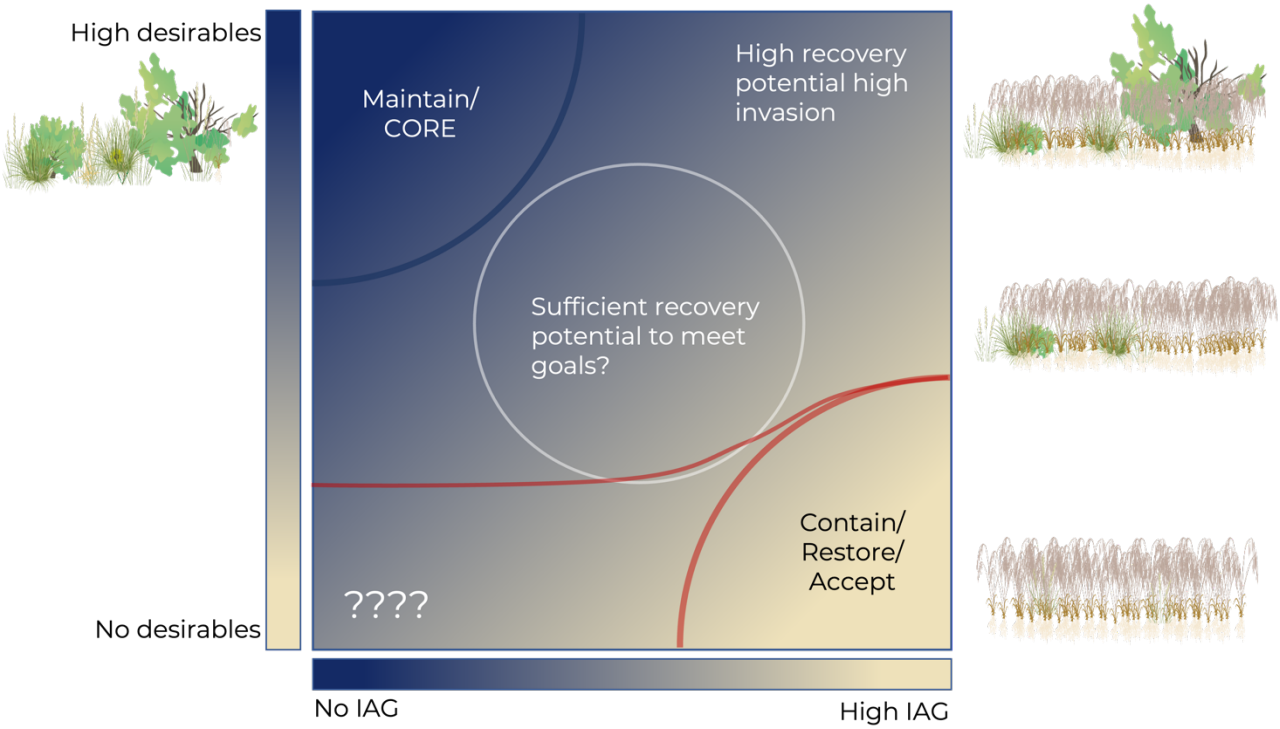
Recovery Potential and Invasion State



If we think about two primary attributes of plant community composition – desirable species (on the vertical axis good guys: perennial grasses, forbs, and sagebrush) and invasive annual grasses (horizontal axis) – each can vary from absent to completely dominant. These two gradients interact to form a large number of potential vegetation states or combinations along those gradients. Different states or combinations presents different management scenarios that may be addressed by different strategies and options for management on the landscape with different potentials for "success" in meeting land management goals.

Extreme cases are probably the easiest to start with. A fully-functioning, diverse rangeland plant community with NO IAG (upper left) is something we want to try to maintain – which adheres to the vegetation portion of what we would consider CORE (other values beyond vegetation may help us further refine our efforts in core). In such sites, we should focus management on maintaining integrity of the plant community in good condition, preventing repeated introduction of IAG seed, managing disturbance to reduce invasion progression, etc.

- Recovery potential is largely irrelevant here because we need to maintain, not recover, structure and function
- Monitoring is important to provide the ability to do things such as EDRR
- We are not very good at prevention, but we should at least think about it in these situations
- Think about site susceptibility to invasion and focus active efforts in areas with a higher suitability to invasion

At the other extreme (lower right) is a site with few to no desirable plants and a bunch of annual grasses – the dreaded cheatgrass monoculture. In many situations, we are limited or unable to restore diverse, functioning plant communities once the site has crossed into an annual grass state. As such, our probability of successfully restoring or recovering functionality back to some higher level is limited. SO our options and expectations are also different for such a site. Depending on scale, topography, etc., we may face accepting this and managing it as a novel plant community in the best way we can.

- Recovery potential is low – but we need to make sure. Perennial grasses may be hiding under all that cheatgrass.

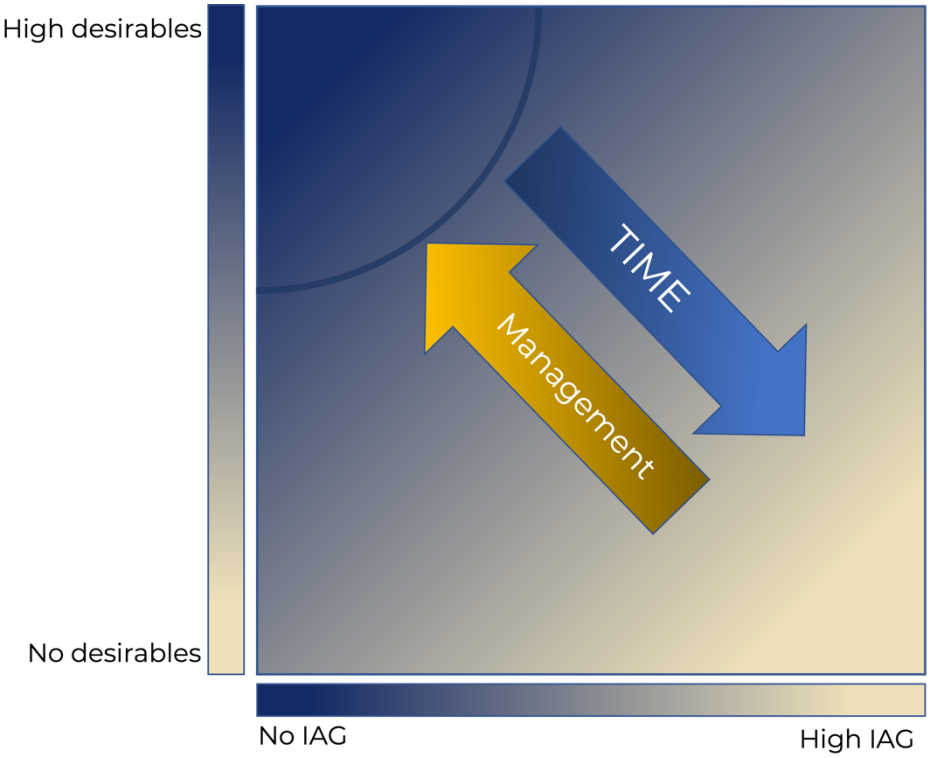
- Because of this, the only way we may be able to get desirables back is to actively replace them with seeding, transplants, etc.
- High uncertainty around success in this situation
- BUT – you can pretty much use any tool you want to try to reclaim or improve it.

As mentioned previously, the extremes are the easiest places to think about – which may explain our tendency, as humans, to focus on such situations. The in-betweens are more difficult and the complexities to be considered are greater. In the upper right, we are faced with a situation where all the good guys are still in place, but perhaps suppressed by annual grass competition. With a high recovery potential, actions to reduce annual grass abundance on the site should result in a positive response from the desirable plant community. With the relatively high invasion state, annual grass control should make additional resources available to the perennials on site and result in an increase in production and growth.

Such sites (high recovery potential/high invasion) may have a higher risk of ignition during summer months with an IAG understory (assumption). We are NOT very good at re-establishing sagebrush once we lose it, so if we are managing for sagebrush grassland conservation, these might be some very high priority 'growth' areas where we can reduce IAG not only to enhance existing plant communities, but to try to reduce ignition probability and loss of sagebrush. Such sites would likely be very important when considering risk of loss and urgency for action.

Let's do the opposite extremes in the alternate diagonal now (lower left). No desirables and no annual grass is unlikely to occur on the landscape, but it may. If so – it is a rocky outcrop or similar site with little potential to support vegetation OR there are some serious issues going on that may require another workshop altogether. Needless to say, recovery potential (presence of desirable species on site) that falls below some minimum level likely reduces probability of success to a point where active management is not warranted for high priority on that site.

The intermediate condition likely presents a high level of uncertainty. One of the challenging decision points is to determine whether sufficient recovery potential exists on a site to allow for passive improvement following invasive grass control or whether active seeding or transplanting is needed. This may depend on the management tools being used and their compatibility with the existing plant community.

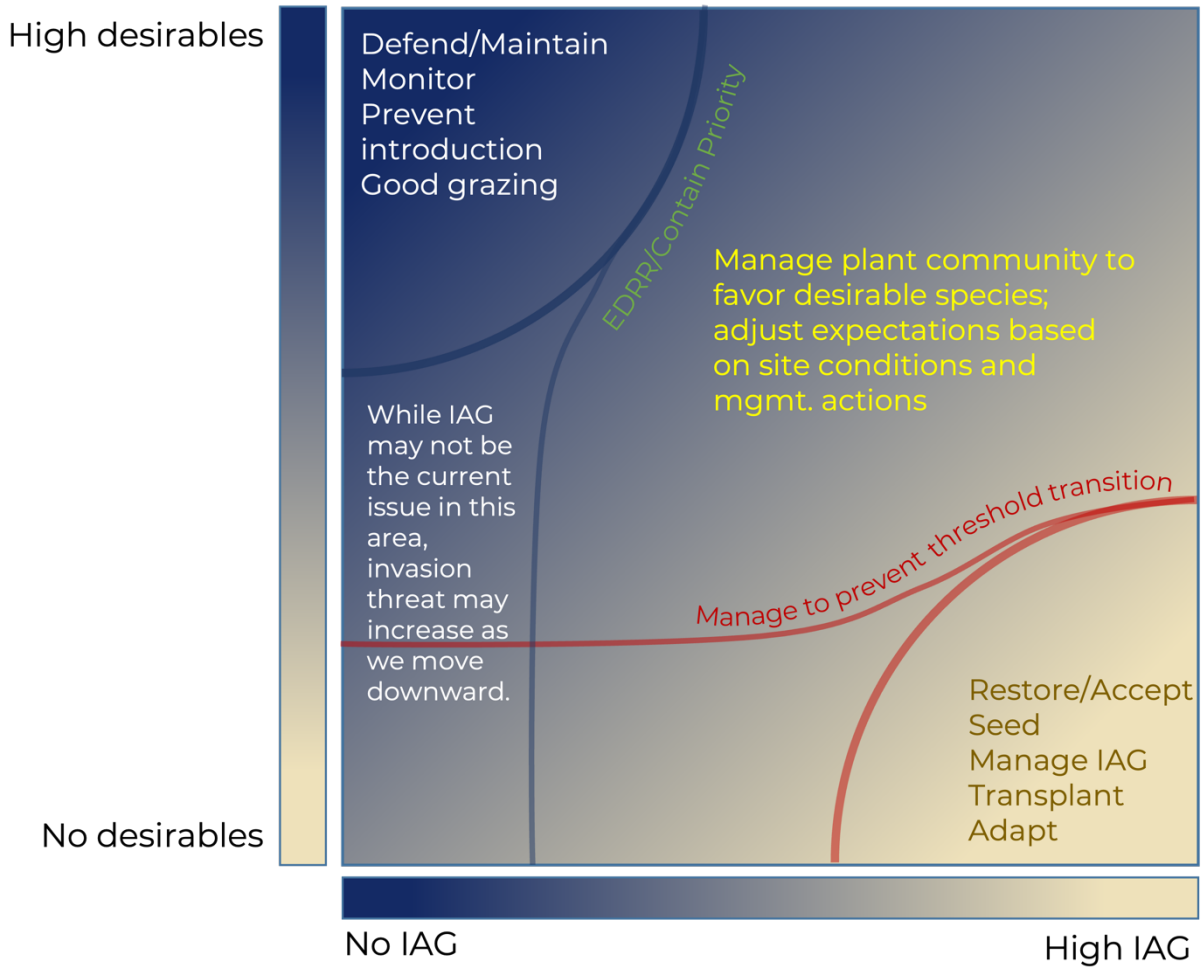


In a very general sense, passage of time on sites susceptible to invasion and dominance by invasive grasses leads to progression toward a higher invasion state and potentially a lower recovery potential. This may be discontinuous, especially when coupled with a change in disturbance regime. A few key things to keep in mind with this 1) it is likely NOT inevitable that a site with low cheatgrass now will become dominated by cheatgrass in the future if all else remains stable*, 2) invasive grasses are highly variable from year to year and the conditions on a site will likely move back and forth as time progresses.

As we increase in size of management unit, likelihood of finding complete "pure" areas of these different states decreases. As such, we have to deal with adjacency and juxta positioning of the different plant communities.

* We say this now, but habitat suitability models are largely reflect site characteristics indicative of the species occurrences that have been documented and incorporated into the model – under the current climatic and management conditions, which may interact with habitat suitability. Keep this in mind when making statements about where a species is not capable of establishing.

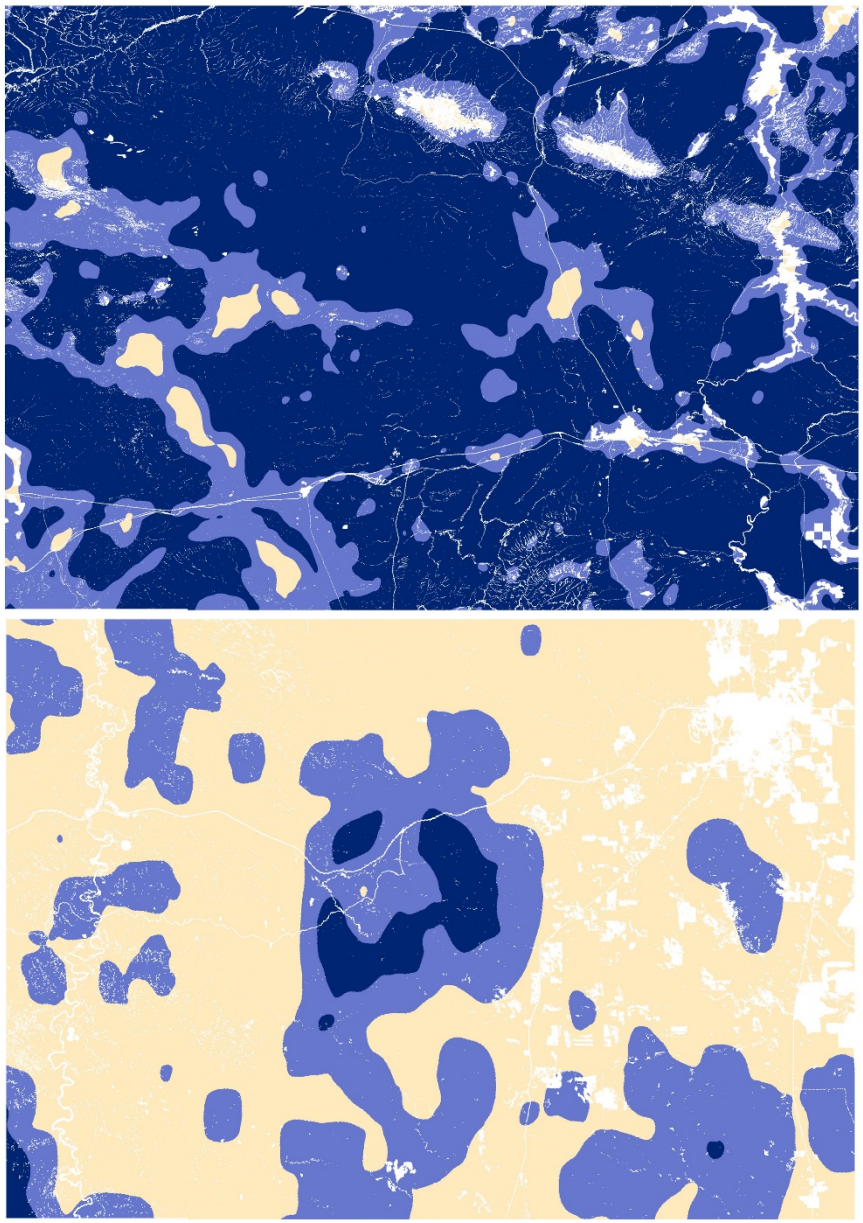
An interesting example is sites that may have sufficient perennial grasses and forbs, but may be lacking sagebrush. If we are managing for perennial grasslands, then recovery potential may be sufficient to warrant active management. If we are prioritizing sagebrush habitat, then we may seek to work in areas with a higher sagebrush component existing in the plant community.



In the transition zone, one of the decision points is to determine whether sufficient recovery potential exists on a site to allow for passive improvement following invasive grass control or whether active seeding or transplanting needs to occur. This may depend on the management tools being used and their compatibility with the existing desirable plant community.

Pre-treatment perennial plant abundance (especially density) is likely the best indicator of what the post-treatment community will look like – particularly if management methods are compatible with the existing desirable community. If pre-treatment perennial plant density seems sufficient to meet management objectives, then a compatible herbicide program may be a good option. If pre-treatment desirable plant abundance is not sufficient, then the tools used for annual grass control need to be compatible with seeding or transplanting.

How plant community invasion state and recovery potential relate to one another across the landscape matters. Highly-invaded sites may serve as seed sources that can infest noninvaded core sites through dispersal of seed into those sites. Additionally, larger blocks of high-quality core may provide more connectivity and more effective habitat than smaller, disjunct patches. Using the color scheme from the graphs above, think through the different scenarios presented in the two figures below. How might you develop a strategy for managing these two locations? Would it differ between the two? If so, how?



Management tools and approaches in the transition zone (discussed above) are likely to be consistent with subtle use differences across locations. The sense of urgency and need to actively manage annual grasses is not dictated by invasion state and recovery potential, but more so by its position relative to different plant communities (and their associated values) across the landscape.