

Sustaining Land and Wild and Free-roaming Horse, and Burro Health

1978 -129 horses

1993 – 396 horses

Gather
winter
2005-2006

2006 – 90 horses

2010 – 399 horses

Gather winter 2010-2011

2011- 113 horses

2014 – 523 horses

2016 – 904 horses

2018 – 1,429 horses

2018.08.06 12:06

- Morgan Spring
- Goshute HMA
- AML 74-123
- 2023 population 2,572
- Photos and data from BLM
- Slide set by
Dr. Sherman Swanson, UNR

Prehistory – North America to Eurasia

Horses evolved in North America
Migrated to Eurasia during the
early Pleistocene

During the Ice Age, horses
lived in many habitats with
other large herbivores:

Three giant ground sloths
Flat-headed peccary
Yesterday's camel

Large-headed llama
Diminutive pronghorn
Shrub ox

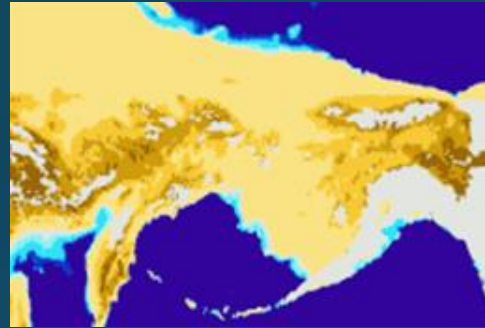
Harlan's muskox
American mastodon
Columbia mammoth

Predators dispersed grazing:

Gray wolves,
Grizzly bears,
Mountain lions

and now-extinct:
Saber tooth cats,
American lions,

American cheetahs,
Giant short-faced bears,
Dire wolves



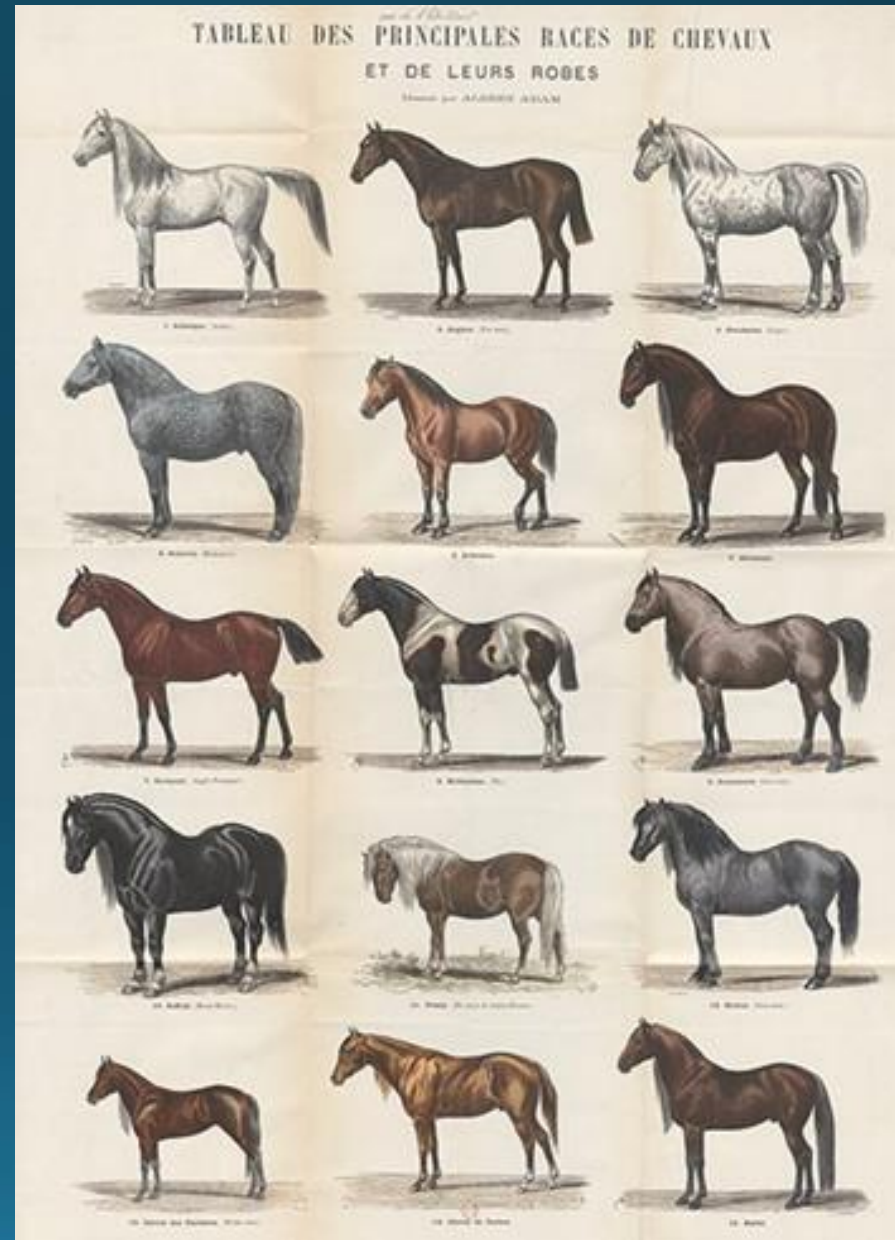
History in Eurasia

Horses developed into new species

Horse domestication and breeding empowered hunting, agriculture, cities, transportation, civilization, sports, and conquering armies



Humans developed breeds and selected preferred traits including reproduction at a younger age (age at first foaling = 2 vs 4.2 for Przewalski's) and with limited forage



Horses in Nevada

Diaries and letters from trappers, 49ers, miners, and explorers (1820s -1860s) do not mention wild horses

After the Gold Rush, people came back with horses, looking for mining and agriculture opportunities

In 1861 Nevada passed its first “Act Concerning Estray Animals”, listing horses first

By 1873, 21,874 horses were recorded in Nevada counties

By 1880, it was 41,386 and horses were sold from Nevada to other states

The US cavalry and Agriculture provided markets for horses. As long as society needed horses, horse ranching was profitable

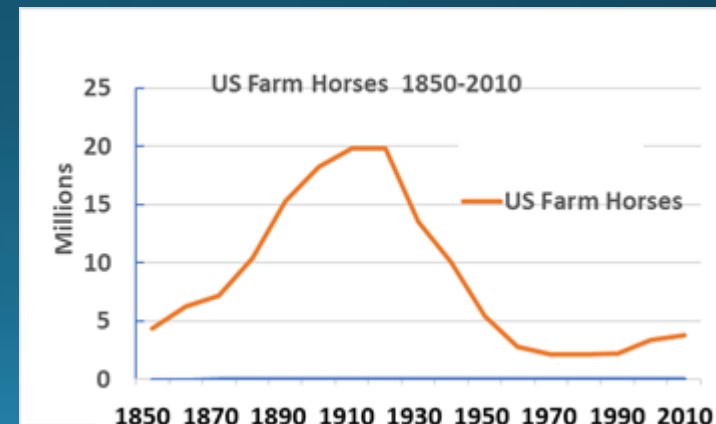


When the Internal Combustion Engine Provided Horsepower

Demand for horses faded

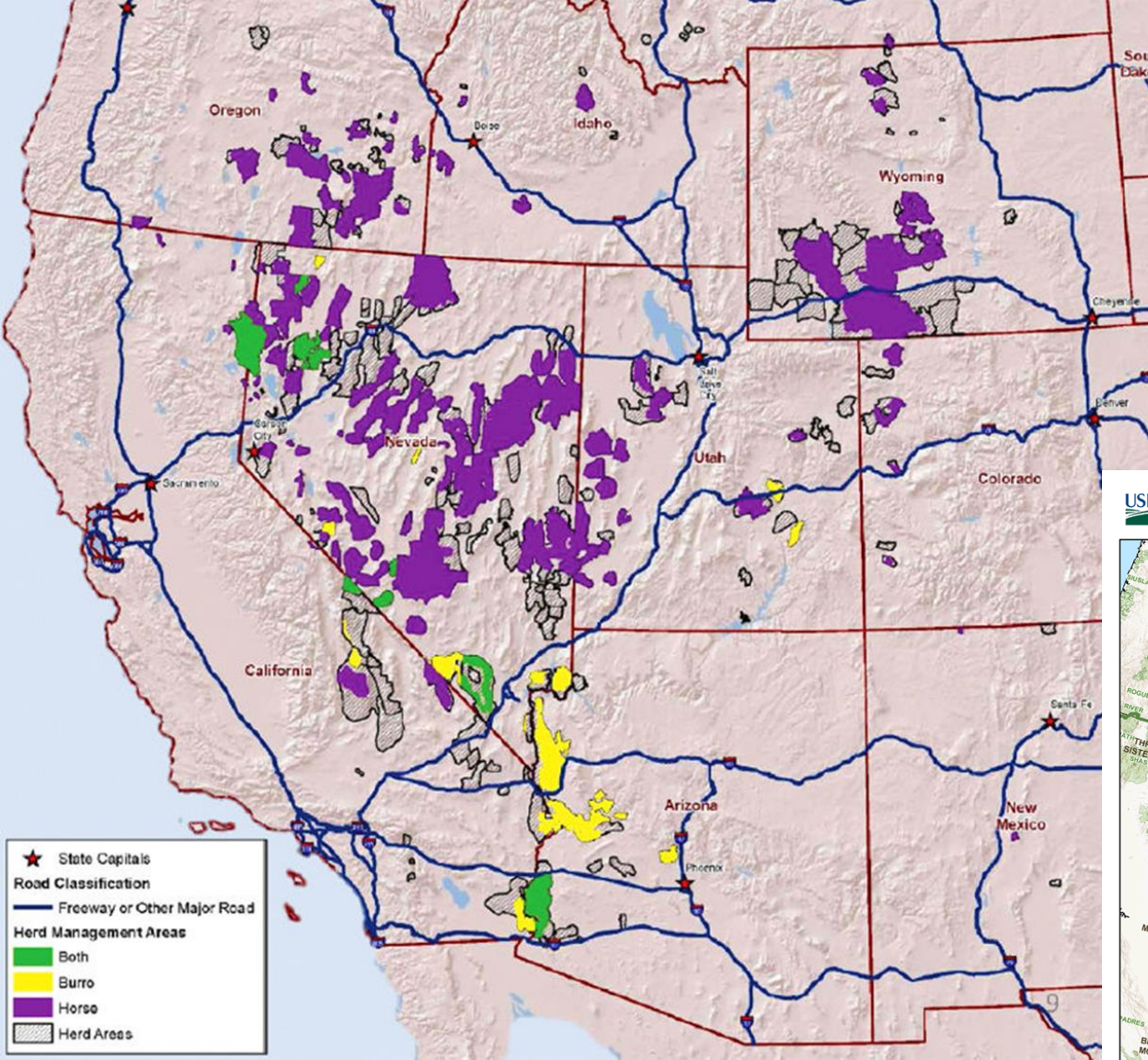
In a weak market, more horses were turned out or escaped and became feral, free-roaming or “wild horses” living free

US Farm horses peaked at 20 million in 1910-1920



BLM

Forest Service



★ State Capitals
— Freeway or Other Major Road
Herd Management Areas
Green: Both
Yellow: Burro
Purple: Horse
Grey: Herd Areas

USDA US Forest Service Active Wild Horse and Burro Territories



Prepared by the USDA Forest Service Geographic Technology and Applications Center Salt Lake City, Utah, 2017. All rights reserved. The USDA Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. Using GIS products for purposes other than those for which they were intended may yield inaccurate or misleading results.

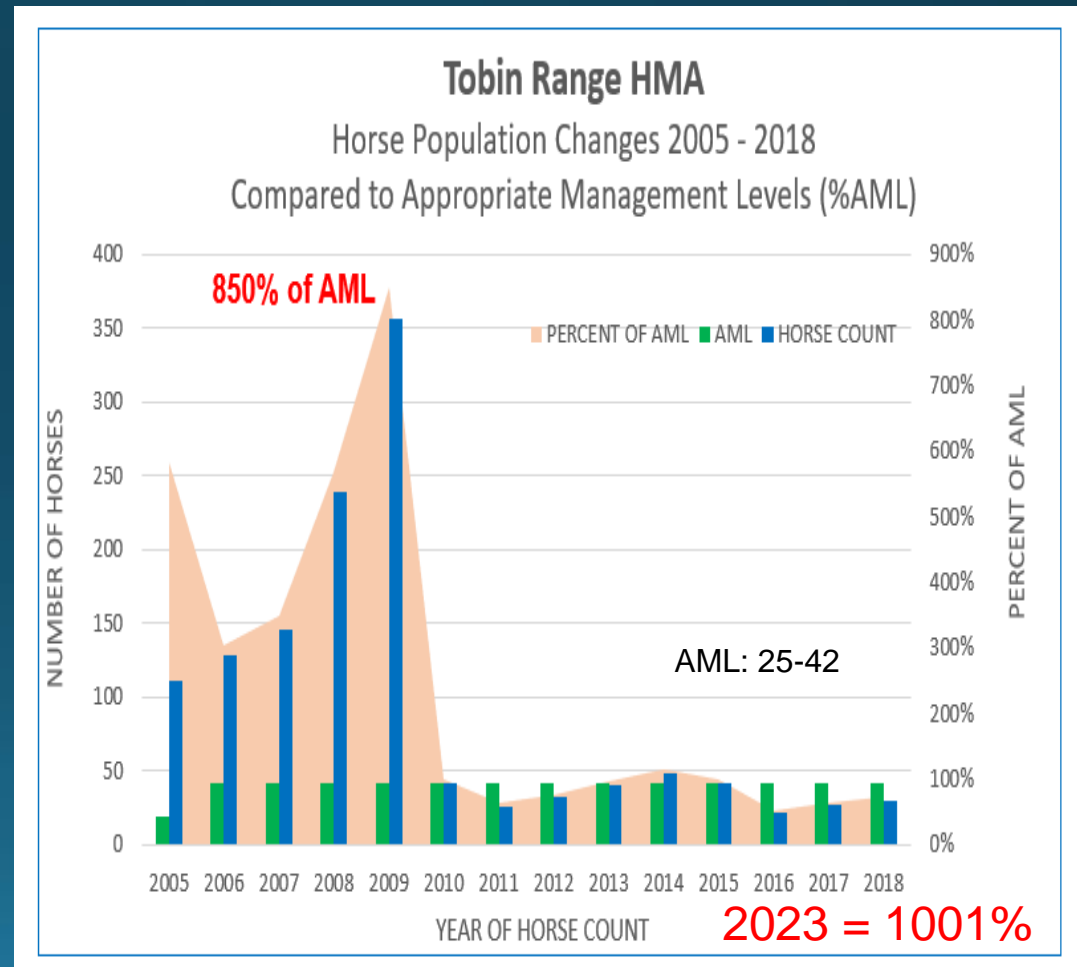
Management is about Maintaining FRHB Within the Carrying Capacity of the Ecosystem

Gathers maintain herd numbers

Calling gathers reductions misleads people

Reducing herds triggers scarcity thinking

But for over 50 years we have needed to reduce herds to achieve AML



Appropriate Management Level (AML)

High-AML to maintain a “thriving natural ecological balance and multiple use relationship in that area”

When populations get to high AML gather to low AML

This avoids annual roundups



Thriving Natural Ecological Balance (TNEB)

- (TNEB) – WH&B are managed in a manner that assures significant progress is made toward achieving the **Land Health Standards** as well as other site-specific or landscape-level objectives, including those necessary to protect and manage Threatened, Endangered, and Sensitive Species.

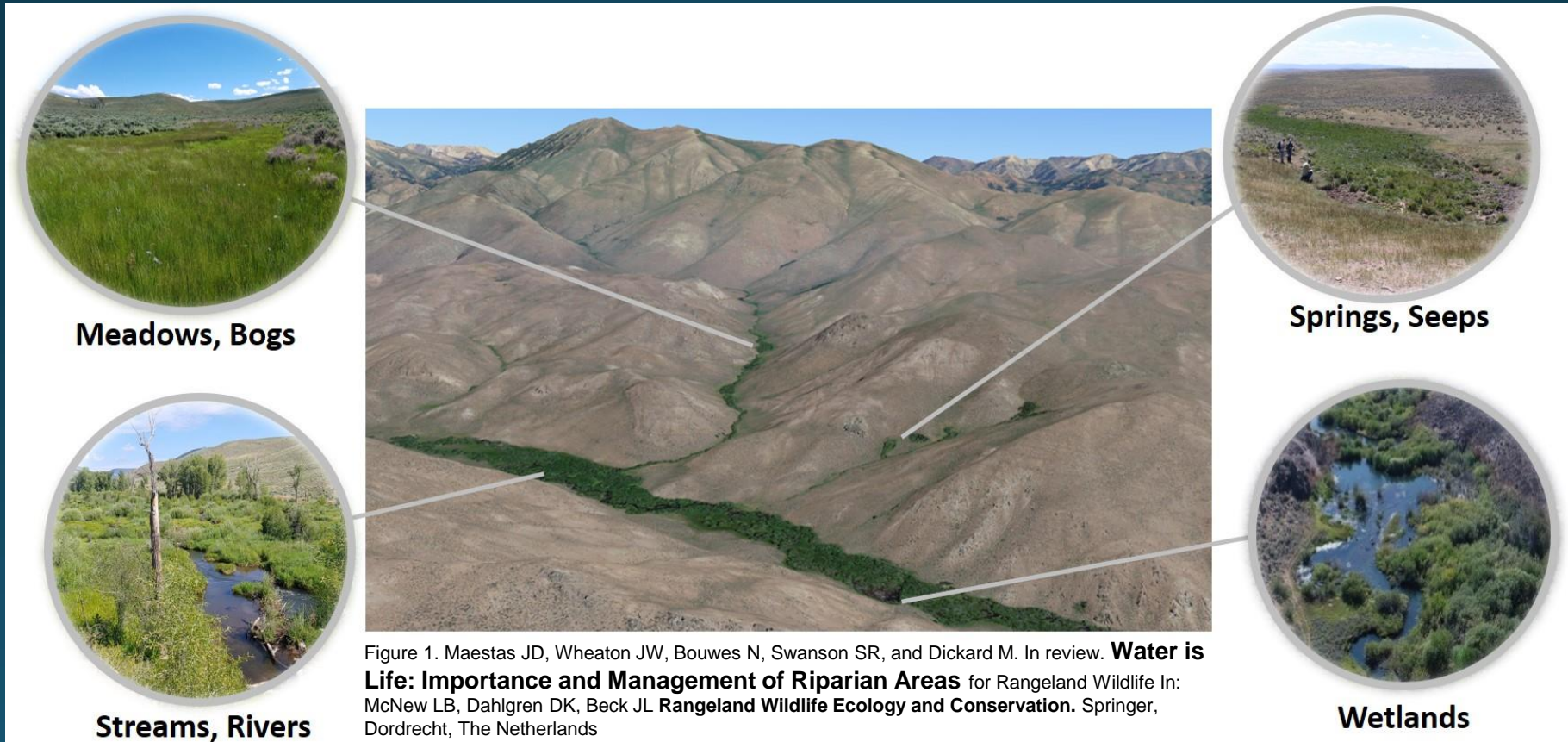


Land Health Standards for Sierra Front and Northern Great Basin

- **Soil processes** will be appropriate to soil types, climate and landform.
- **Riparian/wetland** systems are in **properly functioning** conditions.
- **Water quality** criteria in State Law shall be achieved or maintained.
- Populations and communities of **native plant** species and habitats for **native animal species** are healthy, productive and diverse.
- **Habitat** conditions meet the life cycle requirements of **special status species**.

Riparian Areas

- A transition between aquatic and upland areas
- Exhibit vegetation or physical characteristics of permanent surface or subsurface water
- Hotspots for wildlife and biodiversity
- Hotspots for humans, livestock and free-roaming horses



Meadows, Bogs

Springs, Seeps

Streams, Rivers

Wetlands

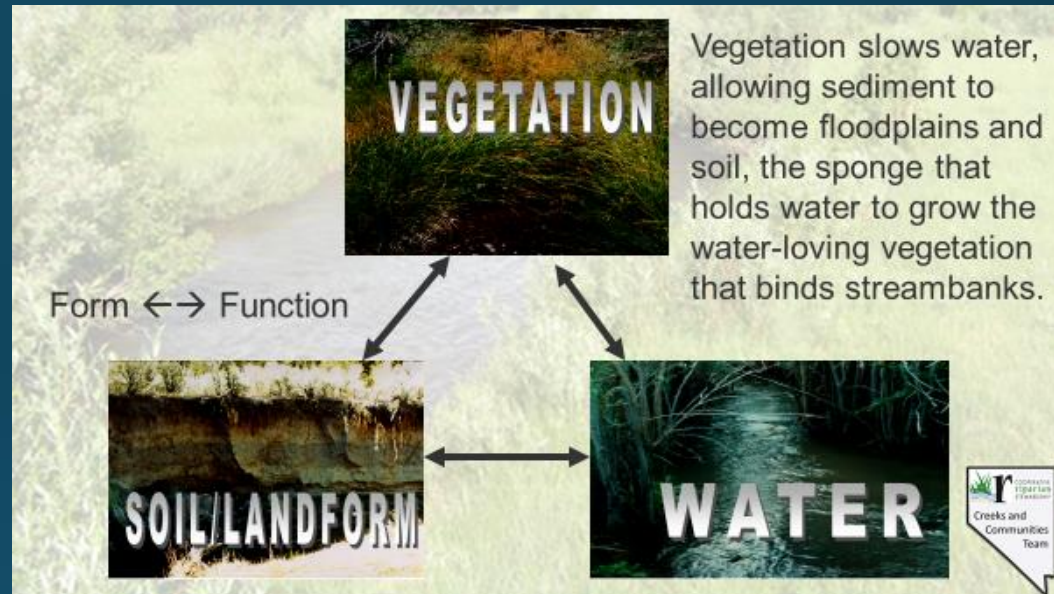
Figure 1. Maestas JD, Wheaton JW, Bouwes N, Swanson SR, and Dickard M. In review. **Water is Life: Importance and Management of Riparian Areas** for Rangeland Wildlife In: McNew LB, Dahlgren DK, Beck JL **Rangeland Wildlife Ecology and Conservation**. Springer, Dordrecht, The Netherlands

Riparian Functions

Riparian vegetation slows water, allowing sediment and roots to become floodplains and rich organic soil, the sponge that holds water and supports water-loving vegetation, that forms and binds well-rooted soil, preventing erosion

In 2010 the BLM Wild Horse and Burro Management Handbook specifically addressed management for riparian functions

Unfortunately, a riparian focus came after AML was set in 1984-1986 or revised by 2006



80% of Nevada Vertebrates (Fish and Wildlife) Use or Depend on Riparian Areas

Fish and others live in water

Most drink in riparian areas that capture and store water

Many nest or find cover in riparian vegetation

Many seek their abundant green forage or prey

Riparian areas are hotspots for biodiversity and travel corridors



28 Sage-grouse

Riparian Wildlife

Three fourths of desert fish and wildlife use or depend on riparian areas, travel corridors and hotspots for biodiversity:

Fish, tadpoles and invertebrates live in water

Most species drink riparian-stored water

Many find cover in riparian vegetation

Many seek riparian green forage or prey

The conservation community is therefore becoming engaged in horse and burro management



Multiple Riparian Resource Values

Values include:

Water/Habitat for FRHB, Fish/Wildlife and Livestock
Endangered Species or species of concern

Recreation and Beauty

Sensitive plants

Water quality

Pollinators

Forage



Horses use spring-fed meadows 50 times more than surrounding rangelands (cattle 30 times more)

Free-roaming Horses Reproduce

No effective predation
→ population growth

Population doubling time
varies by growth rate

Until limited by

Disease,

Lack of food or water

Low AML healthy horses -
24% = 3 years to double

High AML healthy horses -
18% = 4 years

Hungry horses -
15% = 5 years

Very hungry horses -
12% = 6 years

Growth rates by Alan Shepherd, former NV BLM FRHB State Program Lead

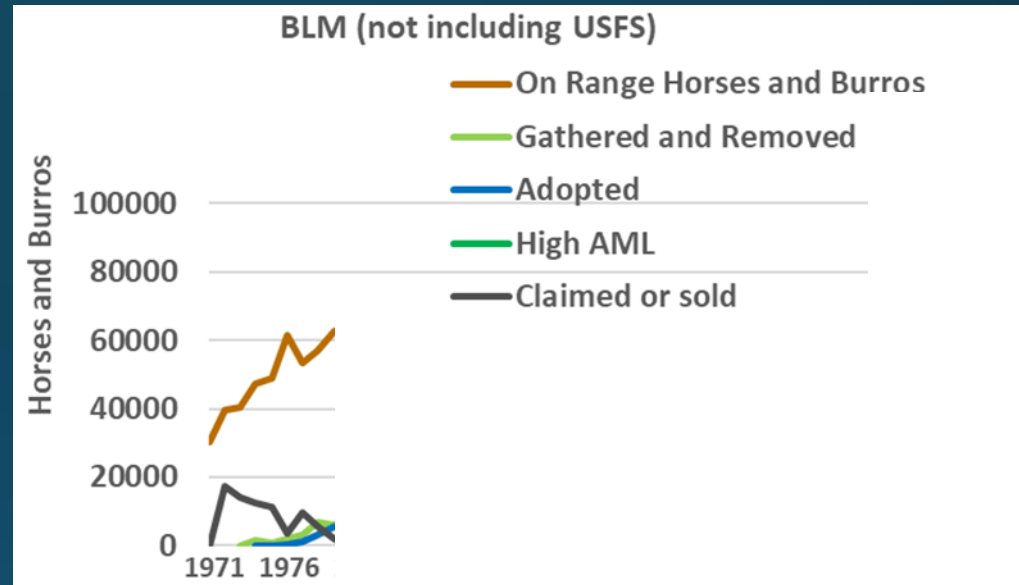


Learning to Manage Free-roaming Horses

In 1971, suddenly a bureaucracy had to address what markets had motivated citizens to do

Agencies had little data, limited staff, no infrastructure, laws that needed modification, and they continue to have many publics to serve

By the time the laws were amended to enable management, populations had more than doubled



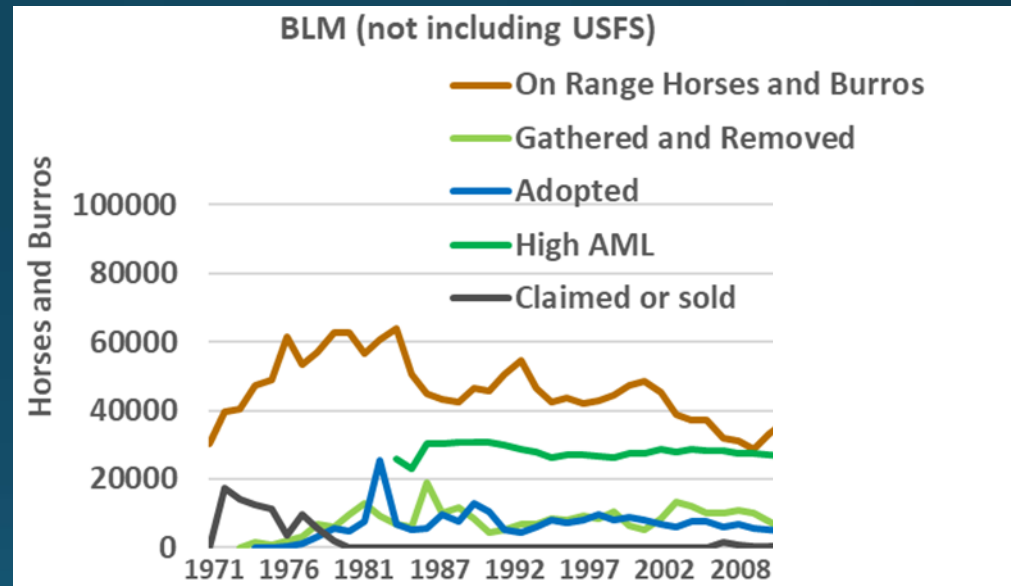
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By 2007 BLM had nearly gotten populations back down to high AML, 28,806, with gathers and adoptions

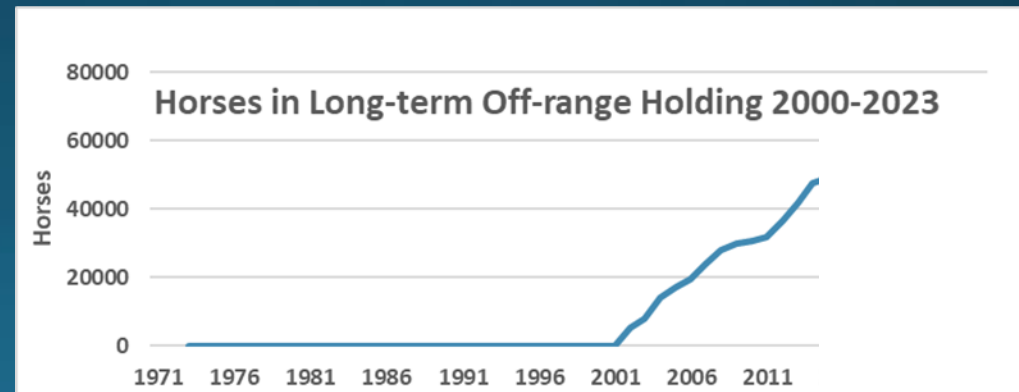
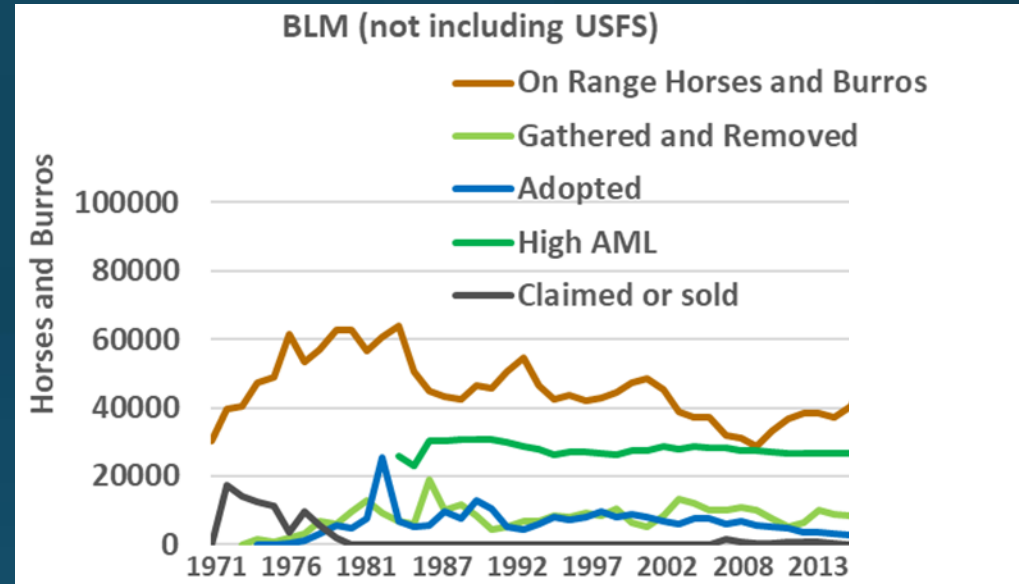


Management was Not Sustained

In the Great Recession, adoptions diminished

Off-range holding increased

The expenses to care for off-range holding came to dominate agency budgets which further increased political debate that reduced gathering



We lacked a Vision for Sustaining Free-roaming Horses

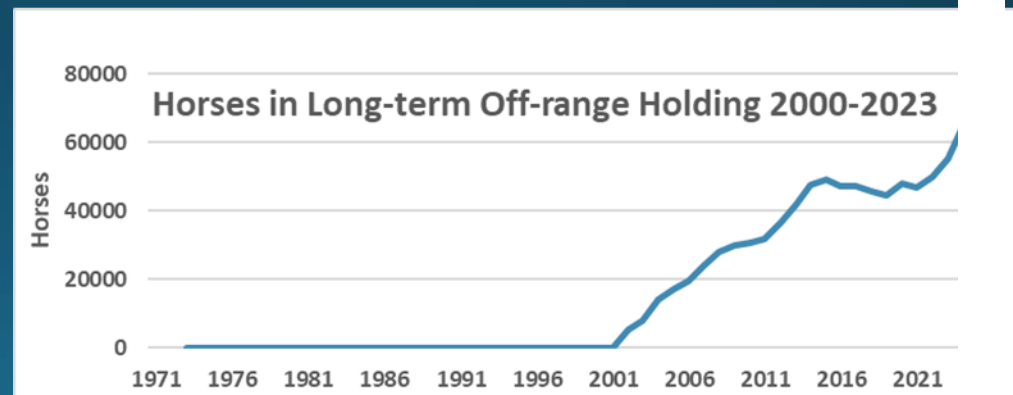
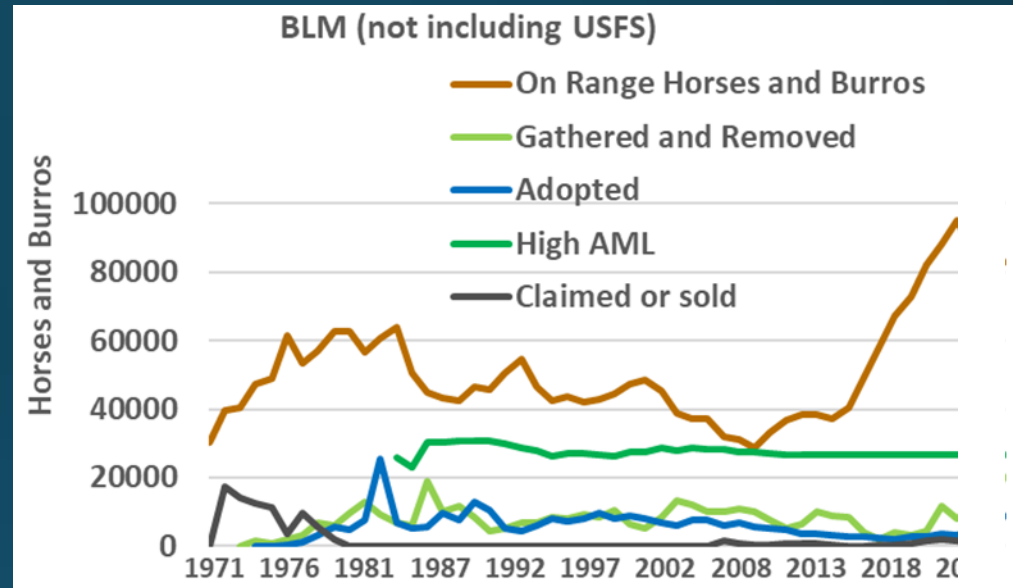
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Lack of a vision for a sustainable future limited budgets

Populations grew exponentially again, **doubling twice in 12 years** with continued, but inadequate gathering



A Sustainable WFRHB Program for Healthy Western Lands

With the fear of continued exponential growth and the hope of the Path Forward, Progress has been made.

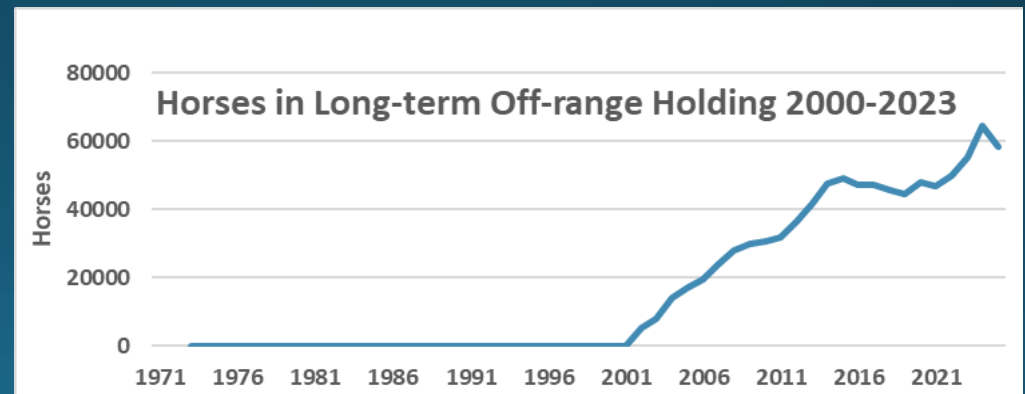
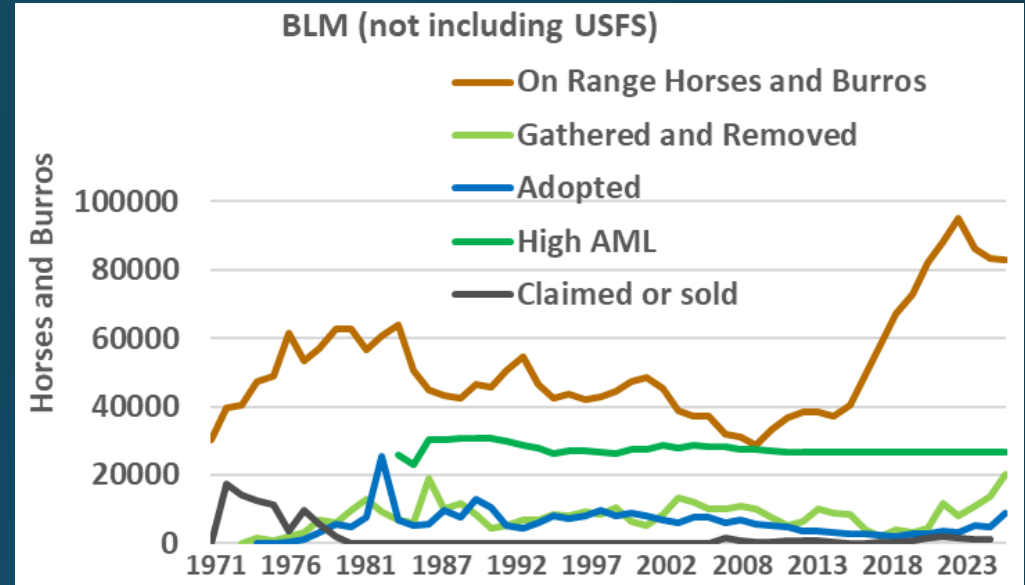
Budget limitations stalled progress and populations again increased by March of 2023.

The FY 2023 gather of 5,335 leads to a population increase of: **9,583**

$$((82,883 \times 1.18) - 5,335) - 82,883 = 9,583$$

1.18 = 18% growth rate

The 19,870 planned to be removed in FY 2024 would bring us back to 2017 FRHB levels



Vision for a Sustainable Future

- “In the absence of reproductive intervention, an on-range horse population near AML realizing the typical 15–20% annual population growth rate would produce an annual increment of 3,600– 4,800 horses that would need to be removed each year to maintain stable populations on the range.” (Garrott 2018)
- The PopEquus model uses published science fertility regarding control options (Bechert et al. 2022)
 - “Our paper demonstrates how values and objectives of diverse stakeholders can be used to support management decisions in ways that might lead to greater acceptance of decisions by a broad array of stakeholder groups.” (Folt et al 2022)
 - No fertility control only strategy achieved AML. Gathering to AML and then using fertility control to reduce future gathering also reduced costs (Folt et al. 2023).

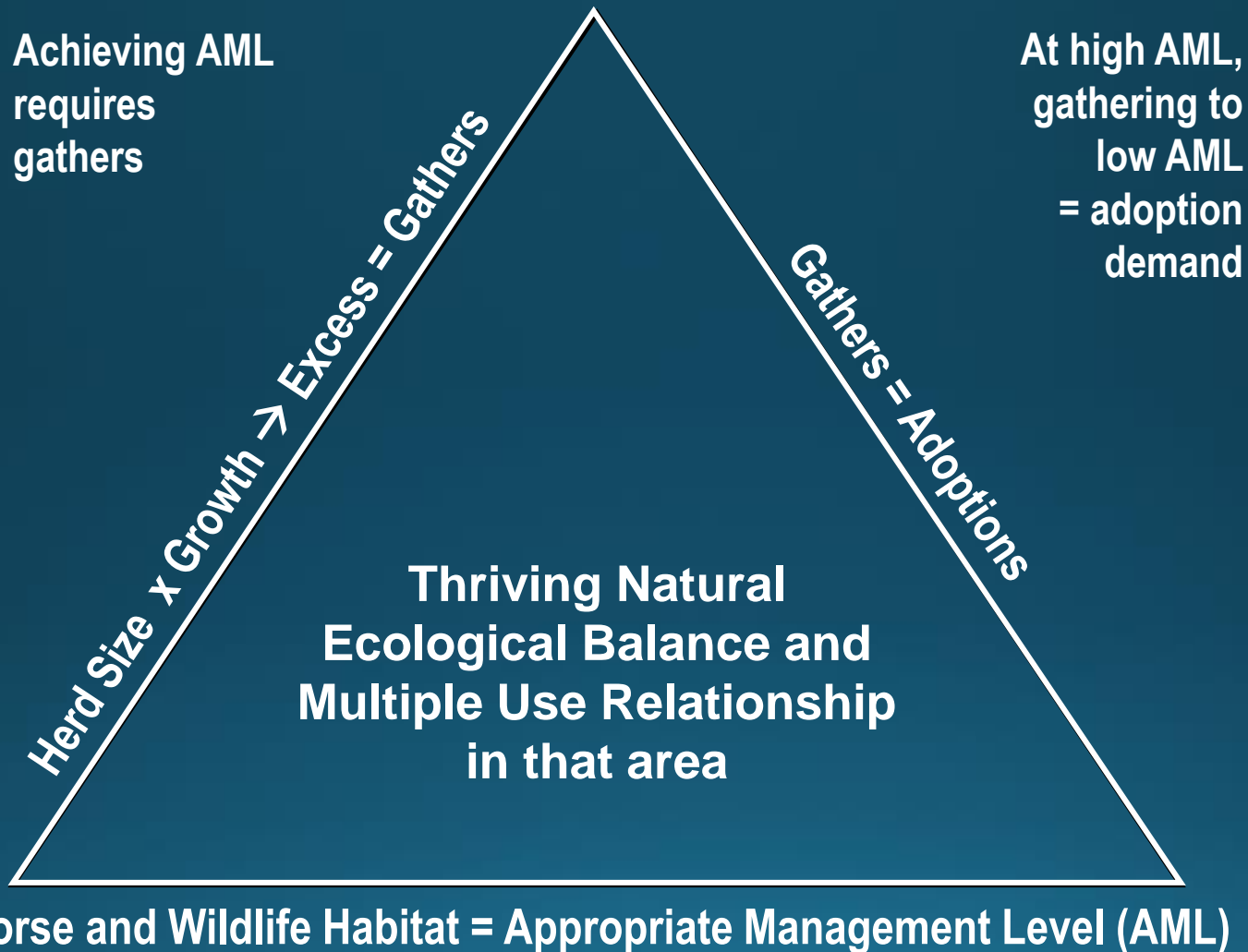
Garrott, R. A. 2018. Wild Horse Demography: Implications for Sustainable Management within Economic Constraints, *Human–Wildlife Interactions* 12(1):46–57

Bechert, U., J. Turner, D. Baker, D. Eckery, J. Bruemmer, C. Lyman, T. Prado, S. King, and M. Fraker. 2022. Fertility control options for management of free-roaming horse populations. *Human–Wildlife Interactions* 16(2):Early Online, 36 pp.

Folt, B., K. A. Schoenecker and L. S. Ekernas. 2022. Multi-objective Modeling as a Decision-support Tool for Feral Horse Management. *Human Wildlife Interactions*.

Folt, B., K. A. Schoenecker, L. S. Ekernas, D. R. Edmunds and M. Hannon. 2023. PopEquus: A predictive modeling tool to support management decisions for free-roaming horse populations. *Ecosphere*. 2023;14:e4632.

Free-roaming Horse Sustainability Triangle

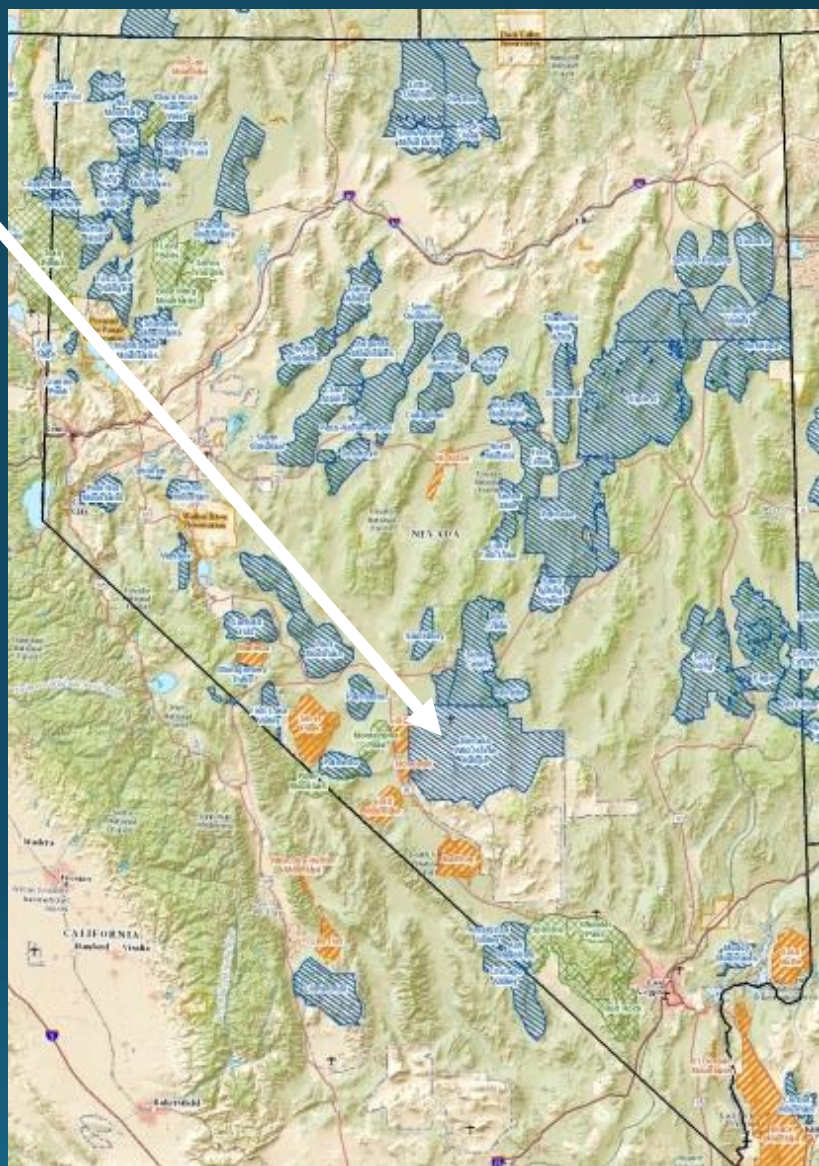


* Fertility control can limit growth rates to help maintain AML only after achieving AML

** Before AML, excess unadoptable horses can live out their lives in non-reproducing herds on private pastures

Nevada Wild Horse Range

- 1,301,637 acres of BLM land withdrawn for Dod/DoE use
- Range established with 200 horses in 1962 - Cooperative Agreement, BLM and Nellis Air Force Base
- Grazing rights revoked before WWII no livestock after 1972
- Gathers stopped by lawsuits
- Without management, horses doubled “every 5 years” up to 10,000 by early 1990s
- Range converted to Herd Management Area in 1994
- AML 300-500.
- Emergency gathers in 1989, the 1990s, and 2000s “due to lack of water and declining body conditions”
- Most springs have gone dry
- Rose spring is the only reliable perennial water
- Other areas have water at times
- <https://www.healthynvlands.org/horse--burro-impacts.html>
- In the wet year 2023 - The herd is at AML and getting fertility treatments. The horses are “the best they’ve ever looked...” since the law was passed.

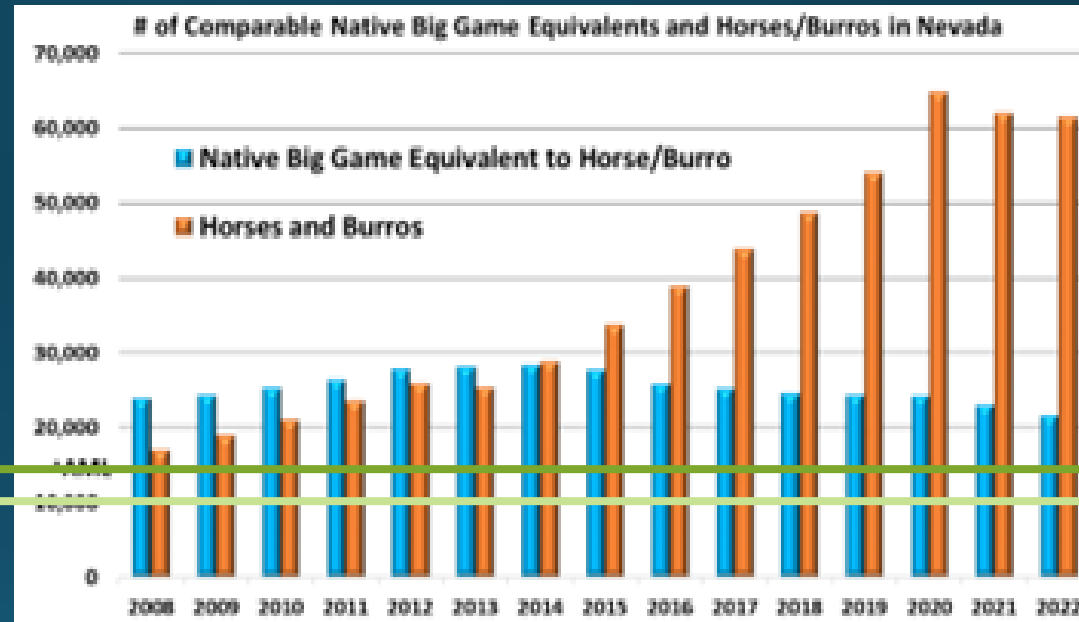


Nevada Free-Roaming Horses & Burros Outweigh all Nevada Big Game

Since 2014 Nevada horses and burros outweigh all big game animals combined:

- Moose,
- Mountain goats,
- Mule deer,
- Pronghorn,
- Elk, and
- Bighorn sheep

High AML = 12,811
Low AML = 7,597

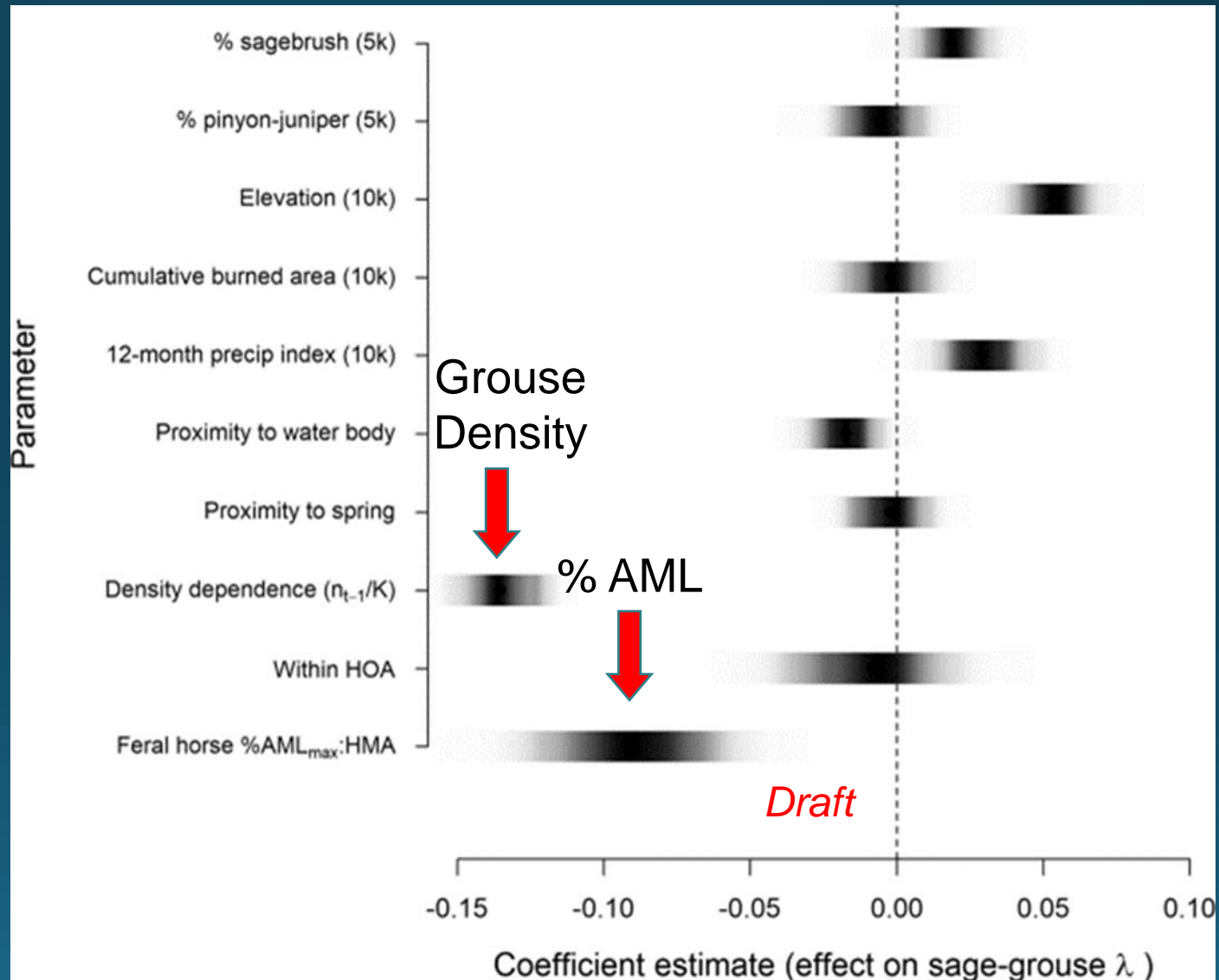


Nevada bighorn sheep range overlaps HMAs by 40%



Estimated Sage-grouse Lek-specific, Interannual Growth Rates

- % AML has the greatest non density dependent impact on sage-grouse growth rates



Coates, P. S., S. T. O'Neil, D. A. Munoz, I. A. Dwight, and J. C. Tull. 2021. Sage-Grouse Population Dynamics are Adversely Affected by Overabundant Feral Horses. The Journal of Wildlife Management 85(6):1132–1149

Excess Horses Impact Wildlife

When horse and burro numbers exceed AML, wildlife suffers

Sage-grouse population decline ($\lambda < 1$) correlates directly with % over AML of horse populations

Horse impacts to sage-grouse include:

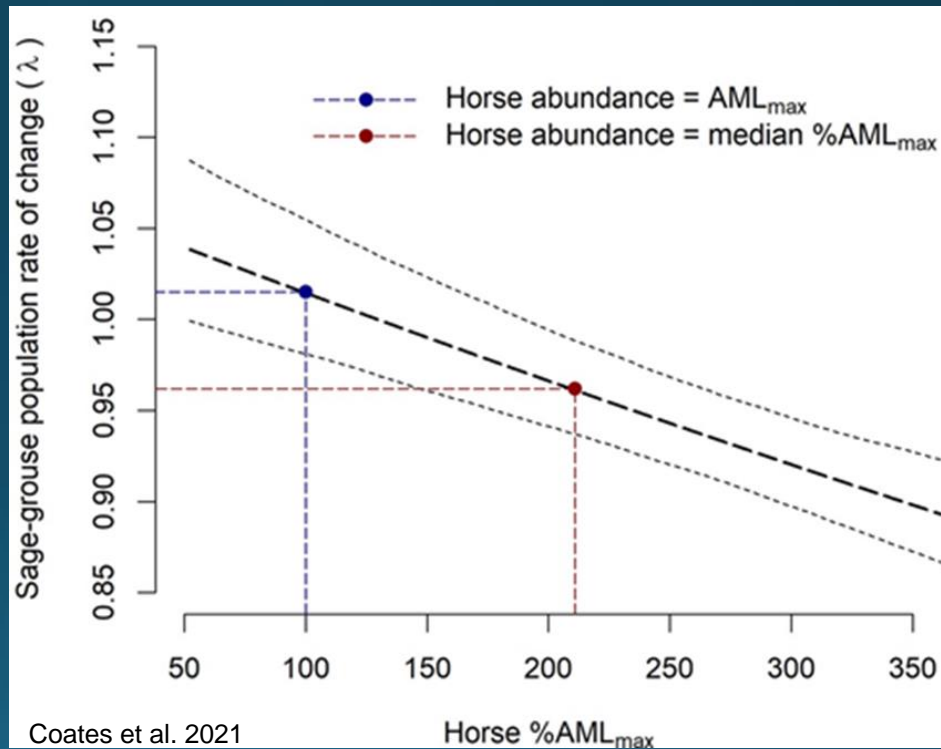
Altered breeding behavior,

Diminished forage and cover
(reduced cover increases predation)

Less resilient ecosystems in the form of:

Shrinking riparian brood-rearing habitat

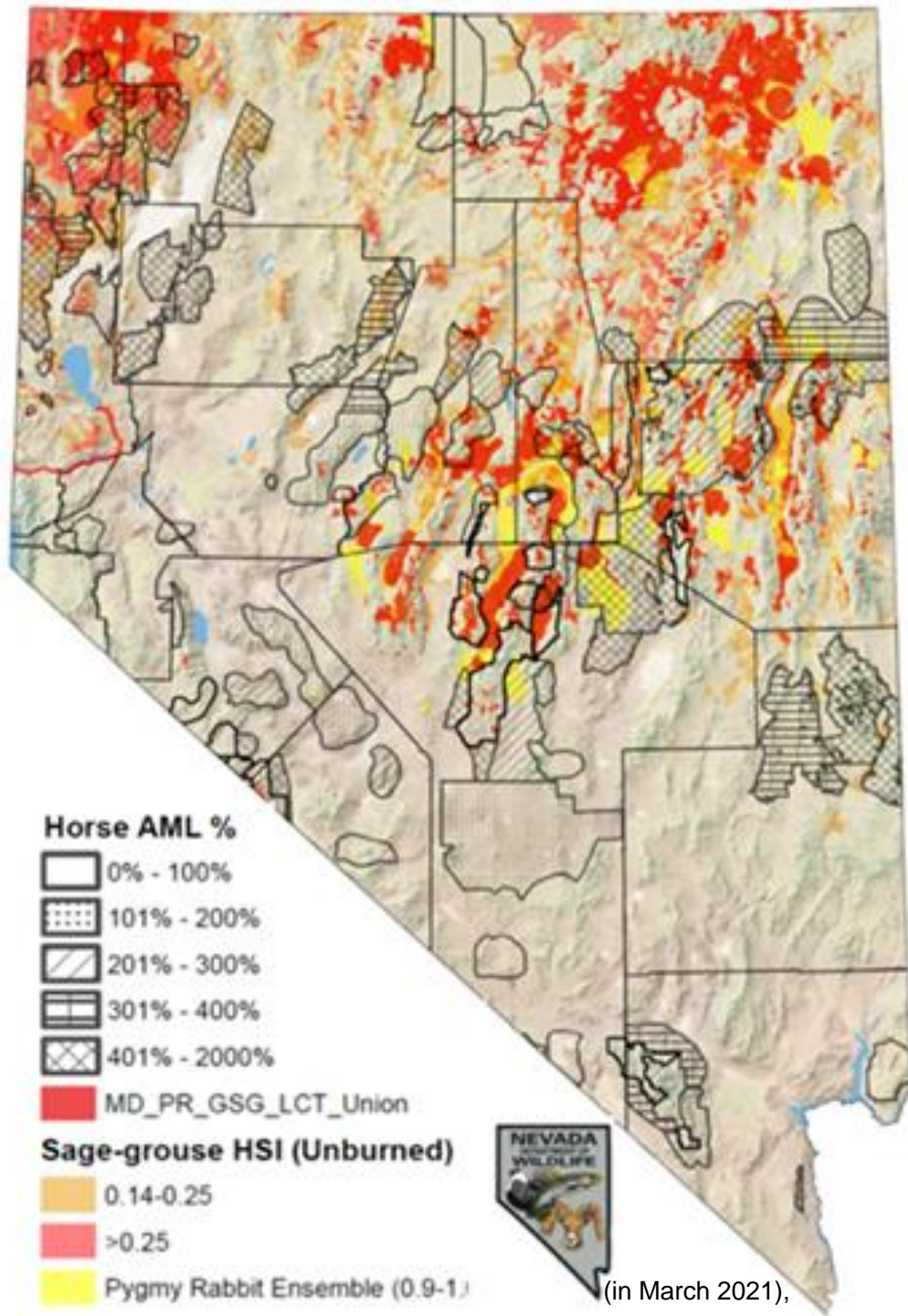
Cheatgrass/fire cycle removing sagebrush



Priority Sage-Grouse Habitat Occurred in 41 Over-AML HMAs

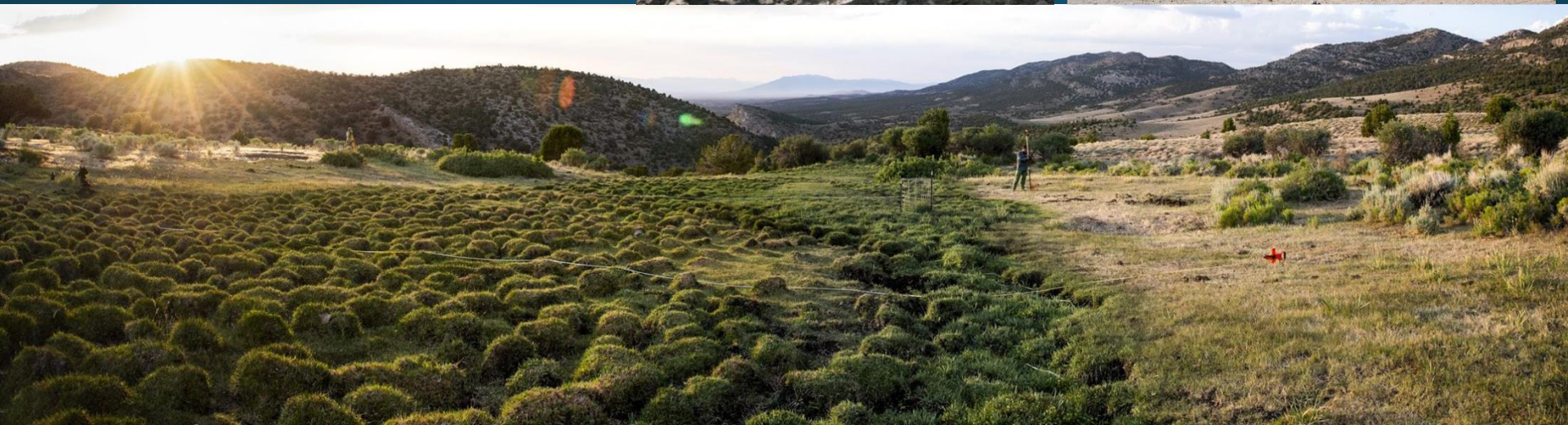
GIS map overlaying herd management areas by % AML

priority habitat for mule deer, lahontan cutthroat trout, greater sage-grouse and pygmy rabbit habitat suitability index



Many Green Zones Grazed by FRHB are Shrinking & Drying

Trampled overgrazed riparian vegetation and altered flow patterns concentrate water flow → erosion and drying



Year-long Excess Grazing Causes Impacts

Agencies require most ranchers to move livestock and take them to private lands for part of each year

Free-roaming horses and burros graze public land year-round

Grazing in one area throughout the growing season does not allow preferred plants a time for growth and recovery

Repeated grazing, trampling, and lack of leaf area for photosynthesis stresses and eventually kills forage and riparian stabilizer plants

Causing erosion, loss of organic matter and water storage



Riparian Management Often Allows and Supports Riparian Functions

2014 Beaver Creek

1988 Beaver Creek
Season-long
livestock use

Early use,
Rest,
and
Periodic
Hot-season
grazing



Riparian Areas Need More Recovery than Damage

Many strategies can help manage cattle grazing for riparian areas:

Short grazing and long recovery periods

Occasional or planned growing season rest

Riparian pasture management

Moderate to light intensity

Cool or early season use only or mostly

Off-riparian-area water access

Regrowth before winter

Varied grazing seasons year to year

Riding, herding, & stockmanship

Salt/supplement placement

Few of these strategies are allowed for free-roaming horses or burros

~~Short grazing and long recovery periods~~

~~Occasional or planned growing season rest~~

~~Riparian pasture management~~

Moderate to light intensity = AML

~~Cool or early season use only or mostly~~

Off-riparian-area water access

~~Regrowth before winter~~

~~Varied grazing seasons year to year~~

~~Riding, herding, & stockmanship~~

~~Salt/supplement placement~~

Strategies that move animals are almost always necessary to avoid rangeland riparian degradation by livestock but these strategies are not allowed for free-roaming horses

Horses, Burros, and Cattle Concentrate in Riparian Areas

Attributes of horses and burros that MITIGATE rangeland & riparian impacts

Horses often travel farther from water to forage than cattle

Some herds or bands migrate, so some riparian areas are not used year long

Horses ingest dry brown and coarse forage along with green actively growing grasses and sedges

Attributes of horses and burros that MAGNIFY rangeland & riparian impacts

Horses selectively graze spring meadows even more than cattle

Especially bands with lactating mares

Even migrating herds use summer range throughout the growing season

Horses and burros, with one stomach, eat 15-20% more forage for their size

Horses and burros with top and bottom incisor teeth can bite off root crowns of perennial plants

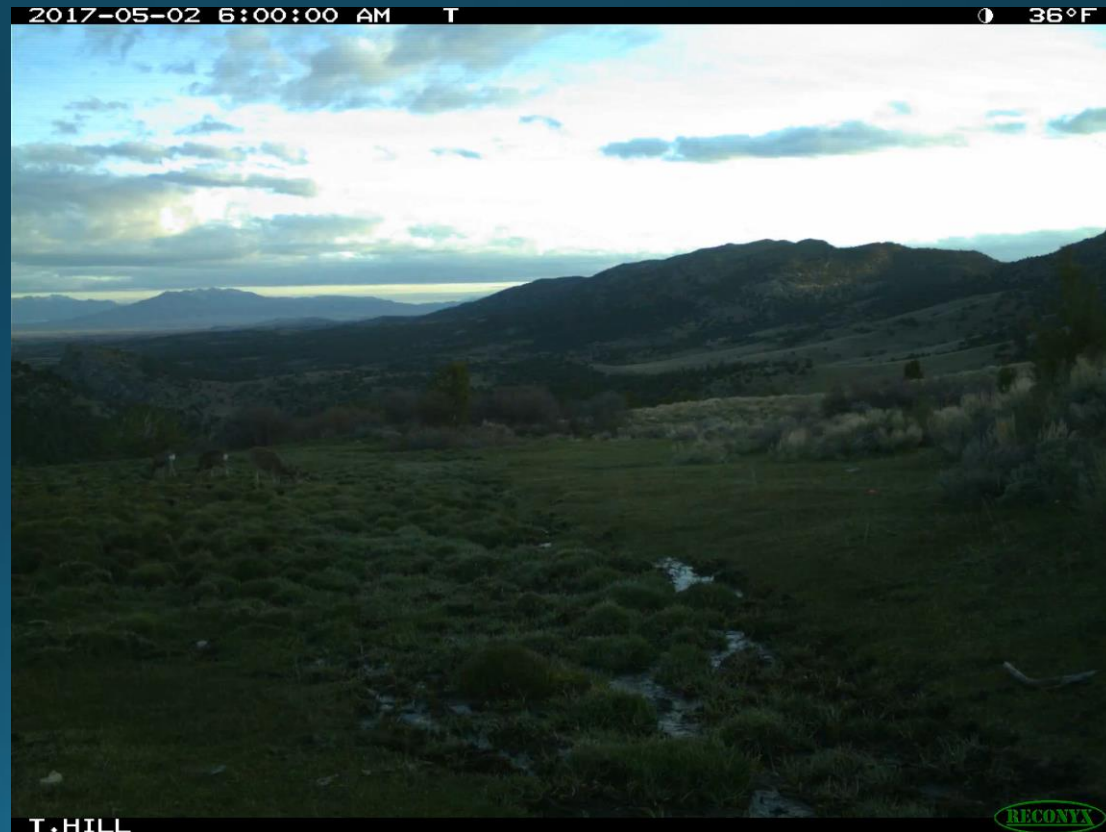
FRHB dominate riparian area use where present with big game year round

Green Riparian Forage and Water Attracts Horses and Cattle

While horses may travel miles to forage away from water, they also travel miles to find green plants

Green forage attracts horses to riparian areas even more than cattle,

Especially during dry summer months



Ungulate use at Treasure Hill Allotment
Meadow May – September 2017

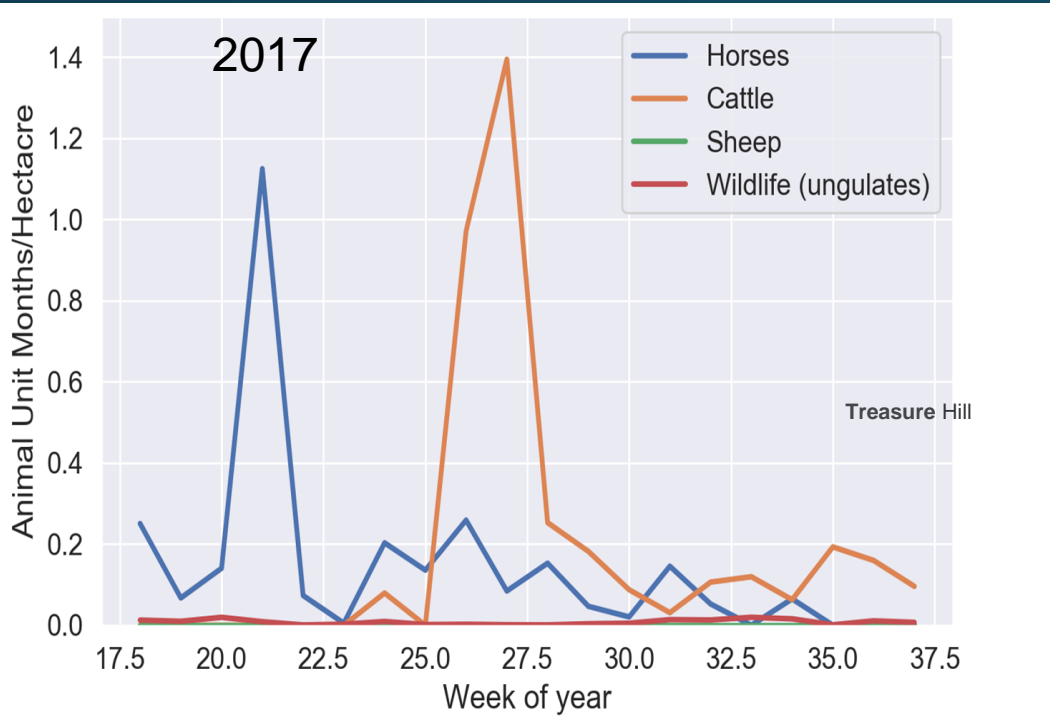
Growing Season Use by Species - Trail Camera Data at Treasure Hill Site 2017 & 2018

Horses: 6.4 AUMs/Ha

Cattle: 2.7 AUMs/Ha

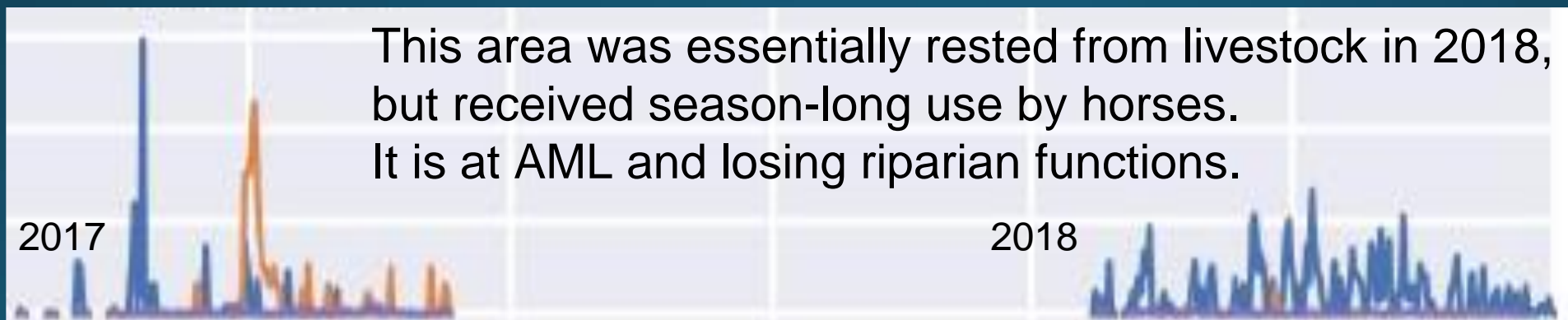
Sheep: 0.5 AUMs/Ha

Wildlife 0.36 AUMs/Ha
(Mule deer, Elk and Pronghorn)



- Cattle selected them 30 times (± 23 [SE]) more than the surrounding rangelands
- Horses selected spring-fed meadow sites 51 times (± 33 [SE]) more

This area was essentially rested from livestock in 2018, but received season-long use by horses. It is at AML and losing riparian functions.



All Sites were Functional at Risk

Risks included:

- Weaker & less stabilizing vegetation

- Erosion from altered flow paths

- Loss of organic matter (sponge)

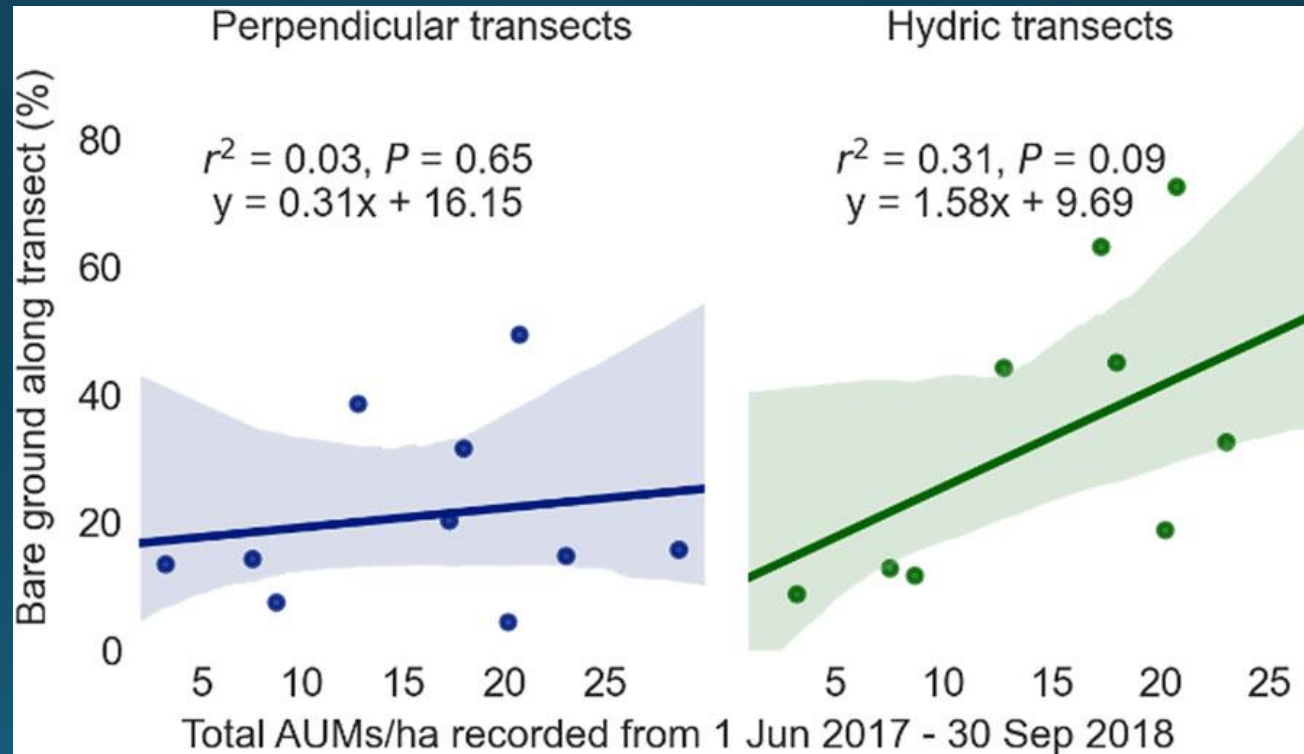
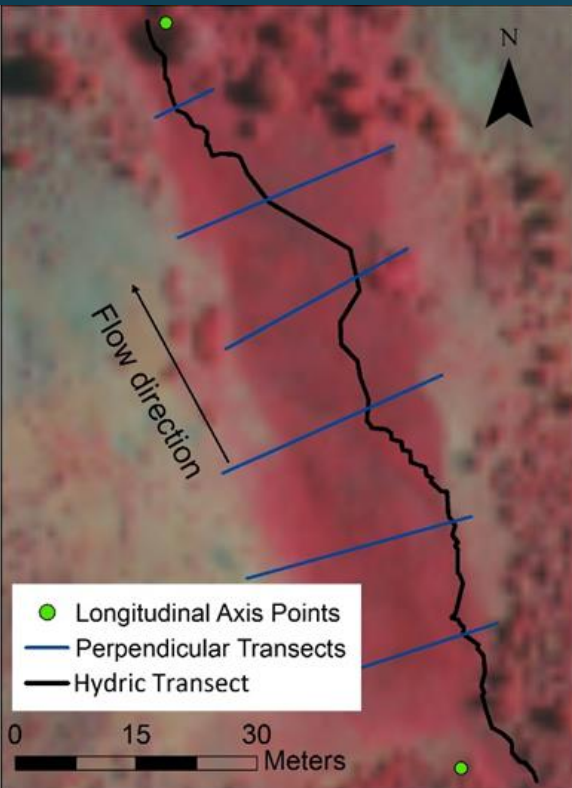
- Dehydration and shrinkage



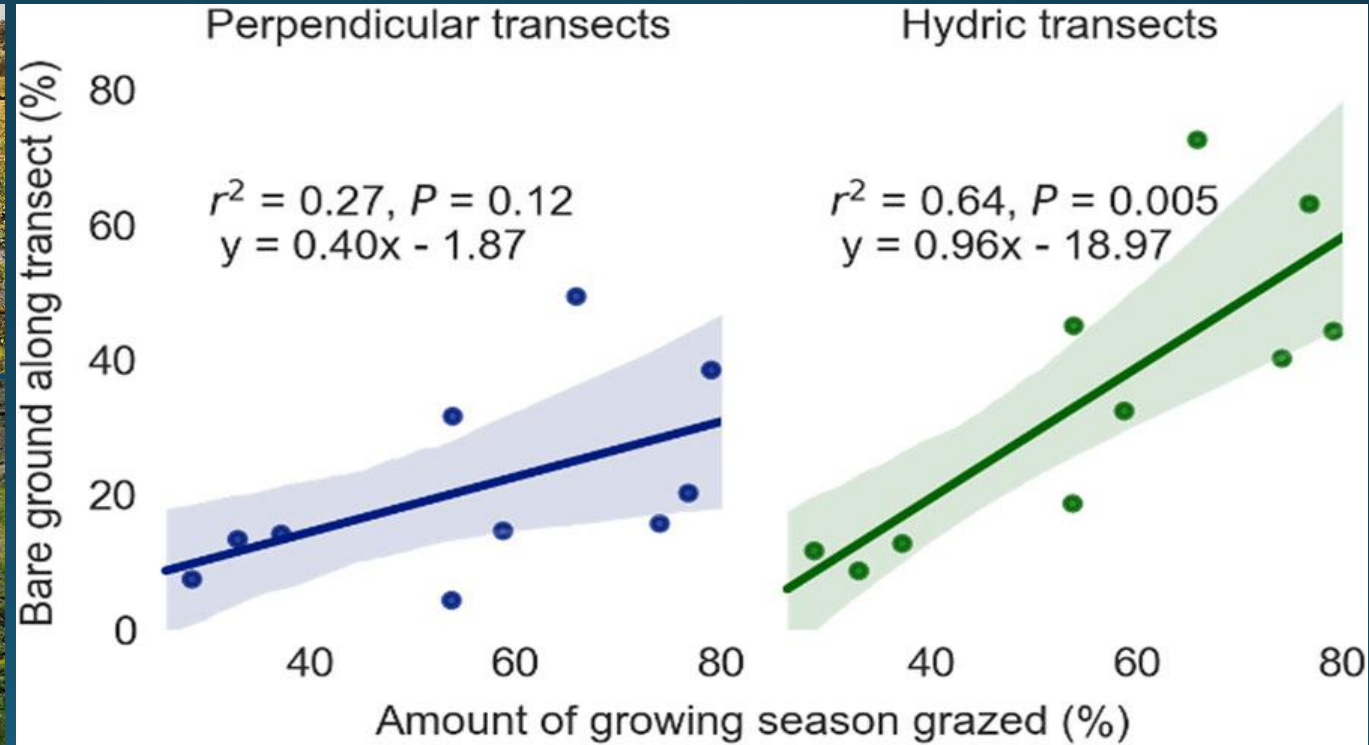
Wetland plants needed for stability

Habitat becomes scarcer when riparian areas shrink or go dry

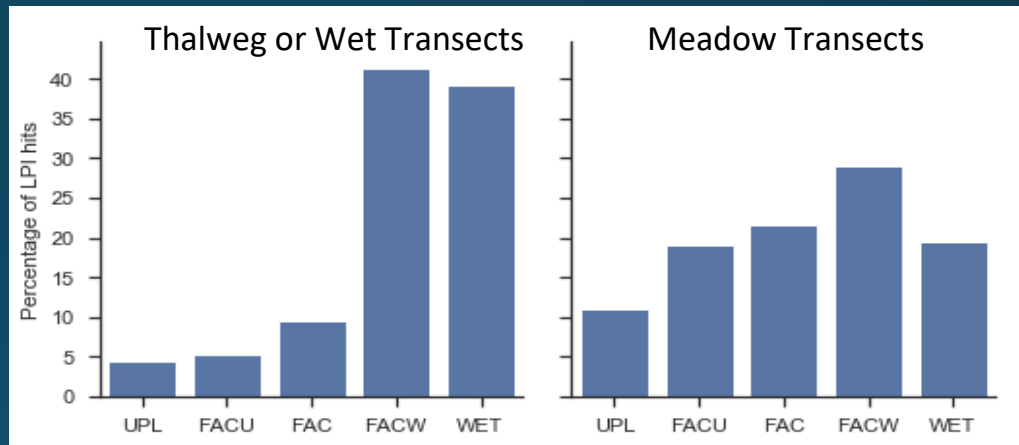
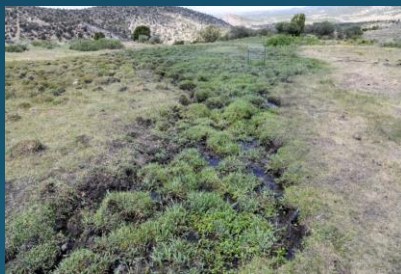
Where Water Flows (Hydric Transects), Bare Ground Matters Most to Riparian Functions and Correlates to Grazing Intensity



Bare Ground was More Affected (higher r^2 & lower P) by % of Growing Season Grazed



Wet or Thalweg Transects Grow Riparian Stabilizers with High Root Density



Plant wetland indicator status across transect types from <https://plants.usda.gov/wetinfo.html>.

- UPL = Upland,
- FACU = Facultative Upland,
- FAC = Facultative,
- FACW = Facultative Wetland,
- WET = Obligate Wetland

When Wild Horses are not Managed, Horses and Wildlife Suffer

Horses are like native ungulates and must be maintained within their carrying capacity (AML) to prevent habitat destruction e.g. loss of soil

Without effective predators, people must gather excess animals to prevent inhumane starvation or more inhumane dying of thirst



A Sustainable WFRHB Program for Healthy Western Lands

Once at AML, the number for adoption can be managed by adjusting the rate of fertility control

Excess on-range young must be gathered and adopted or herds also fertility-treated, for populations to stay between low and high AML (16,071 - 27,882)

By gathering excess horses less than 5 years old, all gathered horses could be adopted annually

Using longer acting or permanent fertility control treatments could reduce the frequency of needed gathers

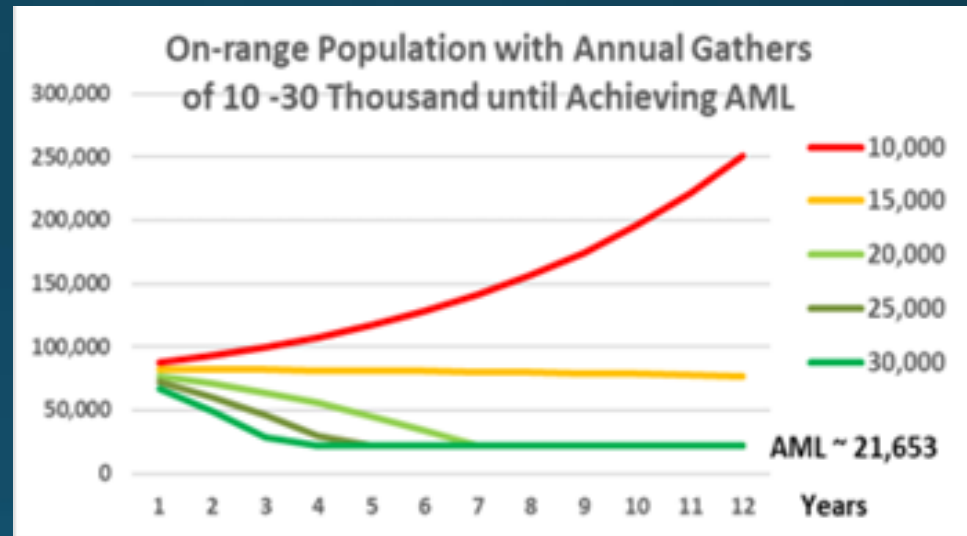
On-range horses will be healthy



A Sustainable WFRHB Program for Healthy Western Lands

The number of excess horses gathered and removed per year drives economic and environmental impacts

Gathering 10,000 or fewer horses continues to add to on-range populations impacts and costs



When the number of horses gathered each year is not enough to keep pace with reproduction, the number of additional excess horses increases

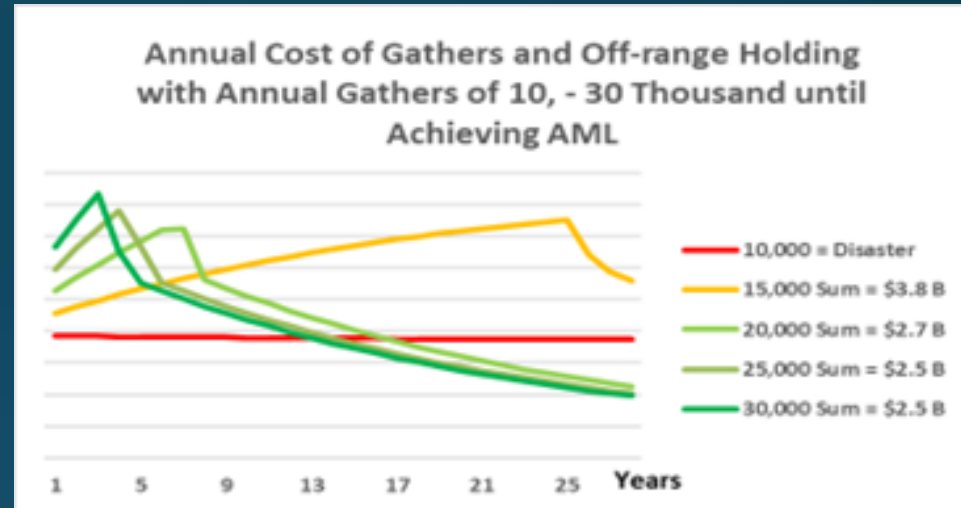
A Sustainable WFRHB Program for Healthy Western Lands

The number of excess horses gathered and removed per year drives economic and environmental impacts

Gathering 10,000 or fewer horses continues to add to on-range populations, impacts, and costs

Removing 20,000 excess horses per year gets to AML and removing 25,000, excess horses annually saves money faster

After achieving AML, all annually gathered horses can be adopted and no more horses need go to off-range holding



Cumulative cost is the area under each curve.

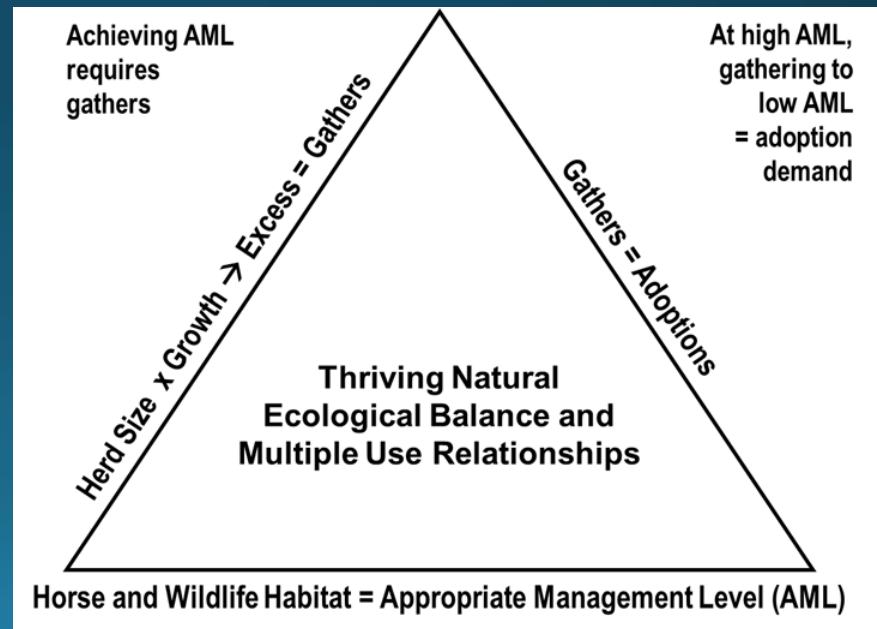
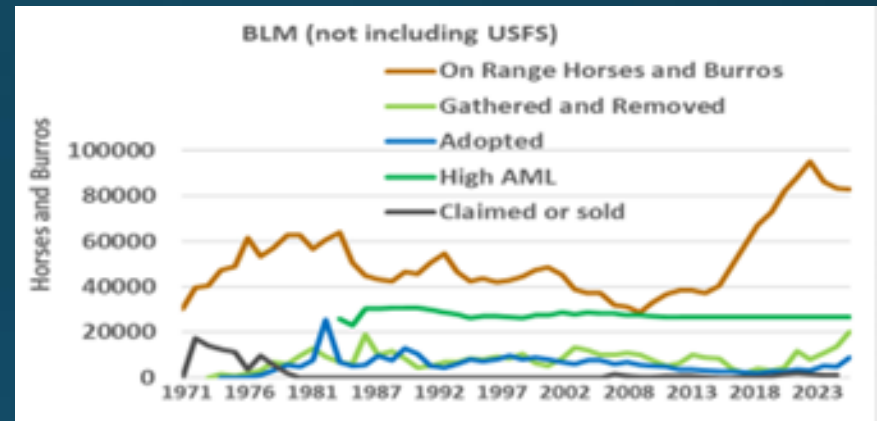
A Sustainable WFRHB Program for Healthy Western Lands

Investing now could make the Wild and Free-Roaming Horse and Burro Program sustainable

Had we gathered to AML and placed 6,570 more horses into long-term holding in 2007, we would have 50,000 fewer horses in long-term holding and 60,000 fewer excess horses and burros on-range today.

Delaying necessary action increases environmental and economic costs

Delaying gathers increases the number that need gathering



Healthy Western Lands is Achieving AML Quickly

Advocates for: Benefit because:

Horse welfare	Horses are healthier on range and in off-range pastures with single-sex herds or adopted
Fertility control	Fertility control can become effective and less gathering after AML
Ecosystem resilience	Thriving natural ecological balance = land health standards met
Less impactful fires	Healthy bunchgrasses resist cheatgrass and its fire cycle
Wildlife	Wildlife habitat improves. Riparian areas keep water on the land longer
Outdoor recreation	Enjoy healthy horses, healthy wildlife and healthy beautiful public lands
Carbon capture	Healthy plants - grazed so they retain leaf area for photosynthesis or recover after grazing – can store soil organic carbon
Taxpayers	Save money when AML reduces gathering and off-range holding costs
Consumers	Ecosystem services increase – benefits include clean water, air, food, and biodiversity
Politicians	Support a win/win/win
BLM and USFS	At AML - all excess horses adoptable