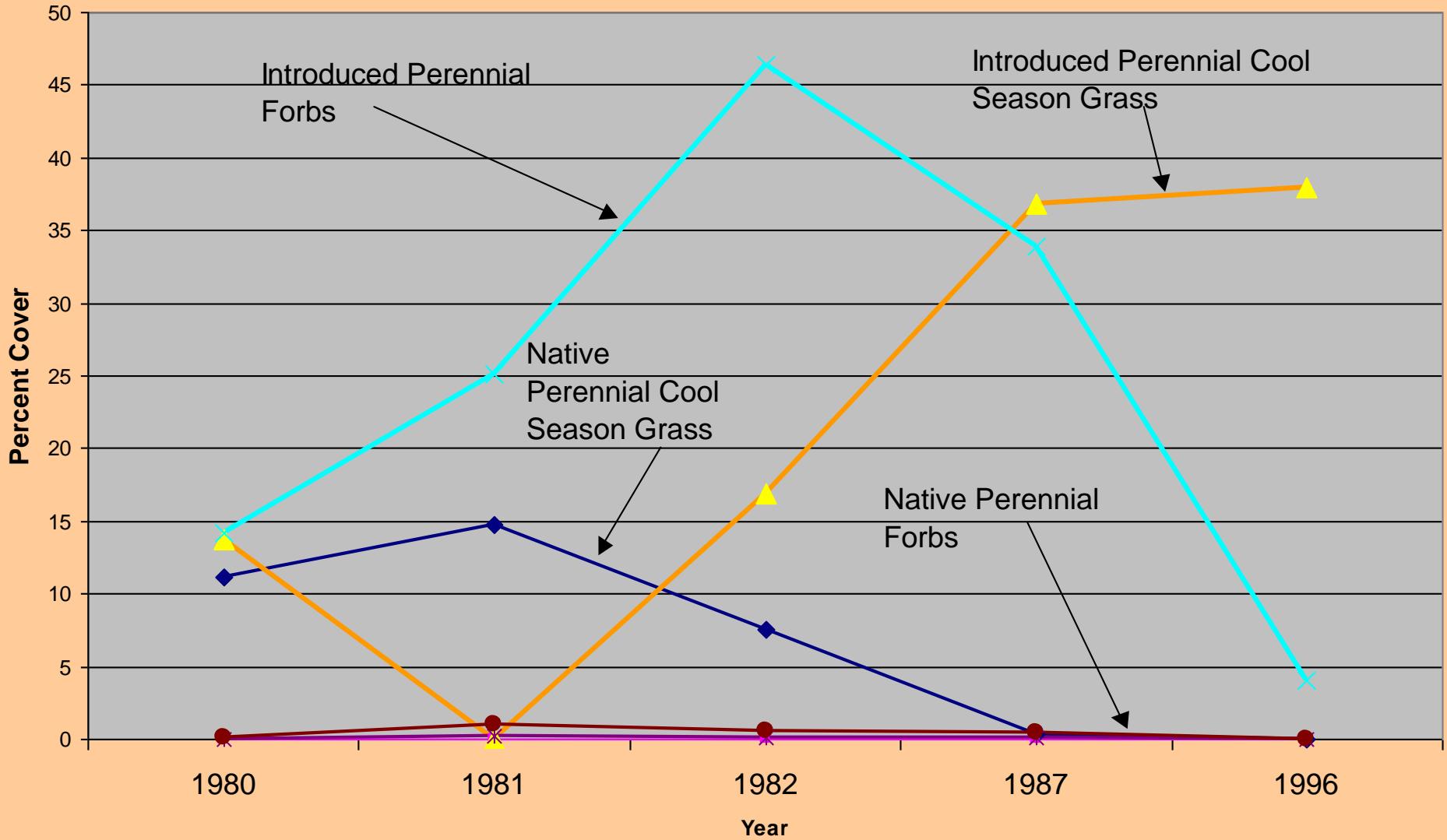
- In the West -- such species as smooth brome (*Bromus inermis*), crested wheatgrass (Agropyron cristatum, or *A. desertorum*), Intermediate Wheatgrass (*Thinopyrum intermedium*).
- Very quickly established and aggressive when young.
- Effective at excluding “weeds”

When an improved pasture is sought, everything besides the planted grass IS a weed so it all works out.

When a combination of life-forms including shrubs, trees and forbs is sought ----- competitive exclusion by domesticated grasses is a big problem.

Use of native species for post-mining land uses of rangeland and wildlife habitat (very common) besides legal and regulatory mandate thus became necessary for practical reasons.

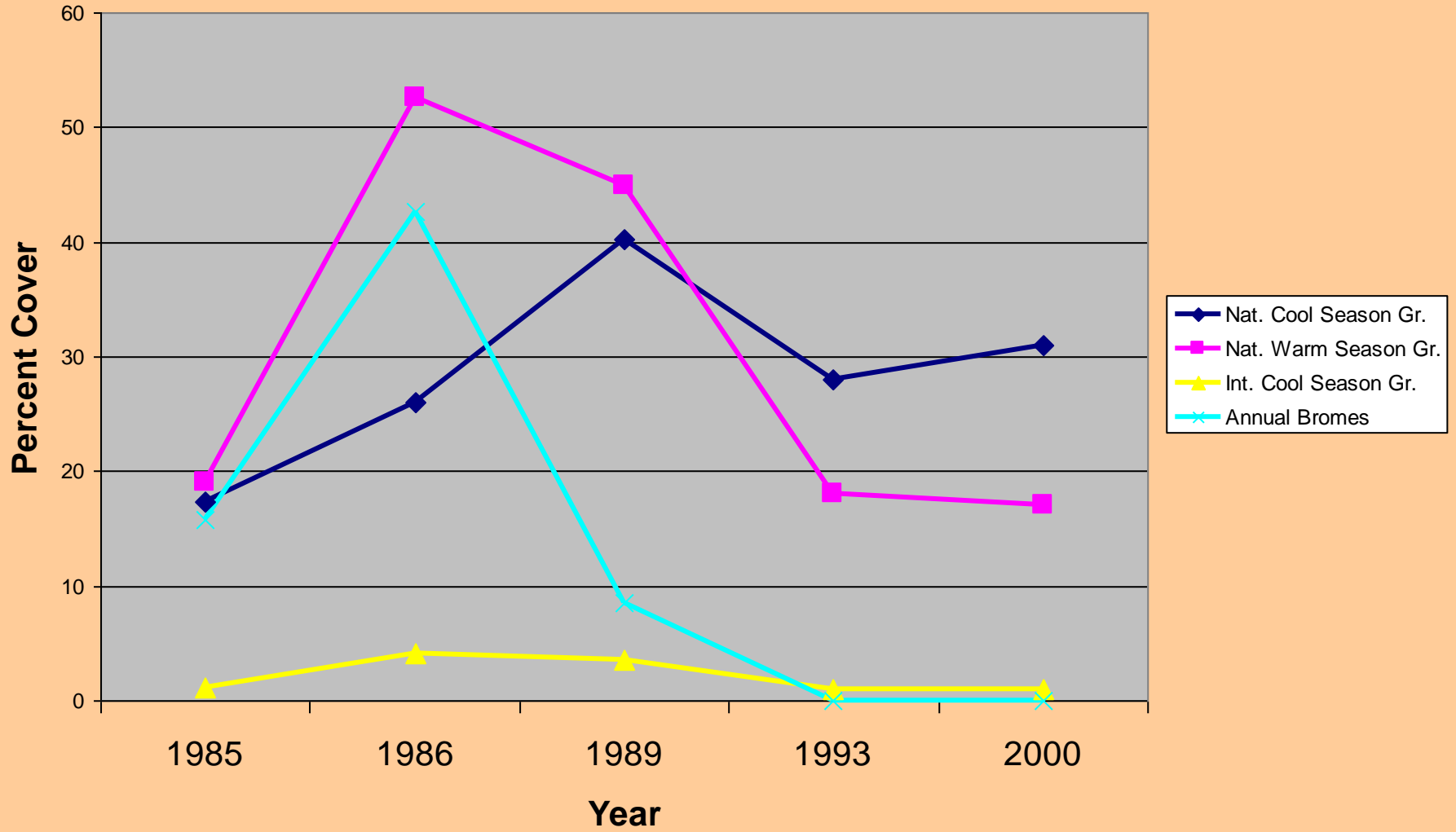
# 1978 Reclamation - Northern Great Plains



Native species are typically much less aggressive than domesticated non-native grasses.

Seed Mixes were modified progressively to reduce and then eliminate the non-native forage grasses - even very small amounts of these plants eventually led to their dominance.

1983 Reclamation by life form



Note to Users: Even when they (non-native forage plants) are zero percent of the seed mix, they may legally be present as “other crop seed” however.

The agricultural grasses are sufficiently rambunctious that even in very small numbers, they may wreak havoc on the prospects of achieving the planned-for native plant community.

Specifically, intermediate wheatgrass, smooth brome, and tall fescue are common uninvited guests that can cause trouble with the passage of time.

I think that I may not need to explain that the “trouble” is development of an improved pasture and not the native community carefully planned.

Even native grass species, especially rhizomatous cool season grasses like western wheatgrass (*Pascopyrum smithii*) and thickspike or streambank wheatgrass (*Elymus lanceolatus* ssp.) can provide excessive plant competition and reduce shrub and forb survival.

Reducing seeding rate (i.e. seeds per square foot) of rhizomatous native grasses to reduce competition is another trend that many operations have found necessary.

An important issue running parallel to control of high competition in pursuit of better shrub and forb establishment is the simultaneous need to have cover sufficient for erosion control.

Without adequate site stability from the beginning via mulch and/or early plant cover, serious site damage due to soil loss may ensue.

And of course appearance of opportunistic party-crashers like cheatgrass or even perennial invasive plants can happen when a site is left too open.

And thus we have a delicate  
balancing act between species  
aggressiveness and just enough  
erosional and weed-exclusion  
protection

To make matters more difficult,  
the vagaries and often unique  
details of moisture and  
temperature along with wind  
during a particular year at a  
particular site add an element of  
chance .

In the long-term, the achievement of shrub and forb diversity and abundance is a product of stresses that allow them to find and exploit competitive openings.

Suitable species and genomes are a factor too -- as a practical matter, the most diverse vegetation results from direct-haul topsoil. This allows diverse species to be present and waiting in the soil until the right opportunity comes along.

But --- where you have severe  
looming likelihood of weed  
invasion and minimal likelihood of  
rapid native species establishment,  
the use of non-native grasses as  
site-holders / “trustees” may  
indeed be a solution.

Cue -- throw rotten vegetables  
now.



But really -- old fields of smooth  
brome and crested wheatgrass  
have been observed to -----  
over a period of 50 to 80 years----  
give way to invasion of native  
species.

It may feel like admitting defeat,  
but in the long-term, it could be a  
viable alternative if you can get  
past the long wait.

In terms of other successes related to native plants over the SMCRA years, the progressive increase in availability of different species is a real success.

Over the course of the past 30+ years, the availability of native seed for inclusion in seed mixes has improved greatly. This is in no small part the the result of the sizeable market that SMCRA-related reclamation seeding has generated.



# The Nature of Restoration Success

*Are we gardening or are we  
re-establishing ecological  
potential and process?*

Much of what has gone on in restoration is more akin to gardening -- set the target / goal and plant the species that are envisioned to be present in the goal community.

It can be surprising to some that many of the planted desired species fail. The likely reality is that the goal community envisioned was the result of a long period of orderly succession (early years) and then randomly occurring stresses and plant responses thereafter.

Those stresses are key to the establishment of diversity at the species and the life form levels.

To a large extent diversity represents the accumulated scars of time as breaks in the competitive status quo allow invasion and establishment.

So in like fashion to a physician,  
a restorer should first do no  
harm..... Make sure that the  
ecological potential of the site is  
retained. ...allowing natural  
species establishment and  
interaction to proceed.

Just planting the desired species on the site will not be successful if the ecological conditions are wrong -- and those conditions that include an extended temporal process and especially those that occur unpredictably will be impossible to reproduce as part of a single gardening effort.

Beyond setting the ecological  
stage -----

Diversity / species composition  
has a strong scale factor involved  
in its development on restoration  
sites.

Assessment of restoration success as regards species / life form diversity ( in a reasonable human time scale) requires an evaluation of the degree to which diversity is showing up on a “dilute” scale early on.... and its chance of concentrating through time.

Native species of appropriate adaptation are central to rehabilitative efforts on most sites. Their usually moderate competitive strength allows enhanced development of species and life form diversity.

Long term stochastic and species interaction effects have large effects on the nature of plant communities at any given time that are under-appreciated.