From:	Wiechman, Lief
To:	Nicole Alt
Subject:	Re: NV - metrics list
Date:	Friday, September 27, 2013 5:04:50 PM
Attachments:	GRSG measures discussion v.3 (with NV comments).docx

---

Nicole,

I'm still working through some of Tim's edit's / comments... I'll work on it this weekend. The sections relative to NOXIOUS WEEDS/ANNUAL GRASSES, ENERGY DEVELOPMENT, MINING, GRAZING, and INFRASTRUCTURE still need some slight reorganization (to fit Tim's comments more towards our desired format), and I add more (expand on) metrics we'd like to have reported.
Until then, here's the work in progress.

Have a good weekend,

LW

Lief Wiechman
Sage-Grouse Energy Biologist
U.S. Fish & Wildlife Service
Mountain-Prairie Region
5353 Yellowstone Road
Cheyenne, WY 82009
307.772.2374
lief_wiechman@fws.gov

On Fri, Sep 27, 2013 at 8:24 AM, Nicole Alt <nicole_alt@fws.gov> wrote:

> I'll send you any others I see. I'll try to call you this afternoon to see where we are on pulling something together for Tuesday's call. Thanks!
>
> Nicole Alt
> Deputy ARD Ecological Services
> Mountain-Prairie Region
> U.S. Fish and Wildlife Service
> nicole_alt@fws.gov
>
> Begin forwarded message:
>
> **From:** Tim Rubald <timrubald@sagebrusheco.nv.gov>
> **Date:** September 26, 2013, 5:56:24 PM MDT
> **To:** '"nicole_alt@fws.gov"' <nicole_alt@fws.gov>
> **Cc:** Tony Wasley <twasley@ndow.org>, Jim Lawrence <lawrence@lands.nv.gov>, Melissa Faigeles <mfaigeles@sagebrusheco.nv.gov>
> **Subject: Please replace previous document**

Ms. Alt,

We would greatly appreciate it if you could possibly replace the document that was sent yesterday afternoon by Nevada, with the attached document. If yesterday's document was passed on to others on the team, it would be much appreciated if they were provided with this replacement.

My apologies for any inconvenience this may cause. If you have any questions whatsoever you are welcome to give me a call or drop a note. Thank you in advance for your consideration.

Tim Rubald, Program Manager

Sagebrush Ecosystem Program

201 S Roop St., Ste 101

Carson City, Nevada 89701

timrubald@sagebrusheco.nv.gov

t: 775-684-8600

c: 775-790-0035

f: 775-684-8604

SAGE-GROUSE CONSERVATION MEASURES / METRICS

This crosswalk is meant to provide the reader a breakdown of threats to sage-grouse and sagebrush habitat as identified by the Conservation Objectives Team report (COT; 2013). Each threat is identified and listed below each threat are the metrics to be measured and reported to the U.S. Fish and Wildlife Service (FWS). Possible research needs and/or information needed to better inform the metrics are also listed below. This is not an all-inclusive list of every action that may be implemented, but captures the range of activities that the FWS is anticipating asking for data reported to be analyzed for contribution to address threats as identified in the COT report.

Comment [LW 1]:

THREAT: Isolated populations / small population size

Population Information and Research Needs:

- *Identify seasonal habitats/ranges,*
  - *Identify limiting habitats (if any exist) for isolated or small populations, and for subpopulations*
  - *Identify movement patterns between seasonal ranges*
    - *Identify migratory status (1-stage, 2-stage, non-migratory)*
- *Identify connectivity corridors between Priority Areas of Conservation (PACs / Subpopulations*
  - *Identify these areas in each Management Zone (MZ)*

Comment [A2]: (per NV)
- *Once identified, maintain or enhance limiting habitat*

Comment [A3]: (per NV)
- *Once identified, maintain movement corridors between these seasonal ranges*

- Maintain connectivity between PACs / within WAFWA Management Zones
  - Quantify projects aimed at habitat improvement within isolated habitats or projects aimed at conserving remaining intact habitats important to isolated/small populations
  - Establish protocols for project proponents to aid in pre-construction planning and siting of development (infrastructure, etc.) to avoid PACs, Preliminary Priority Habitat (PPH), and key seasonal habitats; or site properly (when avoidance is not feasible) to minimize impact and reduce fragmentation in PACs, PPH, and seasonal habitats.
    - **METRIC**: Report number of project proposals and amount of habitat (acres) that were rerouted because of protections put in place to maintain connectivity and prevent habitat fragmentation.
    - **METRIC**: Report number of projects and amount of habitat (acres) lost and/or directly impacted by surface disturbing activities in sage-grouse habitat.
- Strategic predator control to protect and maintain isolated small populations
  - Develop predator control plans to identify predators and type of impact (direct mortality and/or nest predation) and prescribe manageable plan or method of control
    - **METRIC**: Number of predators killed and time span of occurrence
    - **METRIC**: Pre- and post-predator treatment demographic rates (survival and nest survival) to analyze efficacy of plans in place
- Remove population loss through harvest by reduction or cessation of hunting seasons.
  - Reduce or restrict hunting opportunities to protect and maintain isolated or small populations
    - **METRIC**: Number of licenses (or permits) sold
    - **METRIC**: Number of individuals harvested (by age class and sex when possible)

Population Information and Research Needs:

- *Better understanding of genetic structure and relation to neighboring PACs / subpopulations.*

- Avoid translocations without understanding the underlying genetic implications
  - Use translocation only as a last resort to bolster small populations
  - If translocation is implemented, identify best season (time of year) and appropriate gender and age class
  - Implement monitoring of translocated grouse to analyze efficacy of translocation efforts.
    - **METRIC**: Number of individuals captured and translocated

DRAFT

- **METRIC**: Report demographic information (survival, etc.) of translocated individuals in order to monitor the contribution to the host [sub]population

THREAT: Habitat protection / Sagebrush elimination

Population Information and Research Needs:

- *Modeling and/or identification of winter habitat*
  - *Identification of Winter Concentration Areas (WCA) as well as 'Winter Refuge' areas / habitat for harsh winters prior to any sagebrush treatments*

- Protect sagebrush habitat
  - Avoid and minimize surface disturbing activities in sagebrush habitat; With special attention given to large expanses of contiguous sagebrush, especially in PACs, PPH
    - **METRIC**: Report surface disturbing activities that were deferred from PACs, PPH
    - **METRIC**: Report number of projects and amount of habitat (acres) lost and/or directly impacted by surface disturbing activities sage-grouse habitat
  - Implement strategic application of sagebrush management in addition to:
  - Reduce or elimate the use of fire as habitat / sagebrush management tool in low precipitation zones, and where use of fire would likely result in increased cheatgrass response
    - Reduce the use of prescriptive fire in sagebrush ecosystems that have decreased/declined in resiliency due to annual grass invasion.
  - ~~o~~ Avoid removing or disturbing large, contiguous areas of~~cutting/mowing~~ sagebrush with mechanical treatments – ~~Rather use mechanical dragging, brush beating for sagebrush treatment.~~
  - Maintain a balance between nesting, brood-rearing, and winter habitat
    - **METRIC**: Report the amount (acres) of sagebrush habitat that was treated and the method used; identify goal or objective of management associated with the treatment
    - **METRIC**: Report the changes (addition and subtraction) of particular seasonal habitats associated with listed treatments
  - Incorporate incentive-based programs (Farm Bill, CRP, SGI) for maintaining habitat in PACs, PPH
    - **METRIC**: Report number of projects and amount (acres) of sage-grouse habitat created, improved, or restored AND amount of habitat in the rehabilitation process
  - Create an Advanced Credit Acquisition program
  - Enroll landowners in conservation easements to protect exitsing sage-grouse habitat, with focus in PACs and PPH
    - **METRIC**: Report the number of easement / agreements reached and the associated acres. If available, report the types of seasonal habitat(s) protected through agreement
  - Purchase lands important to sage-grouse (PACs, PPH)
    - **METRIC**: Report amount (acres) of land purchased to protect sage-grouse habitat

THREAT: Agriculture conversion

- Protect existing habitats on private lands through conservation agreements
  - Enroll private landowners in [conservation] easements
    - **METRIC**: Report the number of easements and the associated acres protected as a result of the agreement
  - Provide incentives to avoid (or minimize) conversion of sage-grouse habitats to agriculture
    - **METRIC**: Report the number of agreements/programs and the associated acres protected or improve existing habitat(s)
  - CRP & other Farm Bill programs, increased extension of CRP contracts (longer time length, ability to renew), maintaining habitat after CRP contract expires
  - Candidate Conservation Agreements w/ Assurances (CCAAs)

Comment [LW 4]: … and delineation (?)

Comment [LW 5]: Should we add "especially in areas of low elevation"… is this more of a concern in grazing management.

Comment [A6]: (per NV) Quantify deferment of surface disturbing activities (e.g. leases not sold within PPH and/or PGH)

Comment [A7]: (per NV) Elimination of prescribed fire in all instances and in all habitat types is not supported by the best available science. Rx fire is one of many tools that can be used for management of vegetation adapted to fire. Fire should be limited in low elevation, Wyoming big sagebrush communities, but not in high elevation, mountain big sagebrush communities. This is consistent with the COT report.

Comment [LW 8]: It would be beneficial for us to cite the best science available that supports the use of 'Rx fire' in specific areas/habitat types

Formatted: Strikethrough

Comment [A9]: (per NV) This is an area where additional research is needed before making a blanket recommendation to avoid cutting/mowing all sagebrush varieties. For instance, creating a mosaic by cutting/mowing with mastication equipment within decadent stands of ARTRTR can stimulate seed production and provide resources (shade/sunlight, nutrients, moisture, organic material, etc.) for plant growth.

Comment [A10]: (per NV) Does this actually mean that, in lieu of mowing, one should use dragging or brush beating? In many instances, this would be considered a soil disturbing activity that would actually increase the distribution and density of invasive species such as cheatgrass and medusahead.

Comment [LW 11]: I'm trying to get at the point of: We want to refrain from providing incentives for land owners/managers to create late summer/brood-rearing habitat (i.e. meadows) in lieu of losing sagebrush habitat (nesting, winter).

DRAFT

- Create conservation credit systems (Advanced Credit Acquisition)
- Develop and/or enforce state restrictions on agriculture conversion on state lands
- Work with counties and states to restrict and/or reduce agriculture conversion in planning and zoning efforts.

Comment [LW 12]: I'm not sure what the metric is here. I think it's valuable, but I'm not sure what states are to report.

THREAT: Fire

Population Information and Research Needs:

- *Utilize weather augmentation (cloud seeding) in rehabilitation efforts post fire in strategic locations where a modest increase could improve germination success significantly.*
- *Complete burn severity assessments and identify ecological site potential in, and in proximity to, PACs to identify the areas with the highest potential for restoration of habitat functions following fires. Focus rehabilitation efforts on areas of highest potential success based ecological site conditions (soils, precipitation zone, and geography). Utilize revegetation seed mixtures that include native and locally-adapted plant seed that will quickly stabilize soils, help to provide long term hazardous fuels reduction, and increase ecosystem resiliency in appropriate locations.*
- *Develop plans and acquire the necessary resources (e.g. seed collection, seeding equipment pools, trained staff, etc.) for post fire rehabilitation activities and warehouse viable seed stockpiles.*
- *Post-fire rehabilitation efforts should be collaborative and strategic in approach. A wide variety of agencies, representing multiple disciplines should be involved in order to leverage funding opportunities and provide knowledge on appropriate site-specific treatments. Rehabilitation efforts should focus on preventing the spread of invasive species, particularly in or near sage-grouse habitat.*
- *Ecological site descriptions and associated state and transition models will be used to identify target areas for restoration. Areas that are in an invaded state that will likely transition to a cheatgrass monoculture if a disturbance occurs and are located within or near sage-grouse habitat should be prioritized for restoration efforts to increase resistance and resilience.*
- *Ensure sage-grouse habitat needs are considered in restoration efforts including managing for the range of variation, as appropriate for the local area.*
- *In the case of limited resources, prioritize PACs over habitats outside of PACs for restoration efforts.*

PRE-SUPPRESSION / WILDFIRE PREVENTION

- Minimize risk of fire on the landscape by:
  - Prescribe and apply appropriate habitat/vegetation management
  - Emphasize strategic fuels management. Reduce high fuel loads (i.e. cheatgrass areas) in and near PACs, PPH, or limiting habitat
    - **METRIC**: Report the number of treatments and acres treated to reduce high fuel loads in PACs and PPH
  - Strategically site and place fire breaks to protect sage-grouse habitat. Investigate possible use of anthropogenic features, such as transmission lines, trails, previous fire perimeters, utility right-of-ways, etc. as fire breaks so as to not create new disturbances on the landscape. Strategic placement of fire breaks, green strips, and fuels reduction treatments in and near PACs.
  - Grazing management strategies that are intended to increase the resiliency of the native perennial grass and forb community and maintain or enhance soil biotic crusts.
  - Seasonal closure of areas to recreation in high fire-risk areas, restrict human activities that may cause fires in areas that may be at high risk of fire.
  - Dedicate federal, state, and local funding for pre-suppression activities separate from funding for suppression activities
  - Develop prioritized pre-suppression plans that focus on priority sage-grouse habitat in and near PACs, similar to the Wildland Urban Interface planning analysis
  - Establish and implement a framework across all land jurisdictions for pre-suppression actions to minimize ignitions and alter fuel conditions in order to avoid, to the greatest extent possible, large damaging conflagrations. Complete landscape level habitat assessments in, and in

Comment [A13]: Is this seasonal closures or year round closures? Year-round closures may not be practical or realistic. It does not make sense to close areas to recreation when fire risk is low. Also, what is encompassed under the term recreation – OHVs, hiking, hunting?

Comment [LW 14]: I believe this was intended to read as seasonal closures.

DRAFT

proximity to, priority sage-grouse habitat areas to identify those habitat areas that are at the highest risk of wildland fire and subsequent conversion to invasive annual grasses.

- Incentivize beneficial uses of biomass and excess fuels (e.g. stewardship contracting, landscape level/long term projects, etc.) to remove them from the landscape.

SUPRESSION

- Minimize risk of fire on the landscape by:
  - Pre-positioning available resources to suppress fire in key habitats with forecasted as high threat (this may be informed by the identification of seasonal and limiting habitats in each PACs).
  - Encourage mutual aid agreements between jurisdictions
    - Identify PACs / subpopulations that span multiple jurisdiction to aid in the development/creation of those agreements
  - Identify and develop suppression plans, including mapping of sage-grouse habitat in or near PACs, to improve initial attack suppression actions.
  - Update Fire Management Plans, dispatch run cards, and relevant agreements to ensure "closest forces" concepts are being utilized at all times, particularly non-federal suppression resources
  - Eliminate the tactic of "burning out" within sage-grouse habitat in or near PACs
  - Designate sage-grouse habitat in or near PACs as a "high priority value" for suppression resource allocation in the Geographical Area Coordination Centers and within the FEMA-Fire Management Assistance Grant criteria

Comment [LW 15]: (per NV) This is needed for suppression, but if pre-suppression is used in these areas, the need to suppress may not be as urgent.)

POST-FIRE RESTORATION / REHBILITATION

- Establish strategies for monitoring and adaptive management of restoration, including timely, adequate restoration after fire including required monitoring to ensure the desired rehabilitation goal is achieved.
  - Encourage use of local, native or locally-adapted seed mixes, whenever possible, so seeded species can compete. If local native seeds are unavailable or impractical for site conditions, prioritize use of native and then locally-adapted seeds
  - Strategic placement of restoration efforts, likely success, may restore naturally, etc. Encourage use of appropriate local seed mixes, natives can compete.
  - If local native seeds are unavailable, prioritize use of limited local native seeds.
  - Address shortage of local native and locally-adapted seed by expanding and improving capabilities for seed collection, availability, and storage.
  - Strategic use of appropriate non-native non-invasive species for restoration, reclamation, mitigation to move towards reestablishment of native plant communities

Comment [LW 16]: (per NV) Are grazing management strategies appropriate to maintain long term sustainability of restoration efforts (continue resiliency to invasive species conversion)?

Comment [A17]: "Local native" seed is not always available and will not always provide the greatest chances for seeding success. Ex) low elevation, low precipitation zones. In addition, the COT report recommends the use of native of locally-adapted species, not just local native.

THREAT: Conifer encroachment

- Improve habitat in PACs in PPH through conifer removal.
  - Limit ~~use of fire for conifer removal~~ use of fire in low elevation areas, low precipitation zones, Wyoming big sagebrush communities ; use caution when planning use of prescribed fire in high elevation areas, high precipitation zones, and mountain big sagebrush communities. Limit the use of fire in pinyon juniper invaded PACs where cheatgrass/invasive plants are present or could enter from surrounding areas.
  - Use of hand and mechanical removal of conifers in stage 1 & 2 in PACs and PPH.
    - **METRIC**: Report number of acres of habitat treated for conifer removal in PACs and PPH.
    - **METRIC**: Report seasonal habitat(s) treated using conifer removal.]
    - **METRIC**: Report amount of conifers removed from perspective of fire fuels management.
  - Use of hand and mechanical removal of conifers in stage 1 & 2 outside of PACs and PPH.
    - **METRIC**: Report number of acres of habitat treated for conifer removal outside PACs and PPH.

Comment [A18]: Problem with the word "eliminate" here. In some cases, fire in mid to upper elevation phase 2 and even phase 3 habitats has led to improved habitat conditions for sage-grouse.

DRAFT

        - METRIC: Report any improvement in connectivity between existing PACs or separated seasonal ranges. This may also be categorized for known migration routes/patterns.
        - METRIC: Report amount of conifers removed from perspective of fire fuels management.
    - Removal of stage 3 conifers that are site specific and can respond well to rehabilitation efforts to improve sagebrush ecosystem health.
    - Removal of conifers and location of treatment should be prioritized by seasonal habitat needs. Identify locally limiting seasonal habitat(s) on a PAC or subpopulation scale.
    - Conifer removal projects should include long-term monitoring

Comment [A19]: A thorough evaluation of the site potential should be undertaken before a stage three P-J stand is treated.

THREAT: Noxious weeds / annual grasses / invasive species

Population Information and Research Needs:

- *Development and use of ACK-55*
- *Develop protocols for rehabilitation efforts that are more effective, more often*
- *Further evaluations for the development of weather augmentation to enhance initial germination and propagation, especially on fringe sites.*

- Minimize disturbance in sagebrush habitat to help prevent the incursion and spread of annual grasses, noxious weeds, and invasive species.
    - Avoid soil disturbance and surface disturbing activities; when avoidance is not feasible, use microsite planning to minimize disturbance by avoiding invaded areas.
    - ~~o~~ Remove use of prescribed fire in invaded habitat, except were treatment efforts could be benefitted by the initial removal of thatch layers with fire. ~~unless specifically needed to create conditions favorable for rehabilitation/restoration~~
    - ~~Avoid activities in PACs that increase risk of invasive species~~ (Not a reasonable goal)
    - Increase practices of washing vehicles, etc. and provide educational materials and information to educate projects proponents working in sage-grouse habitat.
- Get cheatgrass on noxious weed list in each state (where cheatgrass is not well established)
- Increase conversion from weeds to native grasses through aggressive management or restoration
    - Prioritize areas based on highest likelihood of success
    - Use of local, native, or locally-adapted perennial grasses, forbs, and shrubs for restoration, reclamation, mitigation
    - Increase availability of native seed sources
    - Incentives or dedicated funding sources for local, native seed sources
    - Use of locally-adapted, non-native and non-invasive seed sources for sites that present the greatest challenges due to limitations in precipitation, soil quality, elevation, extreme soil disturbances, and exacerbated effects of climate variability.
    - Support native seed collection and storage efforts to increase genetic diversity for research, seed increase projects, and development of adapted locally grown plant materials
    -
- Strategic use of appropriate non-native non-invasive species for restoration, reclamation, mitigation to move towards reestablishment of native plant communities
- Implement proper range management activities
    - Identification of allotments with cheatgrass or other invasives to minimize transfer of livestock to 'uninvaded' parcels
    - Promote use of 'weed-free' hay in all priority habitat / PACs
    - Where cheatgrass is predominantly present within the understory of sagebrush, utilize targeted grazing and potential seeding to reduce the threat of catastrophic fire and increase the potential resiliency of the understory.
    - Work with federal agencies to develop consistent procedures and policies for the treatment of noxious and invasive plants, chemical usage, and timing. Develop MOU's with State

Comment [A20]: this should be evaluated on a site by site basis rather than recommending a blanket statement that Rx fire has no role on invaded sites. For instance, on a medusahead rye invaded range, Rx fire may be needed to remove matted thatch prior to herbicide application.

Comment [LW 21]: (per NV)
This presents a significant challenge to states that have existing statutes that preclude its listing due to the current expanse and required actions that would be necessary to treat the infestations or secure liens to address the problem.
In many cases, the cost of treatment and the absence of a requirement to vegetate back to a desirable state may create niches for additional invasions of even less desirable non-native species and subsequent soil erosion. The efforts needed may exceed the relative value of the land, essentially rendering the action as a government "taking" or eminent domain

Comment [A22]: Use of non-native when appropriate- low precipitation, low success rates with natives vs higher success rates with non-natives

Multiple years of treatment

DRAFT

Departments of Agriculture or~~n~~ Natural Resources to timely address the issue and avoid redundancy and misinformation.

- Early detection and control of invasive plant species.
- Create sole source mapping, treatment, revegetation, etc. on both public and private lands
    - **METRIC**: Report new and existing (if known) infestations
        - Use of geospatial data to inform land managers
- Evaluations and treatment of heavy use areas, such as near water sources (ponds, riparian, tanks, troughs) or transfer areas, for non-native weed invasions
- Evaluate allotments that are predominately Wyoming big to determine how grazing management practices are promoting native perennial grass and forb community health as well as maintaining or enhancing soil biotic crusts.
- Require best management practices for construction projects in and adjacent to PACs to prevent invasion
- Focus on managing for resilient and resistant sagebrush ecosystems to reduce the risk of conversion to cheatgrass dominated systems if a disturbance, such as wildfire were to occur

THREAT: Energy development

- Site planning to avoid PACs and important seasonal habitat
    - Strategic planning of lease sales outside of PACs
    - On-site planning to avoid disturbing PACs, leks
    - ROW avoidance in priority sage-grouse habitat in or near PACs
    - Time of day, seasonal restrictions
- Minimization of tall structures on the landscape / Employ extraction techniques that minimize footprint
    - Reduce distribution of / consolidate infrastructure
    - Bury transmission and pipelines when and where feasible
    - Co-location of energy development related structures
    - Incorporate directional drilling
- Avoid conflict with sage-grouse habitat by locating facilities and activities in non-habitat wherever possible
- Reducing density of the habitat disturbance
    - Reduction of cumulative disturbance in PACs – use of disturbance caps
    - Use of state tools (DDCT)
- Conservation agreements with energy companies to provide USFWS assurance in regards to how companies will be operating
- Limit extensions of undeveloped leases
- Withdraw underperforming, under-developed leases
- More consistent oversight of industrial siting, lower economic threshold that triggers industrial siting (less local, more regional/state/national)
- Mitigation implemented/compensatory mitigation
- Minimization of impacts by requiring best management practices if avoidance is not possible in or near PACs
    - Reduce tall structures on the landscape
    - Employ extraction techniques that minimize footprint
    - Engage in weed control efforts during pre- and post- project construction
    - Apply measures to deter predator perching and nesting on elevated structures
- ~~Reducing density of the habitat disturbance~~
    - ~~Reduction of cumulative disturbance in PACs – use of disturbance caps~~
    - ~~Use of state tools (DDCT)~~
    - Maintain within established limits of cumulative impacts
- Conservation agreements with energy companies to provide USFWS assurance in regards to how companies will be operating

DRAFT

- More consistent oversight of industrial siting, lower economic threshold that triggers industrial siting (less local, more regional/state/national)
- The mitigation section listed below for mining should be included in this section as well.
- Mitigate impacts – Create conservation credit systems to mitigate for impacts from energy development in order to provide for no net loss of sage-grouse habitat in or near PACs

THREAT: Mining

- Avoid leasing in PACs
- Placement of disturbance out of PAC
    - Mining infrastructure: Place railroad lines, yards, spurs, outside of GRSG habitat
    - timing limitation stipulations (on specific practices – blasting, etc)
    - duration of construction
- Mitigation
    - Mitigation, timing of monitoring or what qualifies for reclaimed (different state definitions of reclamation)
    - Create mitigation plans for all development and habitat loss
    - Mitigation monitoring and definition of 'success'
    - Change in State regulation to change standard for reclamation
- Avoid additional impacts until habitat is restored from previous disturbance, no-net loss of habitat
    - Establish a project footprint, establish the amount of habitat that needs to be mitigated for prior to further development
    - Attempt to synchronize timelines for sage-grouse and mining development
- Adequate state regulation, OSM oversight, Federal minimum
- Minimization of impacts by requiring best management practices if avoidance is not possible in or near PACs
- Mitigate impacts – Create conservation credit systems to mitigate for impacts from energy development in order to provide for no net loss of sage-grouse habitat in or near PACs
- Reclamation: Must have a realistic timeline, plan for potential need to multiple years of treatment, as well as monitoring until habitat is returned to functional status geared specifically for GRSG
- Mitigation
    - Mitigation, timing of monitoring or what qualifies for reclaimed (different state definitions of reclamation)
    - Create mitigation plans for all development and habitat loss
    - Mitigation monitoring and definition of 'success'
    - Change in State regulation to change standard for reclamation
- Avoid additional impacts until habitat is restored from previous disturbance, no-net loss of habitat
    - Establish a project footprint, establish the amount of habitat that needs to be mitigated for prior to further development
    - Attempt to synchronize timelines for sage-grouse and mining development
- Reducing density of the habitat disturbance
    - Reduction of cumulative disturbance in PACs – use of disturbance caps
    - Use of state tools (DDCT)

Comment [A23]: You are confusing the terms "mitigation" and "reclamation" – they are different concepts

THREAT: Infrastructure

- Site planning to avoid habitat / Moving facilities or lines outside of habitat
    - Re-planning to avoid sites
- Designate travel corridors and infrastructure corridors outside of PACs
- Travel management plan
    - Resource advisors on-site to advise on travel management, site plan

DRAFT

- Identifying and removing negative structures (fencing, abandoned/inactive powerlines, roads, in-active wells, etc.)
- Mitigation for impacts (direct and indirect) that are unavoidable
- Minimize footprint of features to minimize predator incursion
    - Develop and implement practices during construction and maintenance of structures to minimize predator incursion
    - Minimization of anthropogenic nesting or roosting sites
- Control or design to avoid invasion of invasive species
- Mitigation for noise
- Restoration with sufficient monitoring and adaptive management
- Fence marking associated with model where leks are at risk from fence structures
- Mitigation implemented
    - Restoration of disturbed habitat
- Reducing density of the habitat disturbance
    - Reduction of cumulative disturbance in PACs – use of disturbance caps
    - Use of state tools (DDCT)
- Mitigation for impacts (direct and indirect) that are unavoidable
    - Create conservation credit systems to mitigate for impacts from infrastructure in order to provide for no net loss of sage-grouse habitat in or near PACs
- Minimize impacts by requiring best management practices if avoidance is not possible in or near PACs
    - Minimize footprint of features to minimize predator incursion
    - Develop and implement practices during construction and maintenance of structures to minimize predator incursion
    - Minimization and the use of deterrence strategies on anthropogenic nesting or roosting sites
    - Reduce tall structures on the landscape
    - Reduce distribution of / consolidate infrastructure
    - Bury transmission and pipelines when and where feasible
    - Co-location of infrastructure
    - Engage in weed control efforts during pre- and post- project construction
    - Noise restriction – time of day, total decibels
- Roads:
    - Provide sufficient funding to support agency enforcement~~Enforcement~~ of travel restrictions and road closures
    - Design roads for appropriate traffic volume and traffic weight/load
        - Do not create road larger or smaller than they need to be
    - Road placement to maintain habitat and to be used as a fire break
    - Where feasible, relocate existing roads outside of riparian areas in PACs
    - Design new roads for locations outside of riparian areas in PACs
    - Seasonal or daily timing restrictions for road traffic
    - Speed limits (GPS monitored by energy companies)
    - Minimize traffic volume through carpooling or efficient use of transport
    - Reduce traffic by using remote sensing and placement of structures

Comment [A24]: Travel restrictions and road closures have to be monitored closely. To do this, funding for enforcement, signage, barriers and/or road obliteration has to be provided for annually in the responsible agency's budget.

THREAT: Grazing / range management

- Proper grazing management
    - Prescribed grazing plans that provide ecologically appropriate practices
        - Range management, grazing management plan
    - ~~Adjusting stocking rates~~ (If properly evaluated and applied, the point above will account for proper stocking rates)
        - ~~Stocking rates to provide appropriate seasonal habitat~~

- Adjust or set and enforce ~~AML~~ (AML is specific to wild horse and burro management and AUM's are generally used for livestock) AUM ~~for drought~~ to annual climatic and ecological site conditions
- Grass banks established for drought conditions (not clear on the intent here. Who? Where? How?)
- Grazing allotment rest and rotation (site or area specific grazing recommendations should be established where rest and rotation may not be the most appropriate management technique to apply)
- Timing restrictions / seasonal restrictions
- Prescribed grazing plans that follow NRCS conference report
- Identification of seasonal needs addressed in livestock mgmt. plans that benefit sage-grouse
- Grazing management strategies that promote native perennial grass and forb community health and maintains or enhances soil biotic crusts.
- Grazing management strategies that promote meadow and riparian health.
- Allotment management plans that meet Rangeland Health Standards and Biodiversity Standards

- Ensure management plan allow ecological habitat requirements to be met
- Prescribed or targeted grazing
  - Grazing as a tool to remove invasive (read: cheat~~-~~grass, medusa head) and reduce fuel load
  - Grazing as a tool to remove abundant fuel sources as appropriately prescribed
- Grazing management practices consistent with all seasonal habitat needs
  - Do not provide incentives to eliminate sagebrush (in lieu of created brood rearing habitat)
  - Establish habitat needs in specific areas where 'in-kind' habitat restorations and/or mitigation
- Monitoring for native/perennial grass and forb communities
- Seasonal closure of roads
- Buffers, avoidance of key habitats (wet seasonal habitat, leks)
- Incentives to provide important seasonal habitat (brood rearing, nesting, wintering, lek), prioritize
- Management of game areas
- Proper and timely disposal ~~management~~ of bone-piles, carcasses
- Proper ~~Fencing~~ livestock grazing in ~~out of~~ riparian areas (Fencing m~~M~~ay limit use by other wildlife species and some studies support properly managed targeted grazing of these areas as beneficial to greater sage-grouse)
  - Minimizes creation of mosquito habitat (WNv)
  - ~~o~~ Maintains PFC of riparian areas
  - Reduce "hot season" grazing in riparian areas
- Large scale CCAAs

THREAT: Free-roaming equids

Population Information and Research Needs:

- *Research birth control options as well as techniques to administer contraceptives herds*
- *Counts and surveys of equids (obtain updated population estimates)*

- Maintain wild horses at Appropriate Management Levels (AML) in designated Herd Management Areas (HMA) in PACs (Levels should be strictly enforced or emergency measures should be taken).
  - Proper management and enforcement of AML based upon the ecological conditions – maintain upland and riparian habitat
  - Adjust or set and enforce AML for drought and fire restricted conditions
  - Identifying adaptive management triggers for adjustment for management
  - Conduct population control
  - Implementation of uniform, consistent application of existing Federal laws and regulations
  - ~~Proper grazing for ecological conditions~~ (Not practicable with free- roaming equids)

Comment [A25]: What is the actual **METRIC** here?

Comment [A26]: Way too many allotment within the Great Basin are not meeting either one of these. If not, grazing management strategies should be changed within are reasonable amount of time to correct the situation.

Comment [A27]: What is the actual **METRIC** here?

Comment [A28]: What does this actually mean? What is the **METRIC** here?

Comment [A29]: Please refer to Evan 1986 and work in BLM Elko district for more information on proper livestock grazing in wet meadow/ riparian areas.

Comment [LW 30]: (per NV) it may be worth considering managing the AML for the worst case scenario annually given the controversy surrounding the maintenance at current levels and subsequent actions necessary to gather and foster them.

DRAFT

THREAT: Recreation

- Use access, timing, noise and seasonal restrictions
  - Seasonal closures ~~– closures~~ as appropriate
- Enforcement of existing regulations
- Rerouting trails
- Avoid creating new trails in habitat or near leks
- Travel management plans
- Designate OHV areas outside of PACs
- Educate OHV users on how to responsibly use OHVs while minimizing adverse effects on public land resources, including sage-grouse habitat in or near PACs

THREAT: Urbanization

- County zoning regulations; specifically the reduction of housing, lot size, subdivision
  - Consolidation of infrastructure
- Strategic placement of development
- Easements
- Land swaps / Acquisition of habitat
  - Conservation leases / incentive based programs

THREAT: OTHER

- Overarching education and outreach in regards to every threat
- Report any new habitat created
- Restoration of previously disturbed areas with appropriate management, monitoring and protection

THREAT: Predation

- When downward population trends and nesting success are detected in sage-grouse habitat in or near PACs initiate predator surveys and identify responsible predator species to target and implement an effective predator control effort.
- When ravens have been identified as negatively affecting a population:
  - Implement a predator control program to reduce transient raven populations for nest protection and increased chick survival
  - Conduct predator control to coincide with the life stage impacted by predation.
- Maintain a mosaic of shrub cover conditions ranging from 20 percent to 40 percent in nesting habitat to provide both habitat resiliency and preferred nesting conditions for sage-grouse in areas with high raven populations.
- Initiate predator control programs based on biological assessments appropriate to local conditions.
- Eliminate external food sources for ravens, particularly landfills, waste transfer facilities, and road kill that subsidize raven populations. Enforce existing State laws that require daily covering of landfills.
- When needed, pursue take permits from USFWS under the Migratory Bird Treaty Act
- Identify and apply appropriate habitat management practices (e.g. livestock management, vegetation treatments, control of artificial nest and roost sites) that decrease the effectiveness of predators.
- Monitor effects of predator control to determine causal relations with sage-grouse survival~~ability~~ and adapt control strategies accordingly.
- Minimize tall structures in or near PACs
- Discourage raven nesting, roosting, perching in or near PACs

Comment [LW 31]: This can be very difficult, especially in nest survival situations.

Comment [LW 32]: How is this accomplished? What's the metric measured/reported here?

Comment [LW 33]: We should provide/list the research used to identify this range.

Comment [LW 34]: When funding appropriations are being identified and prioritized, this could be considered a never-ending sink of resources… What's the metric measure identified here?

Comment [LW 35]: Is it feasible to remove or moves these anthropogenic features on the landscape? Possibly this could be listed as a way to better site future features out of PACs and PPH

Comment [LW 36]: This phrase requires some more detail/specificity and maybe some justification.

Comment [LW 37]: This is more likely a measure directed at livestock management, habitat conservation, and habitat treatments.

Comment [LW 38]: This probably belongs under the threat 'umbrella' of INFRASTRUCTURE

Comment [A39]: (per NV)

DRAFT