

I don't often discuss what I think of things here, but I'd like to discuss some of my observations and thoughts today. I am hearing and seeing a lot of discussion about the BLM's proposed gather, which would likely be taking place next month (September). Following are some things I would like to add to this discussion. Also, the Pryor Mountain Wild Mustang Center's Board of Directors will be putting out its new list and discussion of goals for the wild horses and the range soon; and so this is sort of a prelude to this document.

You often hear about the BLM's goal to have healthy horses living on healthy rangelands. Though cliché and often misrepresented by all sides, I truly believe that this is an important goal. I've got this set up to introduce some different key concepts that you'll see end up getting tied together at the end, so please read this whole thing to get what I am trying to convey.

Healthy rangelands

I start with a discussion of healthy rangelands because you can't have healthy horses without healthy rangelands. The range thus serves as a foundation. The first thing I like to start out with in discussing the range is this – The Pryor Mountain Wild Horse Range (PMWHR) is fenced. I know, the fence has holes and some of the horses have left the range. But from a legal perspective, the PMWHR is fenced; and the herd is to be managed within the fenced area. It's been said that our wild horses are wild, but they certainly aren't free roaming. Because of this, the herd has access to a finite amount of resources, such as water and food. This is important to know – There is not an inexhaustible supply of resources out there. The idea of carrying capacity is definitely important on the PMWHR. Carrying capacity describes how many individuals a given area can support before the area starts to have a downward trend due to the presence of too many individuals. So I think that the important concept here is that the PMWHR consists of a set amount of land that can only produce enough resources to support a certain number of horses.

So how does this all relate to the PMWHR? In recent evaluations, the BLM has determined that there are parts of the range experiencing upward trends while other areas are experiencing downward trends. Bringing in the concepts from above, this means that certain areas are being used by too many horses; and so they are starting to have their resources depleted. In other words, there isn't as much to eat as there likely should be in these areas. What areas am I talking about here? Well, the meadows on the top of the PMWHR, the areas at the highest elevations, are a particularly important area to consider. If you come here right now and try to see the wild horses, you'll find that most, but not all, of the herd is up in these areas. If you were to go up to these areas, you would see open meadows full of vegetation. Lots of green means lots of food for the herd, right? Wrong. Lots of the green you see up there consists of different vegetation that is either poisonous, unpalatable (doesn't taste good), lacking in nutritional value, or a combination of these. The green that does benefit the herd consists largely of grasses and grass-like plants. The availability of these has been found to be decreasing, and this is why the BLM has determined that these parts of the PMWHR are experiencing a downward trend. Because of this, the BLM has proposed removing horses so that the population can be brought down to the level where the land can support the population without experiencing further downward trends.

This year we have received an above average amount of precipitation. There is a lot of vegetation out on the PMWHR because of this. So if this is the case, then why does the BLM seek to remove horses this year? Remember, when I am talking about range conditions, I am talking about trends, not a single point in time. Range conditions are a lot like the stock market. Let's say that today, the market was looking

really good. However, in the past few months, the market has been dropping steadily. That is, the market is going through a downward trend. If today things are looking good, do we have reason to believe that the market is turning around and will start going through an upward trend? No, we do not necessarily know this. Tomorrow, things could suddenly change back to the general downward trend. Similarly, the same must be considered with range conditions. Yes, things are looking better out there this year than they did last year. But this is a single point observation. If things continue to look good next year and in the years after, then this upward trend would warrant a larger herd population size.

Healthy horses

I've heard all sorts of discourse on what makes horses healthy. In these discussions, you often hear the term genetic viability being used. Genetic viability refers to a population's ability to have sufficient genetic diversity to be able to persist through time. Genetic diversity refers to how much variation exists in the population's gene pool. The more inbred a population is, the less genetic diversity there is in the population. The less genetic diversity there is in a population, there is a smaller chance that the population will be able to persist through environmental change. Thus, from my perspective, a healthy horse population is one that has low levels of inbreeding. I've discussed some of my interest in this topic with the herd in a previous post about the development of a genealogical database for the herd.

Over time, genetic diversity will be lost. This is simply the way it works. Once genetic diversity is lost, it won't come back unless it is comes back with individuals reintroduced from a different population. However, the rate at which genetic diversity is lost can be slowed by careful management. Management is a word that brings many thoughts to mind, and it's sometimes hard to have positive thoughts on the management of the Pryor Mountain Wild Horses. Despite this, management must occur because, again, the herd lives on a set amount of land that can only produce enough resources to support a certain number of horses. We'll return to this subject later; but for now, keep this in mind. Returning back to management for the conservation of genetic diversity, I will quote from a letter by Dr. Gus Cothran that is very widespread: "The most important single factor in maintaining genetic variation in a managed population is effective population size." Effective population size, often abbreviated N_e , refers to the number of individuals that are actually contributing to their population's genetics. The higher the effective population size, the less chance there will be for inbreeding to occur. Imagine a population with 25 members. If this population has an effective population size of 5, then you can see how there is a good chance that inbreeding is occurring – 20 members of the population are descended from 5 individuals. The amount of genetic diversity that exists in the population is confined to the amount of genetic diversity that exists in its effective population. This is actually the more standard definition of effective population size. In *Introduction to Conservation Genetics* (Frankham, Ballou, and Briscoe, 2007), effective population size is defined as the size of an idealized population that would lose genetic diversity (or become inbred) at the same rate as the actual population. This text also describes how "the genetic consequences in small populations depend on the effective population size rather than on the number of individuals in the population." This statement reflects what I said above, it is the effective population size that determines the level of genetic diversity within a population and thus how genetically viable the population is.

So the above paragraph describes some interesting concepts, but how does this all come out in the real world? How many wild horses need to be in the Pryor Mountain Wild Horse herd to keep genetic

diversity high so that the population can be genetically viable? In the aforementioned letter by Dr. Cothran, it is described how having an effective population size of 50 will keep the rate of loss of genetic variation at 1% per generation. Introduction to Conservation Genetics (Frankham, Ballou, and Briscoe, 2007), also discusses 50 as a minimum effective population size. So is this to say that the herd could be taken down to 50 individuals? Not at all, this is saying that there should be a minimum effective population size of 50 individuals. Since not all individuals in a population are reproducing, the effective population size actually is less than the total population size. What percentage of the total population does the effective population make up? Estimates I've seen range from 25% to 33%. This pushes the minimum total population size closer to 150 individuals.

If you read through The Wild Free-Roaming Horses and Burros Act of 1971, you'll be hard pressed to find any mentioning of genetic viability or effective population size. The 1971 Act is largely concerned with balancing the number of horses with the number of horses that the range can support. This is thus why you see similar emphasis on rangelands in the BLM's decision making process – They are really required by law to do just that.

Is All Hope Lost?

So if the BLM's saying that they need to take the population down to 120 due to rangeland deterioration but geneticists tell us that the population should be kept closer to 150 to keep them genetically viable, then are the Pryor Mountain Wild Horses going to soon disappear? Introduction to Conservation Genetics (Frankham, Ballou, and Briscoe, 2007) has a good quote from biologist Michael Soulé: There are no hopeless cases, only people without hope and expensive cases. So in this case, I have hope that the Pryor Mountain Wild Horses are not going to soon disappear; and I am going to continue to fight for this as long as I can. Now that you know everything in the above paragraphs, let me explain why I have this hope.

Remember above when I said that parts of the range were experiencing downward trends in range conditions? I also said up there that parts of the range were experiencing upward trends in range conditions. One of the largest areas of the range also happens to be where these upward trends are occurring. This tells me that the problem isn't that there are too many horses on the range. Instead, I think that the problem is that the horses aren't using the range as good as they possibly could. I think that there is a lack of water across the range that is preventing them from doing this. I think that if there was more water available throughout the range, then the horses would be able to more uniformly graze; and I think that this would allow for the BLM to manage for more than 120 horses. Guess what? The BLM thinks this too. They have proposed a number of projects that would likely allow for a higher population size. In fact, the following quote appears in a recent Billings Gazette article: The BLM's horse management plan says the range has the potential to support 179 animals ("Wild Horse Range Pressured by Overgrazing" by Brett French, July 12, 2009). So what are these projects? The BLM wants to develop water sources for the herd in the areas experiencing upward trends so that the areas experiencing downward trends can get some rest. They also want to do things like reseeding, prescribed fires, and the like so that the range can further be improved to benefit the herd. The BLM also has discussed how they will determine how many horses can be on the range after these projects are implemented. They have said that they will do this in five years or when the Billings Resource Management Plan is revised, whichever comes first. Remember the Decision that the BLM released on its new Herd Management Area Plan (HMAP) early this year? It

was this HMAP that outlined all of these projects, and the BLM was going to start implementing the projects when the HMAP went into effect. However, the HMAP is currently in litigation; and so all of these projects are on hold. I hope that there will soon come a time when all of the good ideas in the HMAP are allowed to be implemented.

So Where Do I Stand?

I don't like talking about my personal views too much, but I think it's only fair to share them so you know where the guy writing about the horses comes from.

I am not trying to showboat for the BLM. I am trying to show support for some ideas that the BLM happens to have, and I am trying to explain why I do support them. Many of these ideas are from the BLM, but some are also ideas shared by many people who took time to formulate new approaches and ideas. I believe that it is important for stakeholders to work with the government in the decision-making process so that quality decisions can be made. Sometimes I find it hard to believe how many meetings I have had with stakeholders and government managers from all sorts of different areas that relate to the PMWHR and the herd. I also believe that it is important to assist government managers whenever possible. I think it is now just as evident as ever that this must be done. Here at the Pryor Mountain Wild Mustang Center, we even have a Memorandum of Understanding with the BLM's Billings Field Office that defines our relationship with the BLM regarding the distribution of printed materials and the sharing of the information we gather on the herd. We also have volunteered to help the BLM with a number of other projects. Note, I said volunteer. Our relationship with the BLM is strictly on a volunteer basis. Despite the rumors that are rampant, the Pryor Mountain Wild Mustang Center does not receive funding from the BLM. Also, despite the rumors, we aren't "in the BLM's pocket" and we don't always agree with what the BLM says. Again, it just so happens that we currently agree with a lot of what the BLM has proposed. Why not work with the BLM when such a relationship is for the benefit of the PMWHR and the herd?

I am not trying to create a panic. If the herd keeps grazing the range the way they are, the horses aren't likely going to starve to death by next year; and the range likely won't be totally destroyed by next year. However, if things don't change, these events may end up happening in the future. I can give two big reasons why this isn't good. First off, the PMWHR is a very fragile piece of land. It experienced heavy overgrazing in the early 1900's; and it isn't a high quality piece of land as it is. The land must be taken care of so that it can continue to support wild horses. Second off, if the range does go downhill and there is very little forage, then this makes it really easy for massive die-offs to occur. These big events definitely affect the herd's genetic viability. Such an event happened during the winter of 1977-1978 when half the herd died. Certainly this event had an effect on the herd's genetic viability, and the herd obviously survived it. However, having many of these kinds of events happen is not desirable. Thus, being concerned with the long-term survival of the PMWHR and the herd requires proactive planning; and you have to start somewhere with this type of planning. Why not now?

I am not writing this to show support for the removal of 70 horses this year. Yes, the population is high right now (I am pretty sure there are currently 189 horses on the range at this time). Yes, there are those parts of the range that aren't looking too great. Because of this, the BLM would like to take the population down to 120. However, I believe that this current situation reflects a number of events that took years to unfold. I think that in cases like this, situations that took years to develop should also be

resolved in years, not in a year. Thus, a process using a gradual reduction in population through a series of small removals would be preferred over one large gather. I feel that it would be best this year to remove 30 horses ranging in age from 1 to 3. Using my data from my genealogy project, I have chosen these 30 horses because I believe they can be removed without causing significant damage to existing bloodlines. Similarly, I have identified a number of horses in these cohorts that should not be removed. I also feel pretty optimistic about these younger horses being adopted to good homes due their age. I do not believe that any four or five year olds should be removed. In the case of the five year olds, it's really the five year old. There's only one of them, and so that cohort shouldn't be touched. The four year olds also have a relatively low population size. Many horses from this cohort were removed in 2006, and others have since died. As for any horses over the age of five, I just don't think it's a good idea to remove them because I think they would end up not being adopted and would thus end up in long-term holding. This is something I do not want the Pryor horses, or any wild horses for that matter, to be a part of. I also think there are many other issues that arise when removing an older horse from the range; I just don't think it's a good idea. However, I do think that a number of mature females should be given fertility control. I am a really big supporter of the use of the immunocontraceptive vaccine Porcine Zona Pellucida (PZP). I get frustrated with all of the misinformation spread on PZP. A lot of great work has been done in managing wild horse populations with PZP. Lots of people who have been on the range with me have gotten to hear my lengthy description of why I think it is one of the most ingenious things ever thought of. I think that PZP should be given to mares that have good representation on the range while mares with no representation on the range should not be given it until they do have good representation on the range. I would prefer that PZP be the primary method of population control for the herd. I am honestly not a huge fan of removals, but I would be okay with infrequent, small gathers that met the adoption demand if PZP was used properly. I think that we could start seeing significant results with a proper fertility control program by 2012 if the BLM starts it this year. Between now and then, I think there may need to be another small gather for younger horses. I also truly hope that the BLM can soon start the range improvement projects it has outlined; what I am proposing would work a lot better if these projects were in place. I think that if the population was carefully managed, it could go down toward a size of 120 if the BLM was able to work on its proposed projects so that the population would be at 120 just for a few years.

If you've made it this far, I have to thank you for your patience as you read through this document. It's a lot easier listening to me describe all of this driving up the Burnt Timber Road – It makes the trip a lot faster too! But I do hope that you have some better understanding of the complex issues that surround the management of the Pryor Mountain Wild Horse Range, and I hope you understand why I work for the goals that I work for. Please let me know if I can address any questions or comments.