DRAFT
SUBBASIN MANAGEMENT PLAN
TERRESTRIAL RESEARCH, MONITORING AND EVALUATION

INTRODUCTION

The process used to develop wildlife assessments and management plan objectives and strategies was based on the need for a landscape level holistic approach to protecting the full range of biological diversity at the Ecoregion scale. Attention was focused on the size and condition of core areas (subbasin scale and below – including the Telford Unit), maintaining physical connections between core areas, and providing buffer zones surrounding core areas to ameliorate impacts from incompatible land uses. As most wildlife populations extend beyond subbasin or other political boundaries, this "conservation network" must contain habitat of sufficient extent, quality, and connectivity to ensure long-term viability of obligate/focal wildlife species. Subbasin planners recognized the need for large-scale planning that would lead to effective and efficient conservation of wildlife resources.

In response to this need, Ecoregion planners approached subbasin planning at two scales. The landscape scale emphasized focal habitats and associated species assemblages that are important to Ecoregion wildlife managers while specific focal habitat and/or species needs were identified at the subbasin level.

In developing Subbasin plans, managers made the following assumptions which served to focus planning efforts:

1. Ecoregion/subbasin planners assumed that by focusing resources primarily on selected focal habitats (shrubsteppe, and interior grassland habitats), the needs of most listed and managed terrestrial and aquatic species would be addressed during this planning period. Additional habitats and species assemblages will be addressed as needed in plan updates.
2. It was assumed that species requirements (umbrella species concept) can be used to guide ecosystem management. The main premise is that the requirements of a demanding species assemblage encapsulate those of many co-occurring less demanding species. This assumption guided selection of the subbasin focal wildlife species. Focal wildlife species were selected to represent a range of desired management conditions for each focal habitat within the subbasins. Focal species population trends will be monitored and evaluated over time. The results of these species monitoring and evaluation efforts are expected to function as potential performance measures to monitor and evaluate the results of implementing future management strategies and actions on focal habitats.
3. Focal habitats are functional if a focal species assemblage's recommended management conditions are achieved.
4. Focal species assemblages adequately represent focal habitats.

Working hypotheses for focal habitat types were developed based on factors that affect focal habitats (the term, "factors that affect habitat" is synonymous with "limiting factors" for wildlife species). Ecoregion/subbasin level working hypotheses are statements that assist subbasin planners and their communities to clearly articulate a program aimed at addressing the most pressing needs in a given area. The basis for the hypothesis is the proximate or major factors affecting focal habitats as described within individual subbasin assessments and summarized in Section 4.3 (Ashley and Stovall 2004). The relationship subbasin planners attempted to address is that between management objectives, strategies or actions, and recommended (desired future) focal habitat conditions necessary to meet habitat and/or wildlife objectives and goals.

These relationships are tested through implementation, followed by monitoring and evaluation. Ultimately, adaptive management is used to respond to the outcomes of these "tests" of "working hypotheses."

The Ecoregion assessment and inventory synthesis cycle is illustrated in Figure 1. Movement through the cycle is summarized below:

1. Document and compare historic and current conditions of focal habitats to determine the extent of change.
2. Review habitat needs of focal wildlife species assemblages to assist in characterizing the "range" of recommended future conditions for focal habitats. Combine species assemblages' habitat needs with desired ecological/habitat objectives to determine recommended future habitat conditions.
3. Determine the factors that affect habitat conditions and species assemblages (limiting factors) and compare to current and recommended future habitat conditions to establish needed future action/direction.
4. Develop strategies to address habitat "needs" and "road blocks" to obtaining biological goals.
5. Review strategies and compare to existing projects, programs, and regulatory statutes (Inventory) to determine the level at which existing inventory activities address, or contribute towards amelioration of factors that affect habitat conditions and species assemblages.
6. Develop goals and objectives to address strategies that define the key components of the management plan.

Post subbasin planning algorithms (Research, Monitoring and Evaluation) are described in 7 through 9 below.

7. Projects are approved, based on management plan strategies, goals, and objectives, and implemented.
8. Habitat and species response to habitat changes are monitored at the project level and compared to anticipated results.
9. Adaptive management principles are applied as needed, which leads back to the "new" current conditions restarting the cycle.

The Research Monitoring and Evaluation (RME) Plan lays out the framework that will allow for evaluation of the efficacy of employed strategies in achieving corresponding focal habitat objectives for the subbasin, as per post subbasin planning algorithms 8 and 9. The RME plan emphasizes cooperative efforts among managers and stakeholders, and is designed to:

- evaluate success of focal habitat management strategies, via monitoring of focal wildlife species (The results of focal species monitoring and evaluation efforts are expected to function as potential performance measures to monitor and evaluate the results of implementing management strategies and actions on focal habitats).

- determine if management strategies undertaken are achieving recommended range of habitat management conditions, via monitoring and assessment of habitat conditions over time.

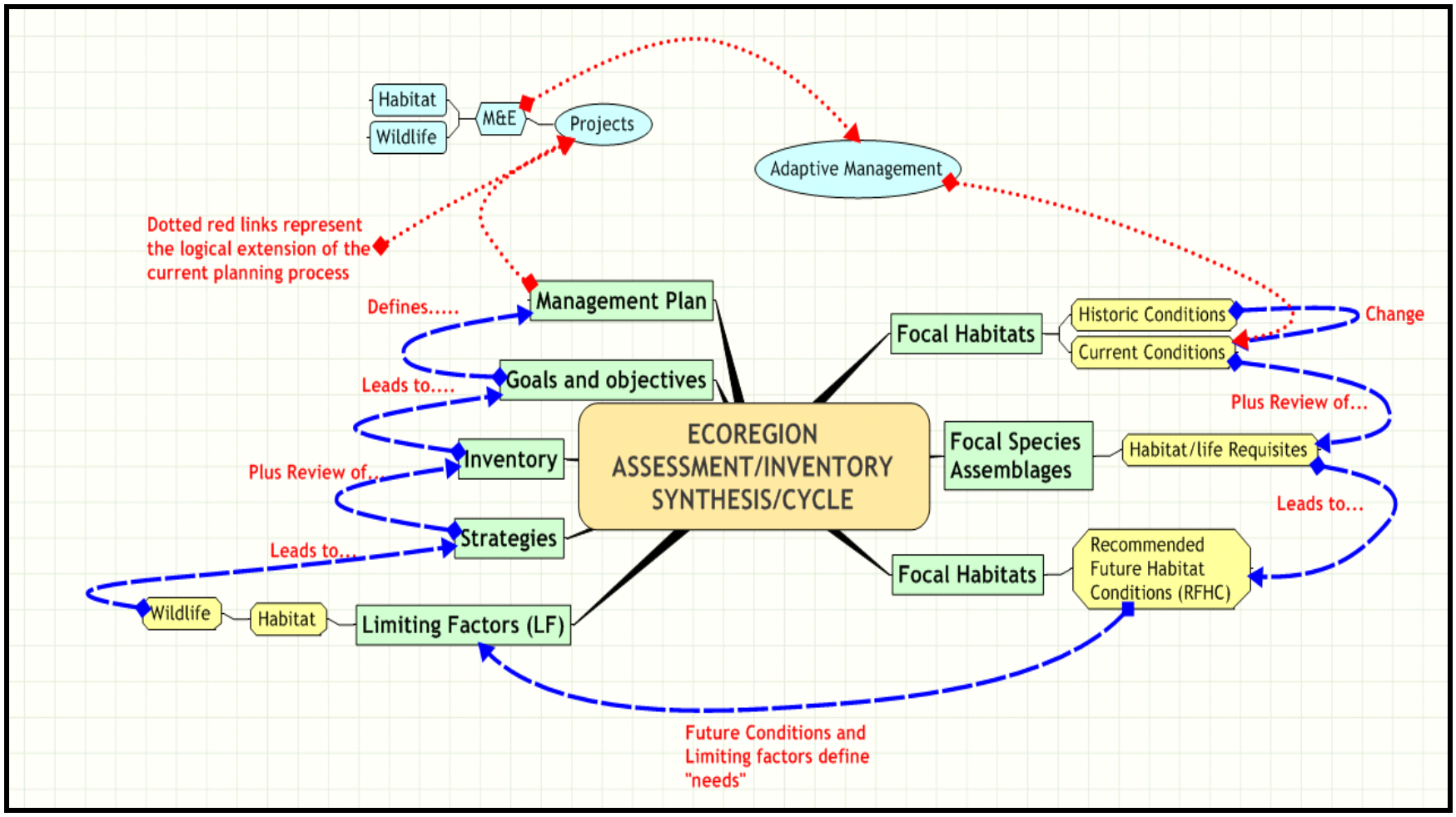

Figure 1. Ecoregional planning (Inventory and Assessment), implementation (REM), and Adaptive Management strategy.

- allow for evaluation of the assumptions and working hypotheses upon which the management plan is based, by determining if a correlation does indeed exist between focal habitat management conditions and focal species population trends.

Finally, the Adaptive Management portion of this REM plan outlines a strategy that will allow managers to adjust and/or focus management activities within the subbasin, based upon monitoring and evaluation data. The feedback loop thus formed will facilitate development of future iterations of the subbasin management plan.

RESEARCH, MONITORING AND EVALUATION PLAN

The Research, Monitoring, and Evaluation (RME) plan for the Telford Unit of Crab Creek Subbasin is intended as a tool that will allow managers to evaluate the efficacy of employed strategies in achieving corresponding focal habitat objectives for the subbasin. If implemented, elements of the plan will also facilitate coordination and tracking of management activities within the subbasin, periodic review of progress, and a basis for recommended adjustments to management direction over time (adaptive management).

The RME plan, as presented, consists of a variety of quantitative elements, ranging from scientific wildlife and vegetation surveys, spacial analyses of project location and acreage, to simple enumeration of landuse projects/regulations commented upon by cooperating agencies.

Implementation of the Subbasin Plans is ultimately the responsibility of all managers and stakeholders who participated in its development. It is recommended that this group form an “Implementation Oversight Committee”, to track and guide research, monitoring and reporting activities included in the plan.

Organization of the RME plan is as follows:

Research

- Research needs, with justification, are also listed. Detailed research project design is not presented, however, being beyond the scope of the current planning effort
- Existing Data Gaps, as identified through the subbasin planning process, are listed in this section, because many will require effort above routine monitoring and evaluation to address

Monitoring and Evaluation

- Focal habitat monitoring methodology, and Management Plan strategies addressed
- Focal species monitoring methodology, and Management Plan strategies addressed

EXISTING DATA GAPS AND RESEARCH NEEDS

In the course of subbasin plan development, a number of data gaps were identified. Some of these gaps will be filled as data is collected via the monitoring and evaluation process as the plan is implemented. Others will require formal research efforts to address. Data gaps and research needs identified during development of the subbasin plan are listed in Table 1.

As part of the adaptive management philosophy of subbasin planning, managers believe that additional research needs not yet identified will become apparent over time. These needs will be addressed in future subbasin plan iterations.

Table 1. Data Gaps and Research Needs, Columbia Plateau Ecoregion, as identified during subbasin planning.

RESEARCH NEEDS AND DATA GAPS	STRATEGY TO ADDRESS	AGENCY/ PERSONNEL
GENERAL (CRAB CREEK SUBBASIN – TELFORD UNIT)		
Testing of assumption that focal habitats are functional if a focal species assemblage's recommended management conditions are achieved		Coordinated government & NGO effort
Testing of assumption that selected species assemblages adequately represent focal habitats		Coordinated government & NGO effort
Current, broad-scale habitat data (Sec. 4.1.3)	Spatial data collection and GIS analysis	Coordinated government & NGO effort
SHRUBSTEPPE (CRAB CREEK SUBBASIN – TELFORD UNIT)		
Research Needs		
Research to determine the ability of shrubsteppe habitat areas to support populations of sharp-tailed grouse, mule deer, and other shrubsteppe focal species.		Coordinated government & NGO effort
Investigate the feasibility of re-establishing Columbian Sharp-tailed Grouse at historic leks which are no longer occupied. Identify reintroduction sites where there is adequate habitat to meet year-round needs; release marked birds and		Coordinated government & NGO effort

RESEARCH NEEDS AND DATA GAPS	STRATEGY TO ADDRESS	AGENCY/ PERSONNEL
track success		
Investigate the effects of different grazing strategies and prescribed burning on hardwood draw vegetation and response by breeding birds, with emphasis on sharp-tailed grouse		Coordinated government & NGO effort
Research to establish mule deer herd movements and habitat use between agricultural areas, shrubsteppe, and the Columbia River breaks, including use of CRP lands	Research/Monitoring	Coordinated government & NGO effort
Evaluate the role of fire, mowing, and other management treatments to maintain/improve shrubsteppe habitat quality	Coordinated, standardized monitoring efforts	Subbasin managers
Data Gaps		
Accurate habitat type maps are needed to improve assessment quality and support management strategies and actions, including, updated and fine resolution historic shrubsteppe data and GIS products e.g., structural conditions and KEC ground-truthed maps	Coordinated, standardized monitoring efforts; Spatial data collection and GIS analysis	Subbasin managers
Habitat quality data. Assessment data bases do not address habitat quality	Coordinated, standardized monitoring efforts); Spatial data collection and GIS analysis	Subbasin managers
Refined habitat type maps, including current CRP program/field delineations	Coordinated, standardized monitoring efforts); Spatial data collection and GIS analysis	Subbasin managers
GIS soils products, including wetland delineations	Spatial data collection and GIS analysis	Subbasin managers
Improve data collection for mule deer and development of a mule deer population model	Species Monitoring	WDFW, Subbasin managers

MONITORING AND EVALUATION: FOCAL HABITAT AND SPECIES MONITORING METHODOLOGY

Recommended monitoring and evaluation strategies contained below for each focal habitat type, including sampling and data analysis and storage, are derived from national standards established by Partners in Flight for avian species (Ralph et al, 1993, 1995) and habitat monitoring (Nott et al, 2003). Deer sampling methodology follows standard protocols established by the Washington Department of Fish and Wildlife (pers. comm., Fowler). In addition, protocols for specific vegetation monitoring/sampling methodologies are drawn from USDA Habitat Evaluation Procedure standards (USFWS 1980a and 1980b). A common thread in the monitoring strategies that follow is the establishment of permanent roadside and off-road census stations to monitor bird population and habitat changes.

Wildlife managers will include statically rigorous sampling methods to establish links between habitat enhancement prescriptions, changes in habitat conditions and target wildlife population responses.

Specific methodology for selection of Monitoring and Evaluation sites within all focal habitat types follows a probabilistic (statistical) sampling procedure, allowing for statistical inferences to be made within the area of interest. The following protocols describe how M&E sites will be selected (from WDFW response to ISRP http://www.cbfwa.org/files/province/cascade/projects/199609400resp.pdf):

- Vegetation/HEP monitoring and evaluation sites are selected by combining stratified random sampling elements with systematic sampling. Project sites are stratified by cover types (strata) to provide homogeneity within strata, which tends to reduce the standard error, allows for use of different sampling techniques between strata, improves precision, and allows for optimal allocation of sampling effort resulting in possible cost savings (Block et al. 2001). Macro cover types such as shrub-steppe are further sub-cover typed based on dominant vegetation features i.e., percent shrub cover and/or percent tree cover. Cover type designations and maps are validated prior to conducting surveys in order to reduce sampling inaccuracies.
- Pilot studies are conducted to estimate the sample size needed for a 95% confidence level with a 10% tolerable error level (Avery 1975) and to determine the most appropriate sampling unit for the habitat variable of interest (BLM 1998). In addition, a power analysis is conducted on pilot study data (and periodically throughout data collection) to ensure that sample sizes are sufficient to identify a minimal detectable change of 20% in the variable of interest with a Type I error rate # 0.10 and P = 0.9 (BLM 1998, Hintze 1999, Block et al. 2001). M&E includes habitat trend condition monitoring on the landscape scale (Tier 1-HEP) and plant community monitoring (Tier 2) i.e., measuring changes in vegetative communities on specific sites.
- For HEP surveys, specific transect locations within strata are determined by placing a Universal Transverse Mercator (UTM) grid over the study area (strata) and randomly selecting “X” and “Y” coordinates to designate transect start points. Random transect azimuths are chosen from a computer generated random number program, or from a standard random number table. Data points and micro plots are systematically placed along the line intercept transect at assigned intervals as described in Part 2 – monitoring section of the proposal. Sample sizes for statistical inferences are determined by replication and systematic placement of lines of

intercept within the strata with sufficient distance between the lines to assume independence and to provide uniform coverage over the study site.

- Permanent vegetation monitoring transect locations are determined by placing a UTM grid over the strata and randomly selecting "X" and "Y" coordinates to designate plot locations as described for HEP surveys. One hundred meter baseline transect azimuths are randomly selected from a random numbers table. Ten perpendicular 30 meter transects are established at 10 meter intervals along the baseline transect to form a 100m x 30m rectangle (sample unit). Micro plot and shrub intercept data are collected at systematic intervals on the perpendicular transects.

By systematically collecting and analyzing plant species frequency, abundance, density, height, and percent cover data; vegetative trends through time can be described. Likewise, the effectiveness of exotic weed control methods can be evaluated and weed control plans can be adjusted accordingly.

Presence of all exotic weeds i.e., knapweed, Canada thistle, cheatgrass etc. will be mapped in GIS using Global Positioning System (GPS) equipment. This information will be used to develop an annual exotic vegetation control plan.

Causes of seeding or planting failure will be identified and planting methods/site preparation will be modified as necessary. Data will be collected and analyzed, and, where necessary, changes in the management plan (adaptive management) will be identified and implemented.

General and site specific M&E protocols, outlining monitoring goals and objectives and specific sampling designs are included in the following monitoring section.

In addition to defining habitat and species population trends, monitoring will also be used to determine if management actions have been carried out as planned (implementation monitoring). In addition to monitoring plan implementation, monitoring results will be evaluated to determine if management actions are achieving desired goals and objectives (effectiveness monitoring) and to provide evidence supporting the continuation of proposed management actions. Areas planted to native shrubs/trees and/or seeded to herbaceous cover will be monitored twice a year to determine shrub/seeding survival, and causes of shrub mortality and seeding failure i.e. depredation, climatic impacts, poor site conditions, poor seed/shrub sources.

Monitoring of habitat attributes and focal species in this manner will provide a standardized means of tracking progress towards conservation, not only within the Subbasins of the Columbia PlateauEcoregion, but within a national context as well. Monitoring will provide essential feedback for demonstrating adequacy of conservation efforts on the ground, and guide the adaptive management component that is inherent in the subbasin planning process.

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Shrubsteppe (Crab Creek Subbasin – Telford Unit)

Focal Species: Sharp-tailed grouse (*Tympanuchus phasianellus*), Mule Deer *(Odocoileus hemionus hemionus)*

Overall Habitat and Species Monitoring Strategy: Establish monitoring program for protected and managed Shrubsteppe sites to monitor focal species population and habitat changes and evaluate success of efforts.

FOCAL HABITAT MONITORING:

Factors affecting habitat:

1. Direct loss of shrubsteppe due to conversion to agriculture
2. Fragmentation of remaining shrubsteppe habitat, with resultant increase in nest parasites
3. Fire Management, either suppression or over-use, and wildfires
4. Invasion of exotic vegetation
5. Habitat degradation due to overgrazing, and invasion of exotic plant species
6. Loss and reduction of cryptogamic crusts, which help maintain the ecological integrity of shrubsteppe/grassland communities.
7. Conversion of CRP lands back to cropland.

Shrubsteppe Working Hypothesis Statement: The near term or major factors affecting this focal habitat type are direct loss of habitat due primarily to conversion to agriculture, reduction of habitat diversity and function resulting from invasion of exotic vegetation and wildfires, and livestock grazing. The principal habitat diversity stressor is the spread and proliferation of annual grasses and noxious weeds such as cheatgrass and yellow-star thistle that either supplant and/or radically alter entire native bunchgrass communities significantly reducing wildlife habitat quality. Habitat loss and fragmentation (including fragmentation resulting from extensive areas of undesirable vegetation) coupled with poor habitat quality of extant vegetation have resulted in extirpation and or significant reductions in grassland obligate wildlife species.

Recommended Range of Management Conditions:

Recommended Condition - *Diverse shrubsteppe habitat:* Sharp-tailed grouse and mule deer were selected to represent species that require/prefer diverse, dense (30 to 60 percent shrub cover less than 5 feet tall) shrubsteppe habitats comprised of bitterbrush, big sagebrush, rabbitbrush, and other shrub species (Leckenby 1969; Kufeld *et al.* 1973; Sheehy 1975; Jackson 1990; Ashley *et al.* 1999) with a palatable herbaceous understory exceeding 30 percent cover (Ashley *et al.* 1999).

Focal Habitat Monitoring Strategies: Establish an inventory and long-term monitoring program for protected and managed shrubsteppe habitats to determine success of management strategies. Subbasin managers recognize that restoration of shrubsteppe is still very much a fledgling field, and complete restoration of degraded or converted shrubsteppe may not be feasible. These Monitoring strategies reflect the commitment to and initiation of the process of longterm management.

1. Identify shrubsteppe habitat sites within the subbasin that support populations of focal species
2. Evaluate habitat site potential on existing public lands and adjacent private lands for protection of focal species habitat (short-term strategy i.e., < 2 years).
3. Enhance habitat on public lands and adjacent private lands (intermediate strategy; 2 to 10 years)
4. Identify high quality/functional privately owned shrubsteppesites that are not adjacent to public lands (long-term strategy 2 to 15 years).
5. Establish permanent roadside and off-road censusing stations to monitor bird population and habitat changes.

Sampling Design: Permanent survey transects will be located within shrubsteppe habitats using HEP protocols. HEP is a standardized habitat-analysis strategy developed by the U.S. Fish and Wildlife Service. It uses a variety of Habitat Suitability Indices (HSI) for select wildlife species to evaluate the plant community as a whole (Anderson and Gutzwiller 1996). Sites are stratified by cover type, and starting points are established using a random number grid. Minimum length of a HEP transect is 600 ft, and patches of cover must be large enough to contain a minimum transect without extending past a 100 foot buffer inside the edge of the cover type.

In addition, at any permanently established avian species monitoring site established within the Shrubsteppe habitat, structural habitat conditions will be monitored every 5 years as per Habitat Structure Assessment protocol (Nott et al 2003).

Sampling Methods (USFWS 1980a and 1980b):

1. Bare ground or cryptogram crust measurements are taken every 20 ft. on the right side of the tape (the right is always determined by standing at 0 ft and facing the line of travel). The sampling quadrat is a rectangular 0.5m^2 microplot, placed with the long axis perpendicular to the tape, and the lower right corner on the sampling interval.

   The percentage of the microplot consisting of either bare ground or cryptogram crust is estimated via ocular estimate.

2. Herbaceous measurements are taken every 20 ft. on the right side of the tape (the right is always determined by standing at 0 ft and facing the line of travel). The sampling quadrat is a rectangular 0.5m^2 microplot, placed with the long axis perpendicular to the tape, and the lower right corner on the sampling interval.

   Herbaceous cover % is measured via an ocular estimate of the percentage of the microplot shaded by any grass or forb species.

3. Shrub canopy cover is measured using a point intercept method and is visually estimated before starting each transect. If the total shrub cover is anticipated to be >20%, shrub data are collected every 5 ft (20 possible "hits" per 100 ft segment). If shrub canopy cover is anticipated to be <20%, data are collected every 2 ft (50 possible "hits" per 100 ft segment).

   Shrub canopy cover is measured on a line intercept 'hit' or 'miss'. Measurements are taken every 2 or 5 feet, depending upon shrub density.

   Shrub height measurements are collected on the tallest part of a shrub that crosses directly above each sampling intercept mark. For shorter shrub classifications (i.e. all shrubs less than 3 feet), the tallest shrub is measured that falls within that category.

4. Tree canopy cover measurements are taken every ten feet along a transect. Basal and snag measurements are taken within a tenth-acre circular plot at the end of each 100 ft segment. The center point of the circular plot is the 100 ft mark of the transect tape, and the radius of the circle is 37.2 ft.

Analysis: Transects are divided into 100 ft. segments, and total transect length is determined using a "running mean" to estimate variance (95% probability of being within 10% of the true mean).

Sample size equation: $n = \frac{t^2 \times s^2}{E^2}$

Where: t = value at 95 percent confidence interval with suitable degrees of freedom
s = standard deviation
E = desired level of precision, or bounds

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FOCAL SPECIES MONITORING:

Sharp-Tailed Grouse

Rationale: Maintaining a viable sharp-tailed grouse population in eastern Washington is a biological objective for WDFW in Region 1. Monitoring of sharp-tailed grouse is crucial to this effort. Historically, the Palouse and adjacent grasslands supported high populations of sharp-tailed grouse that were extirpated as grassland habitat was converted to agriculture, fragmented, overgrazed, and/or entire native plant communities were displaced or severely altered by introduced vegetation (Sec. 5.2.4.2).

Limiting Factors:
1) Conversion of native steppe habitat for agricultural purposes, 2) flooding of habitat resulting from hydropower facilities, 3) habitat fragmentation, 4) degradation of existing habitats from overgrazing and introduced weedy vegetation, and 5) tree/shrub removal in riparian areas (Sec. 5.2.4.2.2). Sharp-tailed grouse limiting factors are nearly identical to the factors that affect focal grassland habitats (Section 4.3).

Although mortality factors such as unrestricted hunting may have affected local sharp-tailed grouse populations (this is not the case for grasshopper sparrows and other obligate species), the assessment clearly indicates that grassland habitats were altered significantly and/or lost. Habitat loss and degradation are the primary factors relating to drops in numbers of sharp-tailed grouse and other grassland obligate species in the Telford Unit.

Assumptions: 1) Addressing factors that affect eastside (interior) grasslands, will also address sharp-tailed grouse and other grassland obligate species limiting factors. 2) If grassland habitat is of sufficient quality, extent, and distribution to support viable sharp-tailed grouse and grasshopper sparrow populations, the needs of most other grassland obligate species will also be addressed and grassland functionality could be inferred. Restoration of sufficient quantity and quality native habitat will be necessary to maintain viable populations of CSTG within the Telford Unit. Reestablishment may require restoring agricultural land to permanent cover for nesting and brood rearing near sites with sufficient winter range (shrubs desireable as food plants). Managing habitat conditions for a species assemblage comprised of sharp-tailed grouse and grasshopper sparrow should provide life requisite needs for most other grassland obligate species.

Methods: **(This is the standardized WDFW protocol.)**
Male greater sage grouse and sharp-tailed grouse congregate during the spring on relatively traditional breeding sites, usually referred to as 'leks' or 'lek complexes'. Females visit these sites during the peak of the breeding season to 'select' and copulate with males. These lek surveys are designed to be consistent with similar surveys being conducted on an annual basis in all western states with populations of either greater sage grouse or sharp-tailed grouse.
Leks usually are difficult to observe. Lek counts should consist of a complete count of birds (differentiate by sex when possible). There should be at least 2 counts of each active lek, although one is better than none. Potential locations may need to be surveyed 2-4 times to be certain that birds are absent. This is particularly true for the small and isolated populations in Washington. Small leks tend to be relatively quiet, thus adding to the difficulty. Counts should be spaced at least 10 days apart between 10 March and 25 May. The peak of activity (female attendance and breeding) is early April in most years.

Searches can be conducted by 'listening' for displaying males at points along roads, trails, ridges, or fence lines. The sound that can be heard best is the low 'coo' note produced. Under perfect conditions, this noise can be heard up to 2 km. Other sounds made by swishing tail feathers, a fast tapping sound called tail rattling can be heard when closer. Both of these sounds are sounds that only the males make. Gobbles and 'chilk' notes can also be heard at times. Gobbles are made by both sexes, and the 'chilk' notes are produced by males. The listening points should be a maximum of 0.5 miles apart. Listening surveys can be initiated about 0.75 hours before sunrise and continued for 2 hours. Listen for at least 5 minutes per station. If observers are too close to leks, sharp-tailed grouse will stop lekking and become quiet. Changing survey stations in repeat surveys may help address this issue.

If the lek complex cannot be clearly observed without disturbance, then birds may have to be counted when flushed. Flushing is best accomplished with at least 2 observers or one person with a trained dog, as peripheral birds often will not flush if the observer is too far away. Males are often best counted returning to the leks. In many situations, a viewpoint is available that permits careful observation of birds with the aid of a spotting scope. Multiple counts of a large lek in a single morning may be needed to insure an accurate and consistent count. This can be done by scanning from left to right and then from right to left and then repeating the procedure 10-15 minutes later. Observers should be aware that young males and/or males on the edge of lek may be difficult to see. Likewise young males may be difficult to differentiate from females, even for greater sage grouse.
Lek counts should be conducted when the weather is good (wind < 10 MPH, no precipitation, temperatures > 20^{o}F, >50% bare ground). Weather matters less during the peak of the breeding season (late-March for greater sage-grouse and early April for sharp-tailed grouse). If the weather is not acceptable, it is likely the count will be abnormally low and have to be repeated.

Counts may be low if the birds are disturbed by predators (golden eagles, red-tailed hawks, coyotes, etc.), by people (photographers, bird watchers, farmers, etc.), or by unknown factors. Counts that appear to be abnormally low that have dropped dramatically from the previous year) should be repeated. Sharp-tailed grouse are very likely to return to the lek 10-20 minutes following disturbance whereas greater sage grouse will often remain off the lek until the next morning.

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Mule Deer

Rationale: Mule deer have been selected as a focal species in two focal habitats; Eastside Interior Grasslands and Shrubsteppe, due to the significant economic, recreational, and cultural values this species provides. Mule deer were selected for the Interior Grasslands because this is the only focal species that has shown a positive response from habitat improvements such as CRP plantings in recent years. (Sec. 5.2.2.4.1).

Limiting Factors: 1) flooding of habitat resulting from hydropower facilities, 2) loss of habitat due to urban and suburban development, 3) road and highway construction, 4) degradation of existing habitats from overgrazing and introduced weedy vegetation, 5) alteration of historic fire regimes, 6) past silvicultural practices, 7) competition from other ungulates, 8) natural predation and over-harvest by hunters, 9) disease and parasites, 10) deer control efforts necessitated by agricultural damage (Sec. 5.2.2.4.2).

Assumptions: Addressing factors that affect shrubsteppe and interior grassland habitats, will also address mule deer and other shrubsteppe and interior grassland obligate species limiting factors.

Management Objective: The population management objective for mule deer will be to increase or maintain populations within the limitations of available mule deer habitat and landowner tolerance (agricultural damage). Population monitoring variables and objectives are established in the Washington Department of Fish and Wildlife Game Management Plan (WDFW 2003). In areas with high mule deer populations and significant agricultural damage complaints (eg. GMUs 145, and 149), WDFW will increase antlerless permits, and authorize “hotspot” hunts as appropriate.

Monitoring Methods: Mule deer populations will be monitored using a combination of pre and post hunting surveys and harvest data. At present, manpower and financial restrictions do not allow the collection of both the quantity and quality of data necessary to provide high confidence in populations modeling. Current surveys allow the monitoring of age/sex ratios to determine if management objectives established in the Game Management Plan (WDFW 2003) are being met for post-season buck survival (> 15 bucks/100 does) and fawn production and recruitment. Harvest data is used to monitor buck harvest trends, which is also an indicator of population trend.

Evaluation Strategies:

1.) Use late summer-early fall (pre-season) ground surveys to determine pre-hunt buck/fawn to doe ratios. Attempt to obtain a sample of 250+ classified mule deer from each of the major mule deer units; e.g. 1200-1500 mule deer.
2.) Use winter aerial and ground surveys to classify 2,000 mule deer from five major mule deer units to determine post-hunt buck/fawn to doe ratios.
3.) Monitor harvest level of bucks and anlterless deer using mandatory hunter report system.
4.) Develop population model for mule deer under a three point management strategy.

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MONITORING PLAN FOR FOCAL HABITAT STRATEGIES

Habitat and species monitoring will allow for evaluation of habitat use by focal species, and evaluation of habitat areas meeting management conditions. All data collection and data management methodologies will be standardized to national standards cited in the focal habitat and focal species sections of the monitoring plan. Each entity collecting or managing data will have the responsibility to comply with established protocols.
Implementation of the Subbasin Plans is ultimately the responsibility of all managers and stakeholders who participated in its development. It is recommended that this group form an "Implementation Oversight Committee", the function of which will be to track and guide research, monitoring and reporting activities included in the plans.

Table 2. Monitoring Plan For Focal Habitat Strategies.

Habitat Type	Obj.	Strategies (Note-Strategies are not prioritized and will be implemented based upon available opportunities)	Element of RME plan that will address the strategy
Shrubsteppe **(Crab Creek Subbasin – Telford Unit)**	S1	1. Identify functioning shrubsteppe habitats, corridors, and linkages classified as ECA Class 1&2 for protection. 2. Provide information, education, and outreach to protect habitats. 3. Use easements, leases, cooperative agreements, and acquisitions to protect habitats (long-term protection strategies are preferred over short-term). 4. Uphold existing land use and environmental regulations (e.g. critical area ordinances, etc.). 5. Identify inadequate land use regulations. Work to strengthen existing regulations or pass new regulations to improve protection of habitats. 6. Complete a more detailed assessment of focal species, focal species assemblages, and obligate species needs to determine their habitat requirements (quantity and quality). Assessment/research would ultimately determine what acreage and distribution of functional habitat is necessary to achieve habitat recovery in the context of focal species needs.	1. Identification of functional shrubsteppe habitats is listed as a data gap. Will be addressed through Research and Monitoring conducted by cooperators 2. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 3. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 4. Responsibility of all participants in subbasin planning area 5. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 6. Identified as Research Need/Data Gap. Will be address through Research and Monitoring efforts conducted by cooperators, including State, Federal and Tribal resource management agencies.

Shrubsteppe (Crab Creek Subbasin – Telford Unit)	S2	1. Identify non-functioning shrubsteppe habitats, corridors, and linkages within ECA Class 1 & 2 areas. 2. Identify sites that are currently not in shrubsteppe habitat that have the potential to be of high ecological value, if restored. 3. Provide information, outreach and-coordination with public and private land managers on management practices and the use of prescribed fire to restore and conserve habitat function. 4. Enter into cooperative projects and management agreements with Federal, State, Tribal, and private landowners to restore and conserve habitat function. 5. Assist in long-term development and implementation of a Southeast Washington Comprehensive Weed Control Management Plan in cooperation with local weed boards. 6. Fund noxious weed control projects to improve habitat function. 7. Work with county, state, federal agencies, and private landowners to develop livestock grazing programs on public and private lands that do not contribute to the invasion of noxious weeds or negatively alter the habitat. 8. Restore viable populations of obligate wildlife species where possible. 9. Work with USDA programs (e.g. CRP) to maintain and enhance habitat quality.	1. Research and Monitoring conducted by cooperators, primarily State, Federal and Tribal resource managers 2. Research and Monitoring conducted by cooperators, primarily State, Federal and Tribal resource managers 3. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 4. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 5. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 6. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will seek to maximize funding and track and report accomplishments annually. 7. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 8. Identified as Research and Management need, primarily the responsibility of WDFW 9. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually
	S3	1. Identify functioning shrubsteppe habitats, corridors, and linkages within protected areas (GAP) and areas of private land that meet one or more of the following conditions: directly contribute to the restoration of aquatic focal species, have high ecological function, are adjacent to public land, contain rare or unique plant communities, have threatened, endangered, or sensitive species habitat or populations, or provide connectivity between high quality habitat areas. See S1 Strategies 2-6.	1. Identification of functional interior grassland habitats is listed as a data gap. Will be addressed through Research and Monitoring conducted by cooperators See S1 Elements 2-6

Shrubsteppe (Crab Creek Subbasin – Telford Unit)	S4	1. Identify non functioning shrubsteppe habitats, corridors, and linkages within protected areas (GAP) and areas of private land that meet one or more of the following conditions: directly contribute to the restoration of aquatic focal species, have high ecological function, are adjacent to public land, contain rare or unique plant communities, have threatened, endangered, or sensitive species habitat or populations, or provide connectivity between high quality habitat areas. See S2 Strategies 2-9.	1. Research and Monitoring conducted by cooperators, primarily State, Federal and Tribal resource management agencies See S2 Elements 2-9
	S5	1. Increase landowner participation in federal, state, tribal, and local programs that enhance watershed health (e.g. CRP, CREP, Wetlands Reserve Program, EQIP, Partners for Fish & Wildlife, WDFW Landowner Incentive Program, Conservation Security Program, etc.) 2. Seek additional funding sources consistent with current CRP and CREP guidelines to increase individual landowner enrollment in programs that achieve similar goals, including prioritization of landowners who have already reached their payment limitations. 3. Seek funding sources to develop programs consistent with the goals of CRP, EQIP, and CREP in those areas where such programs are not available. 4. During re-enrollment, convert CRP land to more functional plant communities. 5. Enroll areas with documented wildlife damage and areas directly adjacent to high-quality wildlife habitat into CRP using cover practices 2, 3, and/or 4.	1. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 2. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 3. Cooperative effort between County, State, Federal and Tribal resource management agencies. Each entity will track and report accomplishments annually. 4. Cooperative effort between County, State and Tribal resource management agencies. Each entity will track and report accomplishments annually. 5. Cooperative effort between County and State resource management agencies, with WDFW having the lead to identify high wildlife damage areas.