From:	Wiechman, Lief
To:	Nicole Alt
Cc:	Jesse DElia
Subject:	Re: Metrics/measures - updated 9/30
Date:	Monday, September 30, 2013 9:07:07 AM
Attachments:	GRSG measures discussion v.3 (with NV comments).docx

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Hi Nicole,

Attached is the re-worked measure/metric list. I've incorporated all of Nevada's (Time Rubald) comments, and left the ones that may merit further discussion among us. I've placed my comments in the margin as well. Just a note for review purposes: All of the '*unaccepted additions*' are those of Tim/NV and not my own.

I've attempted to assign an actual METRIC where I could, but there's room for improvement and possibly some additional duplication between threats. I've also tried to list the "what", the "how", and the metric in the hierarchical fashion that Jesse described, although he may have additional suggestions.

Take a look and let me know how you'd like to proceed...

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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

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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.

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 [A1]: (per NV)
- *Once identified, maintain or enhance limiting habitat*

Comment [A2]: (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

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- **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 existing 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 3]: … and delineation (?)

Comment [LW 4]: Should we add "especially in areas of low elevation"… is this more of a concern in grazing management.

Comment [A5]: (per NV) Quantify deferment of surface disturbing activities (e.g. leases not sold within PPH and/or PGH)

Comment [A6]: (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 7]: It would be beneficial for us to cite the best science available that supports the use of 'Rx fire' in specific areas/habitat types

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Comment [A8]: (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 [A9]: (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 10]: 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).

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- 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 11]: 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.*
- *(Per NV) 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.*
- *(Per NV) 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.*
- *(Per NV) 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.*
- *(Per NV) 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.*
- *(Per NV) Ensure sage-grouse habitat needs are considered in restoration efforts including managing for the range of variation, as appropriate for the local area.*
- *(Per NV) 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.
  - *(Per NV)* 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.
  - *(Per NV)* Dedicate federal, state, and local funding for pre-suppression activities separate from funding for suppression activities
  - *(Per NV)* Develop prioritized pre-suppression plans that focus on priority sage-grouse habitat in and near PACs, similar to the Wildland Urban Interface planning analysis
  - *(Per NV)* 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

Comment [A12]: 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 13]: I believe this was intended to read as seasonal closures.

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possible, large damaging conflagrations. Complete landscape level habitat assessments in, and in 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.

- *(Per NV)* 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:
  - Encourage mutual aid agreements between jurisdictions
    - Identify PACs / subpopulations that span multiple jurisdiction to aid in the development/creation of those agreements
  - 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).
  - *(Per NV)* Identify and develop suppression plans, including mapping of sage-grouse habitat in or near PACs, to improve initial attack suppression actions.
  - *(Per NV)* 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
  - *(Per NV)* 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
  - *(Per NV)* Eliminate the tactic of "burning out" within sage-grouse habitat in or near PACs

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

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.

Comment [LW 14]: (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.)

Comment [LW 15]: (per NV) Are grazing management strategies appropriate to maintain long term sustainability of restoration efforts (continue resiliency to invasive species conversion)?

Comment [A16]: "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.

Comment [A17]: 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.

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        - **METRIC**: Report number of acres of habitat treated for conifer removal outside PACs and PPH.
        - **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.
    - Remove stage 3 conifers that are site specific and can respond well to rehabilitation efforts to improve sagebrush ecosystem health.
    - Location of conifer removal/treatment should be prioritized by seasonal habitat needs. Identify locally limiting seasonal habitat(s) on a PAC or subpopulation scale.
    - Establish long-term monitoring for conifer removal projects/treatments.
        - **METRIC**: Report previously unoccupied habitat that has become occupied as a result (in part) of conifer removal to aid in reporting effectiveness of removal efforts.

Comment [A18]: 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*
- *(Per NV) Develop protocols for rehabilitation efforts that are more effective, more often*
- *(Per NV) 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).
- Establish range management practices to promote 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
- Implement proper range management activities
    - *(Per NV)* 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 Identify allotments with cheatgrass and/or other invasives to minimize transfer of livestock to 'uninvaded' parcels.
        - **METRIC**: Report known allotment composition, where presence (or absence) of invasives have been confirmed.
    - *(Per NV)* Evaluations and treatment of heavy use areas, such as near water sources (ponds, riparian, tanks, troughs) or transfer areas, for non-native weed invasions
    - Promote use of 'weed-free' hay in all priority habitat / PACs.
    - *(Per NV)* 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.
        - **METRIC**: Report strategic grazing practices, and the amount (acres), identified to reduce the threat of invasives and any related fire-prevention benefit.

Comment [A19]: 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 20]: Although this is a valuable way to help reduce the spread of weeds, I'm not sure what the 'METRIC' is here.

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

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- *(Per NV)* 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 Departments of Agriculture or Natural Resources to timely address the issue and avoid redundancy and misinformation.

- Increase conversion from weeds to native grasses through aggressive management or restoration.
  - Prioritize areas based on highest likelihood of success.
  - Use local, native, and/or locally-adapted perennial grasses, forbs, and shrubs for restoration, reclamation, mitigation. 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.
    - **METRIC**: Include the seed mix information in mitigation plans as well as success of seed mixes in the area to reduce repeating unsuccessful recoveries.
  - Strategic use of appropriate non-native non-invasive species for restoration, reclamation, mitigation to move towards reestablishment of native plant communities
  - Increase availability of native seed sources
  - Create incentives or dedicated funding sources for local, native seed sources
  - Support native seed collection and storage efforts to increase genetic diversity for research, seed increase projects, and development of adapted locally grown plant materials.
    - **METRIC**: Report collection efforts related to local, native seed harvest as well as storage of seed dedicated to the rehabilitation of sagebrush habitat(s).
  - *(Per NV)* 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
  - *(Per NV)* Require best management practices for construction projects in and adjacent to PACs to prevent invasion

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

Comment [LW 23]: BMPs are voluntary – This may just be a question of wording, but we may not have the ability to require BMPs

THREAT: Energy development

- Avoid and minimize habitat loss especially in PACs and PPH.
  - Site planning outside of PACs, PPH, and important seasonal habitat to avoid disturbance. Avoid conflict by siting associated facilities (and activities) in non-habitat wherever possible.
    - **METRIC**: Report all new development (projects) and amount of disturbance (acres) that is sited outside PACs and PPH.
  - Strategic planning of lease sales outside of PACs
    - **METRIC**: Report all lease sales are conducted outside of PACs and PPH as a result of restriction and protection placed in PACs and PPH.
  - Employ time of day, seasonal restrictions near leks, nesting habitat; especially in PACs and PPH.
  - ROW avoidance in priority sage-grouse habitat in or near PACs
  - On-site planning to avoid disturbing PACs, leks.
    - **METRIC**: Report all disturbances that are relocated outside of disturbance buffers as a result of disturbance buffer protections around leks (as well as nesting, and winter habitat).
- Minimization of tall structures on the landscape / Employ extraction techniques that minimize footprint.
  - Reduce tall structures on the landscape
  - Apply measures to deter predator perching and nesting on elevated structures
  - Co-location of energy development related structures.
  - Reduce distribution of / consolidate infrastructure.
  - Bury transmission and pipelines when and where feasible
  - Incorporate directional drilling
- Reduce the density of the habitat disturbance across the landscape and at the PAC level.
  - Reduction of cumulative disturbance in PACs – use of disturbance caps.
  - Use of state tools to minimize disturbance (DDCT).
  - Maintain within established limits of cumulative impacts

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- Conservation agreements with energy companies to provide USFWS assurance in regards to how companies will be operating and protections that will be exercised.
- Withdraw underperforming, under-developed leases
- Limit extensions of undeveloped leases
- More consistent oversight of industrial siting, lower economic threshold that triggers industrial siting (less local, more regional/state/national)
- Mitigate for impacts (direct and indirect) to sage-grouse and sage-grouse habitat.
    - Create consistency in mitigation efforts for impacted populations and habitat(s). Establish consistent compensatory mitigation framework, and well as a 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.
    - Create mitigation plans for all development and habitat loss.
    - Mitigation, timing of monitoring or what qualifies for reclaimed (different state definitions of reclamation).
    - Mitigation monitoring and definition of 'success'.
    - Change in State regulation to change standard for reclamation.
        - **METRIC**: Report all in-process mitigation projects as well as the state/stage at which the process is in and the acres being restored.
    - Engage in weed control efforts during pre- and post- project construction.

THREAT: Mining

- Avoid and minimize habitat loss especially in PACs and PPH.
    - Site planning outside of PACs, PPH, and important seasonal habitat to avoid disturbance. Avoid conflict by siting associated facilities (and activities) in non-habitat wherever possible.
    - Site disturbance, development, and associated mining infrastructure (railroad lines, yards, spurs, outside of GRSG habitat).
        - **METRIC**: Report all new development (projects) and amount of disturbance (acres) that is sited outside PACs and PPH.
    - Strategic planning of lease sales outside of PACs
        - **METRIC**: Report all lease sales are conducted outside of PACs and PPH as a result of restriction and protection placed in PACs and PPH.
    - ROW avoidance in priority sage-grouse habitat in or near PACs
    - On-site planning to avoid disturbing PACs, leks.
        - **METRIC**: Report all disturbances that are relocated outside of disturbance buffers as a result of disturbance buffer protections around leks (as well as nesting, and winter habitat).
- Avoid additional impacts until previously disturbed habitat is restored to exhibit 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.
    - Employ time of day, seasonal restrictions near leks, nesting habitat; especially in PACs and PPH.
    - Restrict duration of construction for all mine development.
- Minimization of impacts by requiring best management practices if avoidance is not possible in or near PACs.
- Mitigate for impacts (direct and indirect) to sage-grouse and sage-grouse habitat.
    - Create consistency in mitigation efforts for impacted populations and habitat(s). Establish consistent compensatory mitigation framework, and well as a 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.
    - Create mitigation plans for all development and habitat loss.

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- Mitigation, timing of monitoring or what qualifies for reclaimed (different state definitions of reclamation).
- Mitigation monitoring and definition of 'success'.
- Change in State regulation to change standard for reclamation.
  - **METRIC**: Report all in-process mitigation projects as well as the state/stage at which the process is in and the acres being restored.
- 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. Reduce the density of the habitat disturbance across the landscape and at the PAC level.

- Reduce the density of the habitat disturbance across the landscape and at the PAC level.
  - Reduction of cumulative disturbance in PACs – use of disturbance caps.
  - Use of state tools to minimize disturbance (DDCT).
  - Maintain within established limits of cumulative impacts
    - **METRIC**: Report amounts of disturbance (using disturbance calculation tool)
- Establish adequate state regulation, OSM oversight, Federal minimums.

THREAT: Infrastructure

- Avoid and minimize habitat loss especially in PACs and PPH.
  - Site planning outside of PACs, PPH, and important seasonal habitat to avoid disturbance. Avoid conflict by siting associated facilities (and activities) in non-habitat wherever possible.
  - Site disturbance, development, and associated mining infrastructure (railroad lines, yards, spurs, outside of GRSG habitat).
    - **METRIC**: Report all new development (projects) and amount of disturbance (acres) that is sited outside PACs and PPH.
  - Strategic planning of lease sales outside of PACs
    - **METRIC**: Report all lease sales are conducted outside of PACs and PPH as a result of restriction and protection placed in PACs and PPH.
  - ROW avoidance in priority sage-grouse habitat in or near PACs
  - On-site planning to avoid disturbing PACs, leks.
    - **METRIC**: Report all disturbances that are relocated outside of disturbance buffers as a result of disturbance buffer protections around leks (as well as nesting, and winter habitat).
- Designate travel corridors and infrastructure corridors outside of PACs.
- Revisit and update travel management plans with sage-grouse habitat protection in mind.
  - Consult resource advisors on-site to advise on travel management, site plan.
- Minimize impacts by requiring conservation measures if avoidance is not possible in or near PACs
  - Reduce tall structures on the landscape in PACs and PPH (through proper siting).
  - Reduce distribution of / consolidate infrastructure
  - Bury transmission and pipelines when and where feasible.
  - Minimize footprint of features to minimize surface disturbance
  - Develop and implement practices during construction and maintenance of structures to minimize predator incursion such as trash collection at construction and maintenance sites.
  - Minimization the use of deterrence strategies (perch discouragers) on anthropogenic features that may create nesting or roosting sites.
  - Engage in weed control efforts during pre- and post- project construction
  - Establish and implement noise restrictions. Specify time of day restrictions, seasonal, and specify threshold for decibel level. Conduct mitigation for noise when avoidance is unavoidable.
- Roads:
  - Site roads outside of PACs and PPH and when feasible relocate roads away from leks and seasonal habitat(s). Where feasible, relocate existing roads outside of riparian areas in PACs

Comment [A24]: You are confusing the terms "mitigation" and "reclamation" – they are different concepts

Comment [A25]: 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.

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- Establish and enforce seasonal and/or daily timing restrictions for road use.
- Minimize traffic volume through carpooling or efficient use of transport
- Reduce traffic by using remote sensing and placement of structures
- Establish and enforce speed limits (GPS monitored by energy companies)
- 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
- Design new roads for locations outside of riparian areas in PACs
- Control or design to avoid invasion of invasive species

- Mitigate for impacts (direct and indirect) to sage-grouse and sage-grouse habitat.
  - Create consistency in mitigation efforts for impacted populations and habitat(s). Establish consistent compensatory mitigation framework, and well as a 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.
  - Create mitigation plans for all development and habitat loss.
  - Mitigation, timing of monitoring or what qualifies for reclaimed (different state definitions of reclamation).
  - Mitigation monitoring and definition of 'success'.
  - Change in State regulation to change standard for reclamation.
    - **METRIC**: Report all in-process mitigation projects as well as the state/stage at which the process is in and the acres being restored.
- Restoration with sufficient monitoring and adaptive management
- Restore habitat that may improve connectivity to disturbed and/or fragmented habitat as a result of surface disturbing activities.
  - Identify and remove negative structures (fencing, abandoned/inactive powerlines, roads, in-active wells, etc.).
    - **METRIC**: Report all infrastructure removed from sage-grouse habitat, especially in PACs and PPH.
  - Conduct fence marking to reduce collision in area identified as high-risk (using model Stevens et al.).
- Reduce the density of the habitat disturbance across the landscape and at the PAC level.
  - Reduction of cumulative disturbance in PACs – use of disturbance caps.
  - Use of state tools to minimize disturbance (DDCT).
  - Maintain within established limits of cumulative impacts

Comment [A26]: You are confusing the terms "mitigation" and "reclamation" – they are different concepts

THREAT: Grazing / range management

- Avoid important seasonal habitats (wet seasonal habitat, leks) in PACs, PPH.
- Employ proper grazing management across the landscape, in PACS, and PPH.
  - Prescribed grazing plans that provide ecologically appropriate practices, and that follow the NRCS conference report, including appropriate stocking rates.
  - Allotment management plans that meet Rangeland Health Standards and Biodiversity Standards
  - Employ grazing management strategies that promote native perennial grass and forb community health and maintains or enhances soil biotic crusts.
  - Identification of seasonal needs addressed in livestock management plans that benefit sage-grouse.
  - Grazing management strategies that promote meadow and riparian health.
  - Grazing allotment rest and rotation
  - When appropriate adjust or set and enforce AUM for drought and annual climatic and ecological site conditions.

Comment [A27]: 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 [A28]: What is the actual **METRIC** here?

site or area specific grazing recommendations should be established where rest and rotation may not be the most appropriate management technique to apply)

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- Create grass banks established for drought conditions to provide rest for over-used rangelands and allotments to assure sufficient residual cover that may improve nesting conditions.
- Establish and enforce timing restrictions / seasonal restrictions in PACS, PPH.
  - **METRIC**: Report number of allotments and associated acres that remained closed during breeding and nesting seasons.
- Implement seasonal road closures associated with range management activities.
  - **METRIC**: Report the miles of roads closed seasonally that may reduce impacts (direct and indirect) to sage-grouse.

- When feasible or appropriate, use grazing as a tool to remove invasive (read: cheatgrass, medusa head) and reduce fuel load as appropriately described.
  - Prescribed or targeted grazing.
- 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
- Create new and incorporate existing incentive-based programs to create and/or improve important seasonal habitat (brood rearing, nesting, wintering, lek). Prioritize limiting seasonal habitats in the area for better use of resources.
  - Provide land-owners with opportunities to enroll in large-scale CCAAs.
    - **METRIC**: Report number of landowners, amount (acres) or habitat (type), and the associated conservation measures agreed upon to CCAA.
- Management of game areas
- Proper and timely disposal of bone-piles, carcasses.
- Proper livestock grazing in riparian areas (Fencing may 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)
  - Maintains PFC of riparian areas.
  - Reduce "hot season" grazing in riparian areas

Comment [A29]: What does this actually mean? What is the **METRIC** here?

Comment [A30]: Please refer to Evan 1986 and work in BLM Elko district for more information on proper livestock grazing in wet meadow/ riparian areas.

THREAT: Free-roaming equids

Population Information and Research Needs:

- *Research birth control options as well as techniques to administer contraceptives herds*
- *Establish consistent methodology for surveys; Conduct 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 (herd 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
    - **METRIC**: Report the AML levels each year; communicate and report the triggers and whether management actions met or exceeded management triggers
  - Conduct population control
    - **METRIC**: Report number of horses/burros that were given contraceptives
  - Implementation of uniform, consistent application of existing Federal laws and regulations
  - ~~Proper grazing for ecological conditions~~ (Not practicable with free- roaming equids)

Comment [LW 31]: (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.

Comment [LW 32]: Not sure what the metric(s) is/ are for the wild horse and burro programs…

Comment [LW 33]: I'm not sure what the appropriate time interval is here.

Comment [LW 34]: (per NV)

THREAT: Recreation

- Restrict use and access to limit direct and indirect impacts to sage-grouse and their habitat(s).

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- Establish noise restrictions associated with OHV use.
- Seasonal closures as necessary; Set and enforce seasonal and timing restrictions on all recreational trails in sage-grouse habitat during breeding, nesting, and brood-rearing seasons.
    - **METRIC**: Report amount (miles) of recreation trails with timing and seasonal restrictions
    - **METRIC**: Report amount (miles) of recreational trails with seasonal closures
- Enforcement of existing regulations
    - **METRIC**: Report actions taken to close trails to measure efficacy of closures.

- Avoid habitat loss and fragmentation through avoidance of trails creation in sage-grouse habitat; especially in PACs and PPH.
    - Avoid creating new trails in habitat (PACs, PPH) and/or near leks (minimally 0.6 miles from existing leks).
    - Reroute trails when feasible to out of PACs, PPH, and reclaim old trails.
    - Establish 4.0-mile disturbance buffer in nesting habitat in PACs and PPH.
        - **METRIC**: Report amount of trails closed, reclaimed, and rerouted inside to outside of PPH, and 0.6-mile disturbance buffer near leks.
- Revisit and update travel management plans with sage-grouse habitat protection in mind.
    - 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

- Avoid and minimize habitat loss and fragmentation of sage-grouse habitat, especially in contiguous tracts of sagebrush.
    - Work with counties to adjust zoning regulations; specifically a reduction of construction, lot size, subdivision size, and general amount of subdivisions in occupied sage-grouse habitat, PACs, and PPH.
    - Require site planning to account for consolidation of infrastructure
    - Use of strategic placement of development
        - **METRIC**:
    - Attempt to create easements in lieu of development with land owners to decrease the amount of housing and anthropogenic infrastructure development on the landscape
        - **METRIC**: Report the number of easements and the amount (acres) of habitat in potentially residential areas that protect sage-grouse habitat and the type (seasonal) of habitat protected.
    - Acquire habitat through land swaps, conservation leases, and/or incentive-based programs.
        - **METRIC**: Report the number land swaps and/or conservation leases and the amount (acres) of habitat in potentially residential areas that protect sage-grouse habitat and the type (seasonal) of habitat protected.

THREAT: OTHER

- Provide education and outreach to inform the public, land owners, energy industry, non-governmental organizations (NGO), and any other potential project proponents in regards to every threat impacting sage-grouse and their habitat across the range.
    - Encourage state agencies, counties and land owners/managers (both Federal and private) to provide educational materials and forums specific to the region, management zone, PAC.
- Develop programs and initiatives that create new habitat or improve existing habitat; especially that bridges gaps or creates connectivity.
        - **METRIC**: Report creation of habitat by type (seasonal) once creation is complete (acres)
- Establish consistency in the planning, management, and monitoring of mitigated habitat to the previously disturbed (or improved) state.

Comment [LW 35]:
This is the type of measure/metric where we should settle on a consistent definition of reclaimed/restored/mitigated… does it have to be functional and/or occupied. That's a distinction that will help to inform what should or shouldn't be reported.

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- Restore previously disturbed areas with appropriate management, monitoring and protection.
  - **METRIC**: Report success/completion of mitigation efforts.

THREAT: Predation

- *(Per NV)* 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.
- *(Per NV)* When ravens have been identified as negatively affecting a population:
  - *(Per NV)* Implement a predator control program to reduce transient raven populations for nest protection and increased chick survival
  - *(Per NV)* Conduct predator control to coincide with the life stage impacted by predation.
- *(Per NV)* 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.
- *(Per NV)* Initiate predator control programs based on biological assessments appropriate to local conditions.
- *(Per NV)* 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.
- *(Per NV)* When needed, pursue take permits from USFWS under the Migratory Bird Treaty Act
- *(Per NV)* 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.
- *(Per NV)* Monitor effects of predator control to determine causal relations with sage-grouse survival and adapt control strategies accordingly.
- *(Per NV)* Minimize tall structures in or near PACs
- *(Per NV)* Discourage raven nesting, roosting, perching in or near PACs

Comment [LW 36]: Maybe the way to go about this list or section is to move some of these suggestions to other Threat Headings where they may be appropriate and add language at the end stating something along the lines of "which may also reduce predator occurrence in the area"…

Comment [LW 37]: ?

This can be very difficult, especially in nest survival situations.

Comment [LW 38]: ?

How is this accomplished?
What's the metric measured/reported here?

Comment [LW 39]: HABITAT PROTECTION

We should provide/list the research used to identify this range.

Comment [LW 40]: OTHER

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 41]: INFRASTRUCTURE, URBANIZATION

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 42]: OTHER

This phrase requires some more detail/specificity and maybe some justification.

Comment [LW 43]: GRAZING

This is more likely a measure directed at livestock management, habitat conservation, and habitat treatments.

Comment [LW 44]: INFRASTRUCTURE

This probably belongs under the threat 'umbrella' of INFRASTRUCTURE

Comment [A45]: (per NV)

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