

Sagebrush
Conservation Efforts Database
User Manual
Version 2.0.0

DRAFT

A Living Document That Will Be Refined With Use

U.S. Fish and Wildlife Service

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1 CONSERVATION EFFORTS DATABASE EXECUTIVE SUMMARY

2
3 The sagebrush ecosystem is the largest ecosystem type in the continental U.S., providing habitat for
4 more than 350 associated fish and wildlife species. In recognition of the need to conserve a healthy
5 sagebrush ecosystem to provide for the long-term conservation of its inhabitants, the US Fish and
6 Wildlife Service (Service) and United States Geological Survey (USGS) developed the Conservation Efforts
7 Database version 2.0.0 (CED). The purpose of the CED is to efficiently capture the unprecedented level
8 of conservation plans and actions being implemented throughout the sagebrush ecosystem and
9 designed to capture actions not only for its most famous resident, the greater sage-grouse (*Centrocercus*
10 *urophasianus*; hereafter, sage-grouse) but for the other species that rely on sagebrush habitats.

11
12 The Service completed a range-wide status review of the greater sage-grouse in September 2015,
13 resulting in a 'not warranted' finding, under the Endangered Species Act (ESA). As part of that status
14 review, the Service evaluated a combination of voluntary, incentive-based efforts, habitat restoration
15 projects, and management through regulatory mechanisms. The Service used the Conservation
16 Objectives Team final report (COT report; USFWS 2013), and the threats described therein, as guidance
17 to identify the conservation actions that would address and reduce the threats and/or the associated
18 impacts. Additionally, the Service coordinated with State and Federal partners and collaboratively
19 generated a list of conservation actions to address and ameliorate those threats.

20
21 The Service will continue to work collaboratively with its partners to identify new information to collect
22 and how to utilize it as we gain new insight on links between conservation efforts and biological
23 responses to sagebrush habitats as well as resources values for particular species. The Service has made
24 a commitment to make these adjustments to reflect our shift, and the shift of many of our conservation
25 partners, to an ecosystem based approach to conservation, as well as to be adaptable and make
26 changes in the future based on release of new science and information that informs effective
27 conservation.

28
29 While the focus of the CED has shifted to focus on the entire ecosystem, it will continue to serve as the
30 data collection tool to support analyses and inform any future greater sage-grouse status reviews,
31 including but not limited to the 2020 status review described in the 2015 federal register document (80
32 FR 59857).

33
34 **The CED is easy to use.** This is a web-based database with a geospatial component that is used to collect
35 information on the plans and projects currently being implemented, or with a high likelihood of being
36 implemented in the near future, to conserve sagebrush habitats as well as the species dependent on
37 them (i.e. sage-grouse, Brewer's sparrow, etc.). Developed to provide a secure and transparent way to
38 gather information on sagebrush conservation efforts, the CED allows multiple users to enter
39 information about their conservation efforts and link them to one or more threats to a species.
40 Conservation plans, individual project descriptions and reports, tabular data from large data sets, spatial
41 data, and documentation of data sources can all be entered in the CED, which is housed on the data
42 sharing platform, LC Map (Landscape Conservation Management and Analysis Portal). LC Map is
43 managed by the Great Northern Landscape Conservation Cooperative (GNLCC). The CED is user-friendly
44 for all technical levels and was designed with efficiency in mind. No GIS skills are required for entering
45 data on individual plans or projects, and USGS programmers are available to help with batch uploads of
46 large data sets or GIS files.

48 **The CED is secure.** Agencies and organizations will work with the Service/USGS CED Team to establish
49 approving officials to determine who can enter and edit data in the CED for their organization. These
50 agency-designated approving officials will also allow for important oversight of data entry and QA/QC.
51

52 **The CED is transparent.** The information on the CED will become part of the public record and may be
53 publicly disclosed as part of the Service's administrative record or in response to a request under the
54 Freedom of Information Act (FOIA). Additionally, we offer users the option to make their data readily
55 available to anyone, or to a subset of registered users of their choosing.
56

57 **The CED is simple.** Each project or plan entry consists of six main components:

- 58 1. Basic project information
- 59 2. Location information (easy-to-use onscreen digitize*, upload shapefiles*, and in some cases,
60 selection of 'canned' areas of interest (States, Counties, etc.).
- 61 3. Activities, subactivities, and metrics*
- 62 4. Objectives* and likely effects* of the activity
- 63 5. Threats address
- 64 6. Uploading supporting documents
- 65 7. Information describing implementation and [biological] effectiveness*
66

67 ** Some components are only required for specific activities and subactivities*
68

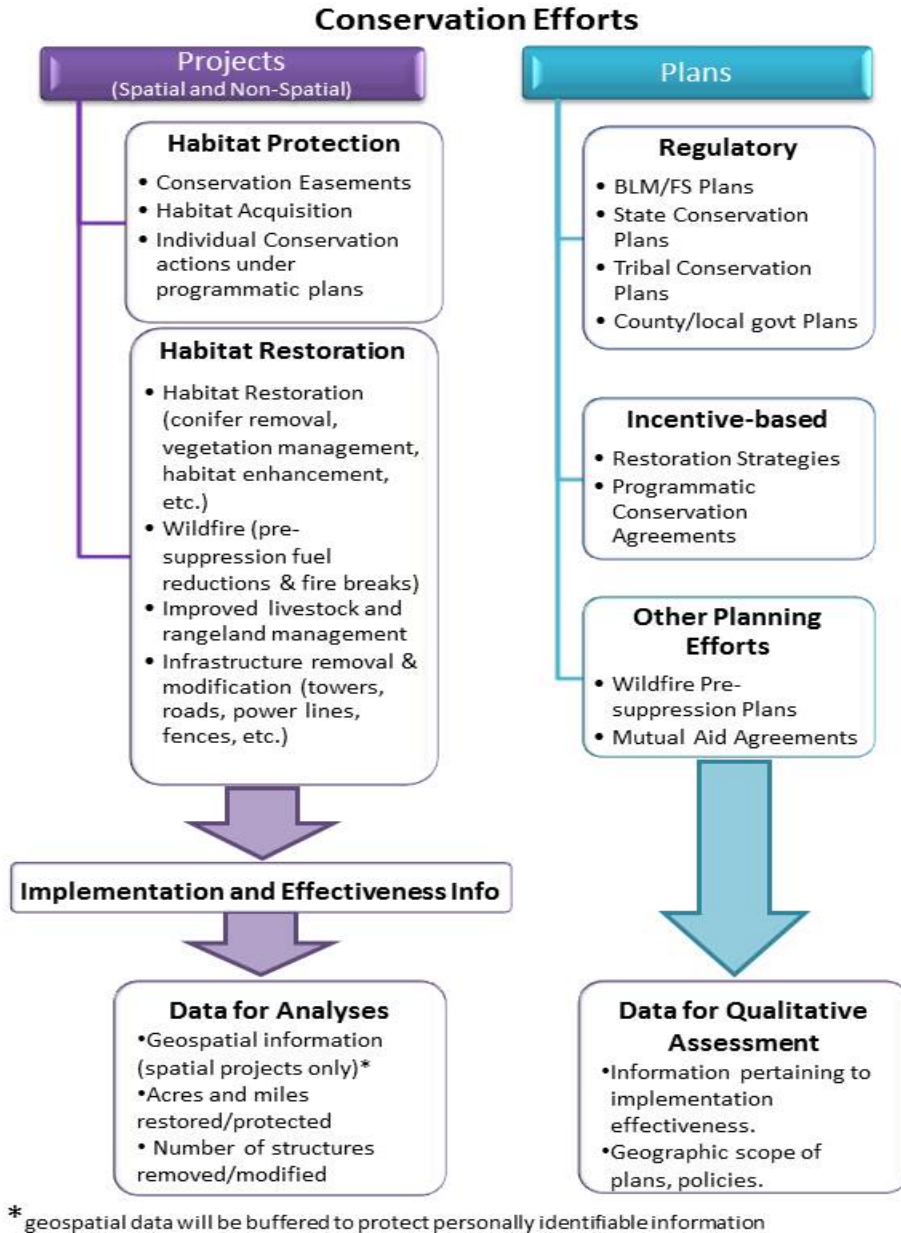
69 **How will the information be used?** Each plan or project entered in the CED will be linked to one or
70 more of the following thirteen threats (in alphabetical order) identified in the COT report (USFWS 2013)
71 as well as areas of interest relevant to sage-grouse. As we gain better understanding of the threats
72 contributing to habitat loss, fragmentation and degradation in the sagebrush ecosystem, some of these
73 threats and conservation actions aimed at reducing or eliminating their impacts, we will adjust
74 accordingly in an effort to better represent the potential benefit of the action implemented.

- 75 • Agricultural Conversion
- 76 • Conifer Encroachment
- 77 • Energy Development
- 78 • Fire
- 79 • Free-Roaming Equids (Feral Horses and Burros)
- 80 • Improper Grazing/Range Management
- 81 • Infrastructure
- 82 • Isolated/Small Population Size
- 83 • Mining
- 84 • Noxious Weeds/Annual Grasses
- 85 • Recreation
- 86 • Sagebrush Elimination
- 87 • Urban Development
88

89 We will review the information about individual projects and plans entered into the CED to evaluate the
90 extent to which these efforts will reduce or eliminate the threats to sagebrush habitats (and species
91 dependent on them) identified in the COT report (USFWS 2013), with the goal of compiling these results
92 to generate a range-wide assessment of sage-grouse and sagebrush conservation efforts. The CED does
93 not collect information about the distribution or severity of threats to sagebrush (or sage-grouse); that
94 information will be compiled separately by the Service and available for viewing when using the

95 interactive map. However, some threat information will be displayed in the background of the CED to
 96 aid in the evaluation of conservation efforts.

97
 98 An overview of some of the basic components of the CED is provided in Fig. 1. This schematic is not all-
 99 inclusive, but provides general information on the structure of the database. For more information,
 100 please visit <https://conservationefforts.org>



101
 102 **Figure 1. Simplified portrayal of the CED structure and information flow.**
 103
 104
 105

1.0 CED Data Providers

Conservation partners throughout the range of sagebrush, spanning 13 states and 2 provinces, are undertaking unprecedented actions to conserve sagebrush (and sage-grouse) habitats. These conservation actions include, but are not limited to, landscape-scale Federal and State management plans that provide regulatory mechanisms, incentives, and/or strategic approaches to conserve important sage-grouse habitat as well as on-the-ground habitat restoration projects such as addressing piñon-juniper encroachment, improving wet meadow habitats, and restoring habitat loss to fire for the conservation of sage-grouse habitats. An important element of our long-term monitoring will be a compilation of the conservation efforts currently being implemented, or planned for implementation in the near future, to conserve sagebrush habitats and the species dependent on them. The Conservation Efforts Database (CED) was developed to collect this information from partners in a standardized way so that we can assess the distribution of conservation activities of different kinds and evaluate their effectiveness in reducing or eliminating threats across the ecosystem. This standardized way of collecting information related to conservation efforts will allow the Service to work with our partners to monitor, long-term, the benefits realized through effective implementation of conservation efforts.

1.1 CED Data Providers

Federal agencies, State agencies, Tribal governments, local governments, non-governmental organizations (NGOs) members of industry, universities, and others will all be able to enter information describing their conservation efforts in the CED.

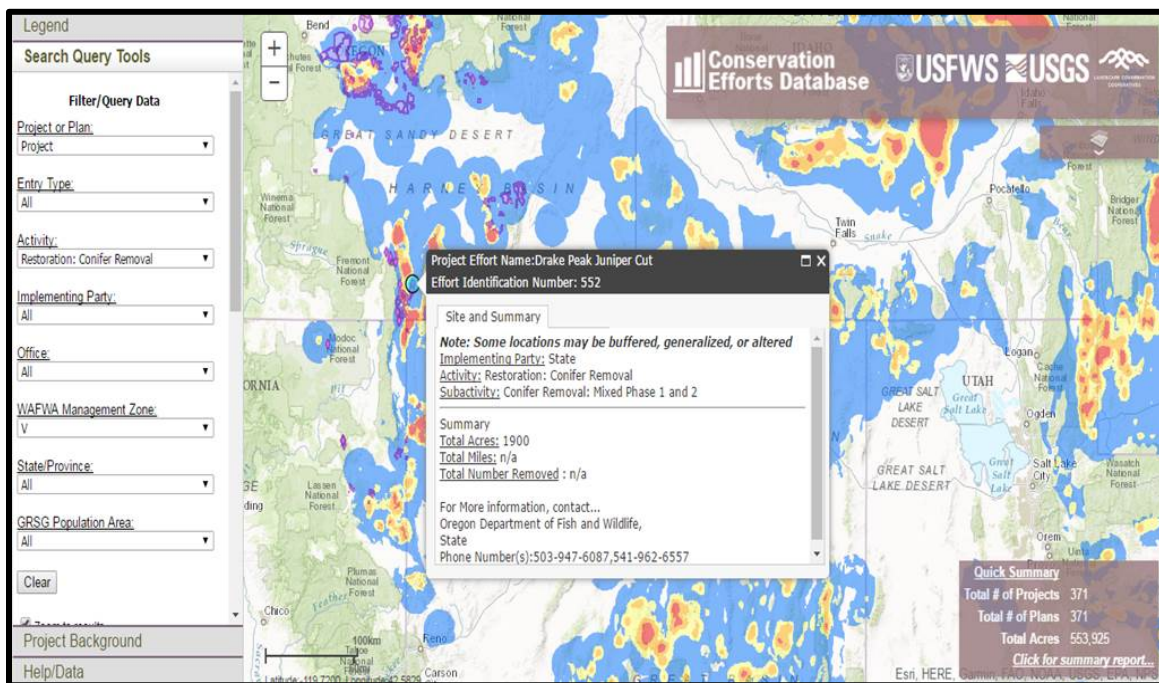
Data providers are asked to enter information describing the conservation plans and projects they have implemented or developed that will conserve sagebrush habitats and associated species, and also provide information on the implementation and effectiveness of those conservation efforts. Section 2.2 and 2.3 provide more detailed information on the elements of those three components.

1.2 CED Privacy and Transparency

All data in the CED will become part of the public record and may be publicly disclosed as part of the Service's administrative record or in response to a request under the Freedom of Information Act (FOIA).

All interested persons (general public) will be able to view a scalable map of all conservation efforts entered in the CED. An example is provided in Figure 2. The finest viewable scale will be set at 1 inch = 1 mile. This synoptic map will provide an overview of the database contents and potentially generate further interest in local restoration and conservation efforts. The interactive map will also aid in coarse-scale siting of potential conservation efforts (See Section 5.0). A polygon (and in limited cases, a point) on the map will represent a conservation effort, or database record, for that location. The following information will be visible to any database user for each conservation effort, or record, on the map:

- Effort ID Number
- Effort Name
- Subactivity
- Total acres (and in some limited cases, miles)
- Implementing party and contact information



154
155 **Figure 2. Sample Map Viewable by Public**

156
157 Registered CED users that provide data in the CED will be able to generate reports and maps for the data
158 that they have provided. No users of the CED other than the Service may generate comprehensive
159 reports from multiple database records; however, the Service is exploring options to make some
160 information readily available. However, all interested individuals or parties will be able to contact any
161 implementing party to request additional information about a plan or project. If a CED data provider
162 wants information in the CED that was provided by a different CED data provider, they need to obtain
163 that information directly from the data owner. This will provide security for CED data providers and
164 allow for them to communicate directly with those requesting additional information and provide
165 responses to those requests.

166 167 2.0 CED Contents and Structure

168
169 The Service is seeking information on conservation efforts that have been implemented after 2009 and
170 those conservation efforts that have a high likelihood of being implemented in the near future. If
171 conservation partners have data on significant conservation efforts that were not provided or were not
172 yet effective prior for the 2010 finding, the Service will also accept data prior to 2009. Much of that
173 information was collected as part of the data call for the 2015 greater sage-grouse status review;
174 however, no information was entered into the database after February, 2015. The CED will be 'open'
175 beginning in April, 2017 and will remain open. The Service has the ability to use a 'snapshot' of the data
176 provided at any time, and this will hopefully preclude or reduce the need to have a concentrated data
177 call for any potential future actions as well as preclude the CED from needing to be 'closed' during any
178 analysis.

179
180 The CED is designed to capture conservation efforts that will help reduce or eliminate the impacts
181 associated with threats or otherwise improve the sagebrush habitats. As defined in the Policy for

182 Evaluation Conservation Efforts (PECE Policy; 68 FR 15100, March 28, 2003), conservation efforts
183 include plans such as conservation agreements, conservation plans, management plans, and
184 specific actions to implement those plans (such as juniper removal projects, wet meadow
185 restoration, and restoration of habitats lost to fire). Activities such as conducting population
186 surveys, mapping habitat, monitoring plans, public outreach, and holding meetings of local
187 working groups to design projects, while important, are not intended for entry in the CED.
188

189 Each CED record identifies an effort type, activity, subactivity, and one or more threats to provide a
190 structure for organizing information about sagebrush conservation efforts. Project efforts also identify
191 quantifiable metrics such as acres (or potentially ‘miles’ in some limited cases) of habitat restored.
192 Individual subactivities or metrics listed, whether related to an on-the-ground effort or related
193 regulatory mechanism/plan, are not necessarily applicable everywhere as the threats impacting
194 sagebrush vary across the landscape in presence and intensity. There are no implications for not
195 reporting data that does not apply to, or is not available for, each conservation partner. However, some
196 fields are required, and failure to provide that information may result in a record not being accepted in
197 the CED. The Service has worked to reduce any fields that are not essential for summary, quantification,
198 or evaluation of a given record.
199

200 2.1 Implementation and Effectiveness Information

201

202 The Service will need some basic information about the plan or project entered into the CED to
203 determine if the plan or project has been fully implemented and if it has been demonstrated to be
204 effective in addressing one or more threats. Information on the conservation effort objectives and
205 effectiveness are required for all conservation efforts.
206

207 **Effort Objectives:** In addition to the general project or plan objective(s), the Service is seeking a
208 narrative explanation of how the effort intends to address one or more threat and/or achieve one or
209 more conservation objective either identified in the COT Report or otherwise identified as a threat to
210 sagebrush ecosystems.
211

212 For example, a shrub-steppe habitat restoration project may have one or more of the following general
213 objectives:

- 214 • Restore key components to enhance habitat quality for sage-grouse.
- 215 • Restore native bunchgrasses and forbs to an abundance and density that can increase the
216 resistance of an area to invasives annual grasses.
- 217 • Restore productive rangelands that also support a diversity of wildlife.
218

219 While the above bulleted statements are valid objectives for restoring or improving habitat, the Service
220 requests that our conservation partners also specify how the achievement of those objectives will help
221 reduce or eliminate a threat. For example, would achievement of the above restoration objectives at
222 the site being reported help reduce threats from Noxious Weeds/Annual Grasses, and/or minimize fire
223 risk by reducing invasive annual grasses. Another example is how a conservation easement may not
224 directly improve sagebrush habitats, but it may ensure that the habitat will not be tilled and converted
225 to an agricultural field. It will also be helpful if the narrative information in the ‘Objectives’ text box
226 explained how the effort would accomplish one of the Conservation Objectives outlined on pages 31-52
227 of the COT Report if the conservation effort is for sage-grouse, or applies to the species for which the
228 effort is focused.
229

230 **Effort Effectiveness:** The Service is also seeking information on whether the efforts were successful in
231 fulfilling the stated objective, and effective in ameliorating or reducing one or more threats to sage
232 grouse.

233 In the CED, three options are available for answering the question: Was the effort effective?

- 234 • Yes, project plan or project is already effective.
- 235 • Highly Likely, project or plan is reasonably certain to be effective given adequate time.
- 236 • Uncertain or Unlikely, project or plan is uncertain or unlikely to be effective based on current
237 information.

238
239 In cases where the effort has been deemed effective, or is highly likely to be effective given enough
240 time, we are seeking narrative information explaining how and why that is the case. If monitoring
241 reports or other supporting documents are available, we encourage those be uploaded in Step 3.

242
243 Restoration of shrub-steppe habitat is a process that takes repeated interventions to control weeds and
244 restore diverse species assemblages, allow natives to disperse in from adjacent areas, and achieve
245 compositional and structural objectives. Many variables influence the effectiveness of sagebrush
246 habitat restoration projects, and it takes many years to achieve functional habitat for associated species.
247 Recognizing that that few, if any, restoration efforts implemented in recent years may have achieved
248 functional habitat, we encourage partners to report effectiveness based on established incremental
249 objectives and conducted timely monitoring to demonstrate effectiveness for that point in time.

250
251 Example incremental objectives and effectiveness include:

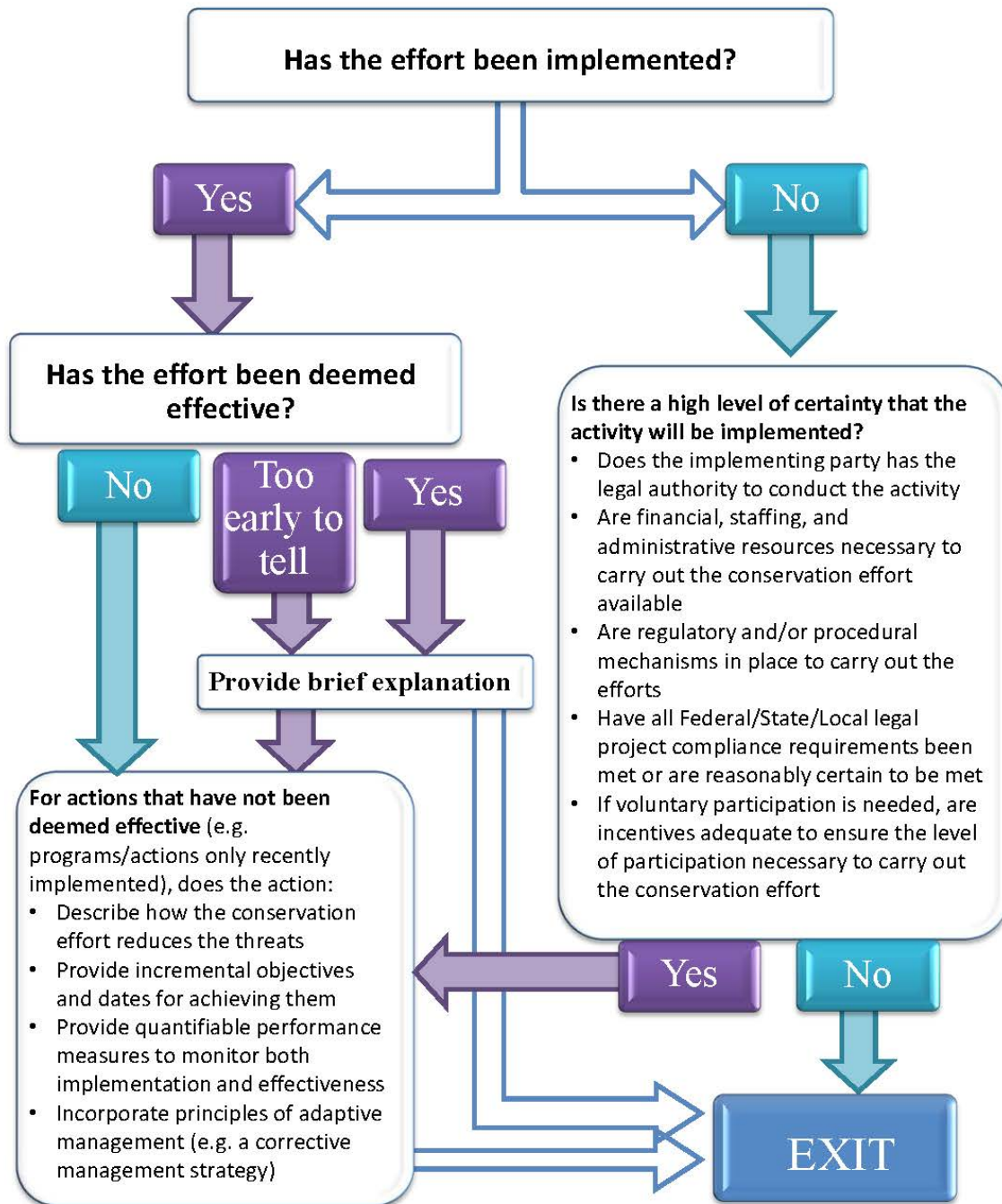
- 252 • Year 1 Objective: Greater than 80% of all seeded species will be established on site. Cover of
253 seeded bunchgrasses will be greater than 15%. Annual weeds will be less than 5% of total
254 cover. Monitoring indicates these objectives were met.
- 255 • Year 3: All seeded species will be established. Bunchgrass cover will be greater than 35%.
256 Annual weeds will be less than 2%. Monitoring was conducted, corrective actions were
257 implemented to treat annual weed coverage, and all Year 3 objectives were met.
- 258 • Year 10: Greater than 80% of all species on the reference site species list will be present
259 within the restoration area. Too early to tell, but based on previous years monitoring and
260 corrective actions, Year 10 Objectives are highly likely to be met.

261
262 If specific, measurable, time-bound, incremental objectives are not available, other information, such as
263 the bullets listed below, could help explain why the restoration effort is on the correct trajectory to
264 provide functional habitat given adequate time:.

- 265 • Was the effort part of a broader strategic process that addresses the sagebrush ecosystem
266 as a whole, and that provides explicit rationale for spatial prioritization of best management
267 practices to meet the stated objectives?
- 268 • Were established and proved techniques used for soil prep and seeding rates?
- 269 • Was periodic weed control provided?
- 270 • Was herbivore protection in place?
- 271 • Was there adequate precipitation to establish roots and survive the following summer, or
272 was supplemental water provided?
- 273 • Was a follow-up monitoring and a corrective action strategy in place, particularly for sites
274 with low precipitation, shallow soils, and/or areas with steep, southwest-facing slopes?
- 275 • Were locally-sourced seeds and/or seedlings used in the restoration effort?

276 The questions used in the CED to elicit implementation and effectiveness information CED are displayed
 277 in Fig. 3.

Conservation Efforts Database Implementation and Effectiveness Information

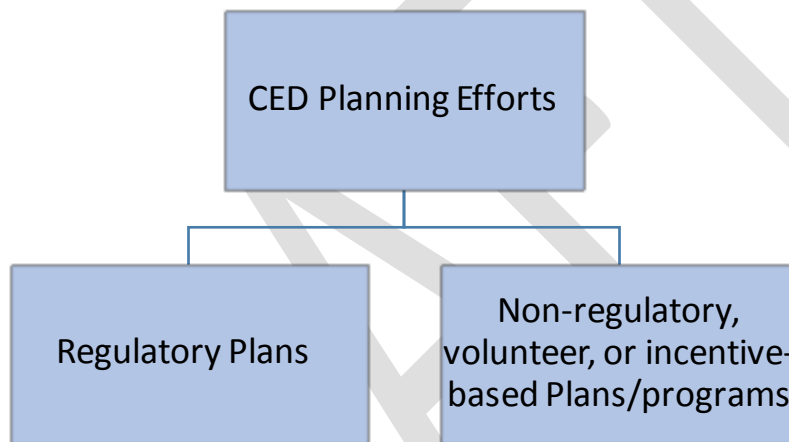


278
 279 **Figure 3. Implementation and Effectiveness Information**

280 **2.2 Plan Information**

281
282 The goal for long-term conservation of healthy sagebrush habitats (including native perennial grass and
283 forb communities) is achieved by maintaining viable, connected, and well-distributed sagebrush
284 communities through threat amelioration, conservation of key habitats, and restoration activities.
285 Healthy, viable, connected sagebrush ecosystem in turn provides for viable, connected, and well-
286 distributed populations of sagebrush associated species. One of the objectives to achieve this goal is to
287 implement state and federal sagebrush conservation strategies (including but not limited to sage-grouse
288 conservation strategies and associated incentive-based conservation actions and regulatory
289 mechanisms.

290
291 Recognizing that threats can be ameliorated using a variety of tools within the purview of states and
292 federal agencies, including incentive-based conservation actions or regulatory mechanisms, the CED
293 organizes information about planning efforts into two broad categories (Fig. 4)
294



295
296 **Figure 4. Types of Planning Efforts captured in the CED.**

297
298 We offer the following guidelines for identifying plans for entry in the CED:

299
300 Regulatory Plans: Plans with regulatory authority (e.g., laws, regulations, ordinances) that define land
301 use designations/allocations or control activities that occur in sage-grouse habitat. Examples include
302 but are not limited to: Federal Land Use Plans, State Management Plans, and County Zoning Ordinances.

303
304 Non-regulatory, Volunteer, or Incentive-based Plans: Proactive, voluntary conservation plans that
305 provide a geospatial prioritization, and/or schedule of implementation for practices and activities
306 needed for the long-term conservation healthy sagebrush shrubs and native perennial grass and forb
307 communities and associated species (including sage-grouse). Examples include, but are not limited to:
308 Programmatic Candidate Conservation Agreements with Assurances (CCAAs), Candidate Conservation
309 Agreements (CCAs), Programmatic Restoration Plans, and Natural Resources Conservation Service
310 Strategic Plans. Incentive-based programs can provide a strategic approach for prioritizing opportunities
311 with landowners.

312
313 Fire Suppression Plans: A mix of land use planning efforts and preparation efforts that could be
314 considered “projects” but for the lack of an on-the-ground component, this planning category is
315 designed to capture the important fire suppression actions such as geospatial plans to prioritize

316 fuels management and habitat recovery/restoration designed to improve sagebrush habitats
317 with greater resistance to invasive annual grasses and/or resilience after disturbances such as
318 wildfires. This category also includes planning efforts such as agreements to share fire response
319 resources, or pre-positioning those resources in advance of wildfires.
320

321 When entering planning information in the CED, a narrative explanation of what the plan entails
322 (suggested topics presented below) is required. While not required, we encourage information that
323 describes implementation and why it is/was effective.
324

325 **2.2.1 Regulatory Mechanisms, Plans, and Policies**

326 *2.2.1.0 BLM and USFS Federal Land Use Plans*

327
328 The Bureau of Land Management (BLM) and the U.S. Forest Service (USFS) have developed 15
329 Environmental Impact Statements that will inform approximately 98 Land Use Plans. For the 2015
330 greater sage-grouse status review, the National Operations Center (NOC) worked closely with the
331 Service and USGS CED Team to upload the geospatial data layers of the land use
332 allocations/designations that are intended to reduce or ameliorate threats to sage-grouse. It is the
333 Service's intent to remain in close coordination with the BLM and USFS to ensure that the most up-to-
334 date land use allocations/designations are included in the CED.
335
336

337 *2.2.1.1 Other Federal, State, Tribal, County, and Local Government Conservation Plans*

338
339 Because Federal, State, Tribal, county, and local governments manage actions to address multiple
340 threats, we encourage these partners to enter a separate record for each threat addressed in their
341 regulatory plans.
342

343 We offer the following suggested approach for the threat-
344 specific narratives entered in the CED.
345

- 346 • Provide basic information as requested
- 347 • Summarize how the plan addresses the
348 suggested objective listed in the COT Report as
349 applicable.
- 350 • Summarize policies/regulations/ordinances to
351 prevent/minimize/ameliorate the threat
- 352 • Upload relevant documents supporting the
353 summary information provided in Step 2
- 354 • Check land ownership boxes as appropriate
- 355 • Implementation information
 - 356 a. Summarize funding source(s) and funding plan
 - 357 b. Describe any obstacles to full implementation of the plan
 - 358 c. Describe any successes in implementing the plan
 - 359 d. Describe implementation plan for the next five years
 - 360 e. Describe plans for monitoring [biological] effectiveness
 - 361 f. Include any additional information needed to describe the plan
 - 362

**Suggested Naming Convention
for Plans addressing multiple
threats:**

State: Agency: Plan Name: Fire

State: Agency: Plan Name: Mining

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2.2.2 Incentive-based (Non-regulatory) Conservation Strategies

Incentive-based conservation strategies play an important role in the conservation of sagebrush associated species, especially on private lands. Because of their conservation potential, programmatic and/or large scale non-regulatory conservation strategies will be important entries in the CED. Examples include Voluntary Federal, State, NGO, Local and Tribal habitat restoration programs, Programmatic Candidate Conservation Agreements, Programmatic Candidate Conservation Agreements with Assurances, Programmatic Restoration Plans for Invasive Plants, and Programmatic Reclamation Plans.

2.3 Project Information

2.3.1 Mitigation

Mitigation strategies or programs are designed to avoid, minimize, rectify, reduce over time, and compensate impacts to sagebrush habitats and the associated species (i.e. the mitigation hierarchy). Mitigation strategies or programs are typically part of a larger conservation plan or program, and as such, will be captured in the CED as a regulatory mechanism, plan, or policy. Individual project-specific minimization or avoidance measures should not be reported as conservation projects in the CED. However, application of effective minimization and avoidance measures will be important information to demonstrate the effectiveness of conservation plans. Examples of minimization and avoidance measures that are part of a broader conservation plan should be described in Step 5– Implementation Information for the overall conservation plan.

Individual compensatory mitigation projects can be reported in the CED as project-specific conservation efforts. Consider the following example: a conservation easement is placed on a ranch with high quality sage-grouse habitat, protecting that ranch from fragmentation and development threats in perpetuity as compensatory mitigation for the siting of a new communication tower in general habitat. The conservation easement would be entered in the CED, whereas any applicable minimization measures such as construction timing restrictions, or footprint reduction stipulations for the new communication tower would not be entered in the CED as a specific conservation effort.

2.3.2 Activities, Subactivities, and Metrics

Table 1 provides a list of the quantitative project metrics used in the CED, organized by ‘Activity’ and ‘Subactivity’. A project can only be associated with one activity and one subactivity. In cases where a conservation effort includes several activities and subactivities (e.g., a comprehensive restoration action on a land parcel to decommission an old telecommunication road, revegetate that road, and place a perpetual conservation easement specifically for sage-grouse (or other sagebrush dependent species) on that parcel), the data provider is encouraged to either enter multiple CED effort records (one for each sub-activity or action), or to enter the project for the highest conservation value for the area. Please let the CED Team know if you have multiple projects that include multiple subactivities so we can revisit this if needed.

Not all relevant information will be captured by the metrics associated with each subactivity; therefore, in addition to standardized data fields and metrics, qualitative information will be gathered from text box entries and from supplemental documents that can be uploaded by registered CED users. Narrative

410 reports, plans, monitoring results, and other documents will provide essential context for information
411 provided in standardized format and other valuable information about each conservation effort entered
412 into the CED. This supporting information will be invaluable when evaluating actions for effectiveness.
413 When and where alike actions have taken place in an area, but may be geographically disjointed, users
414 are encouraged to 'lump' actions together as long as they have the same outcomes, and
415 support/justification for effectiveness can be applied similarly across all treatment areas. An example of
416 this would be five conifer removal treatments that occurred in the same project area. If the treatments
417 share the same methodology, habitat objectives, post-treatment monitoring results, and same
418 justification of effectiveness, the 5 separate polygons could be combined into one shapefile, and
419 uploaded as one record as opposed to 5. This bundling is aimed at reduced workload from the
420 perspective of our partners, and may increase efficiencies in the Service's evaluation process.

Table 1. List of spatially-explicit activities, subactivities, and metrics.

ACTIVITY	SUBACTIVITY	PROJECT METRICS	EXAMPLES AND INFORMATION TO INCLUDE (Objectives, Notes, Effectiveness Narrative Boxes)
SAGEBRUSH HABITAT PROTECTION:	Conservation Easement:	Acres Length of agreement <ul style="list-style-type: none"> • (years, perpetuity) Early termination penalty <ul style="list-style-type: none"> • (yes/no) Percent (based on acres) of easement that protects against:	Long-term or permanent easements such as those provided through the Grassland Reserve Program, Farm and Ranchlands Protection Program, Wetland Reserve Program, and the 2014 Farm Bill Agricultural Conservation Easement Program, or provided through other Federal, State, or NGO programs. Please be sure to redact any PII from the information provided.
	Habitat Protected by Easement for Long- Term Conservation	<ul style="list-style-type: none"> • Sagebrush Elimination, • Agricultural Conversion, • Oil & Gas Development, • Urbanization/Subdivision, 	Lands enrolled in rental-payment programs such as the Conservation Reserve Program and State Acres For Wildlife Enhancement (SAFE) could be entered as a conservation effort, provided that the lands were planted to native grasses, forbs, and native arid-land shrubs and/or native shrubs (particularly big sagebrush) have seeded-in from adjacent sagebrush communities.
	Land Acquisition: Habitat Protected by Acquisition for Long- Term Conservation	Acres Percent (based on acres) of acquisition that protects against: <ul style="list-style-type: none"> • Sagebrush Elimination, • Agricultural Conversion, • Oil & Gas Development, • Urbanization/Subdivision 	Permanent protections such as acquisitions of lands for governmental or NGO programs where the purpose is for sagebrush habitat wildlife dependent species. Please be sure to redact any PII from the information provided.

RESTORATION: Conifer Removal	Conifer Removal: All Phases	Acres	<p>Projects to remove piñon pine and/or juniper in all phases.</p> <ol style="list-style-type: none"> 1. Areas with intact sagebrush and understory vegetation present, shrubs and herbs are the dominant vegetation that influences ecological processes on the site. 2. Areas where trees are co-dominant with shrubs and herbs and all three vegetation layers influence ecological processes on the site. 3. Areas where trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site. Selectively conducted to improve connectivity.
RESTORATION:	Fuel Management / Reduction / Treatments	Acres	<p>Includes projects that are designed to change vegetation composition and/or structure to modify fire behavior characteristics for the purpose of aiding in fire suppression and reducing fire extent.</p> <p>Conifer removals, while can be considered a fuels treatment, are categorized separately.</p>
Fire Related Habitat Restoration and Pre- Suppression Efforts	Fuel Breaks	Miles	<p>Fuel breaks involve removing flammable vegetation in a swath wide enough to prevent a fire from spreading. Roads and natural fuel breaks can sometimes be incorporated into the design. If the project or plan has reduced the threat of wildfire by creating fuel breaks as a habitat protection measure, please provide a summary in which you respond to the following questions: what type of fire break(s) was/were created? What was the reason for the siting/placement of the firebreak? How will the firebreak be maintained?</p>
RESTORATION:	Post-fire restoration (only native seeding, plantings)	Acres	<p>Acres restored to functional sagebrush habitat. Enter acres that have been treated post-fire to restore functional sagebrush/sage-grouse habitat. Recognizing that multiple treatments and multiple steps are often needed to restore sagebrush habitat, please describe in objectives box, which step the restoration treatment is currently undergoing (e.g. chemical treatment of annual grasses, seeding, planting sage brush seedlings, etc.), and report the project as implemented when the habitat is of conservation value for sagebrush dependent species.</p>
Habitat Restoration (Fire)	Post-fire restoration (only non-native seeding, plantings)	Acres	
	Post-fire restoration (native/non-native seeding mix)	Acres	

RESTORATION: Non-Fire Related Habitat Improvement / Restoration	Area Closure (Area and/or Seasonal)	Acres	Acres of areas closed permanently or seasonally in an attempt to prohibit activities or land uses that may contribute to sagebrush habitat loss or degradation.
	Vegetation Management / Habitat Enhancement	Acres	Acres of projects or treatments aimed at improving existing, intact sagebrush habitats. While many actions are covered specifically, this subactivity allows to capture actions aimed at improving sagebrush habitat as well as actions aimed at improving others aspects of healthy sagebrush ecosystem including but not limited to augmenting canopy coverage, understory species diversity, and managing other shrubs that may contribute to sagebrush habitat loss or degradation.
	Annual Grass (Cheatgrass) Treatments	Acres	Includes projects that are designed to change vegetation composition and/or structure by reducing the presence of invasives annual grasses and/or forbs. Examples of this action would be efforts to remove or reduce cheatgrass or medusahead rye, among other species that degrade understory health.
	Non-fire restoration (only native seedings, plantings)	Acres	Acres restored to functional sagebrush habitat. Recognizing that multiple treatments and multiple steps are often needed to restore shrub-steppe habitat, please describe in objectives box, which step the restoration treatment is currently undergoing (e.g. chemical treatment of annual grasses, seeding, planting sagebrush seedlings, etc.), and report the project as implemented when the habitat is of conservation value for sagebrush dependent species.
	Non-fire restoration (only non-native seedings, plantings)	Acres	
	Non-fire restoration (native/non-native seeding mixes, plantings)	Acres	

Table2. List of non-spatial project activities, subactivities, and metrics.

ACTIVITY	SUBACTIVITY	PROJECT METRICS	EXAMPLES AND INFORMATION TO INCLUDE (Objectives, Notes, Effectiveness Narrative Boxes)
SAGEBRUSH HABITAT PROTECTION:	Conservation Agreements (includes CCAs, CCAAs, Farm Bill and other Incentive- based programs).	Acres	Examples include Voluntary Federal, State, NGO, Local and Tribal habitat restoration programs, Programmatic CCAs, Programmatic CCAAs, Programmatic Restoration Plans for Invasive Plants, and Programmatic Reclamation Plans. Include the conservation effort implemented as part of the agreement as well as reporting on effectiveness monitoring. Please be sure to redact any PII from the information provided.
	Conservation Easements Preventing Subdivision	Acres	Long-term or permanent easements put into place with the specific objective of preventing urban development resulting in sagebrush habitat loss, fragmentation, or degradation. Please be sure to redact any PII from the information provided.
RESTORATION: Infrastructure Removal, and Modification	Structure Removal	Type of structure removed	Provide the total number, and type of structures that were removed or moved out of sagebrush habitats. Structures typically include (but may not be limited to): communication towers, cellular towers, abandoned windmills, abandoned buildings, power lines (transmission or distribution), and wind turbines.
		Amount Removed	
	Powerline Burial	Type of powerline	Miles of power lines (transmission and distribution) buried to reduce impacts to sagebrush dependent species
		Miles of powerline buried	
Powerline Retrofitting / Modification	Type of Modification	Miles of power lines (transmission and distribution) modified to reduce impacts to sagebrush dependent species	
	Miles of powerline modified		
Fence Modification	Miles	Report miles of fence modified (i.e., smooth top wire) in areas with high potential for sage-grouse strikes/collisions documented. Consider including multiple fence marking projects occurring within an area (i.e., population, watershed, county, conservation district) together as opposed to entering multiple records.	

	Fence Marking	Miles	Report miles of fence marked in areas with high potential for sage-grouse strikes/collisions documented. Consider including multiple fence marking projects occurring within an area (i.e., population, watershed, county, conservation district) together as opposed to entering multiple records
	Fence Removal	Miles	Report miles of fence removed in areas with high potential for sage-grouse strikes/collisions documented. Consider including multiple fence removal projects occurring within an area (i.e., population, watershed, county, conservation district) together as opposed to entering multiple records
RESTORATION: Livestock & Rangeland Management	Improved Grazing Practices (Rest, Rotation, Etc.)	Acre (Associated w/ Allotments/Pastures in Practice)	<p>Enter total acres of rangeland/ranchland being managed according to NRCS Sage-Grouse Initiative grazing practices and range management recommendations OR State or Federal agency recommendations including:</p> <ol style="list-style-type: none"> 1. Rotating livestock to different pastures, while resting others to establish a diversity of habitat types. 2. Changing seasons of use within pastures to ensure all plants have the ability to reproduce. 3. Leaving residual cover (grass from the past season) to increase hiding and nesting cover for sage-grouse. 4. Managing the frequency and intensity of grazing to sustain native grasses, wildflowers, and shrubs. 5. Managing livestock access to water to ensure healthy livestock and healthy 6. Grazing aimed at reduced fine fuel loads
RESTORATION: Recreation Management	Road and Trail closure	Miles	Miles of road removed, de-commissioned, or rerouted as well as roads/trails that are closed for a defined period of time (while remaining on the landscape) to reduce human activity in an area.
	Reroute Trail	Miles	
SPECIES MANAGEMENT: Population Augmentation	Translocation	Number of Sage-grouse Translocated	Include the number of sage-grouse included in translocation effort. Include information about where sage-grouse were moved from, as well as where they are being moved to. Include post-release effectiveness monitoring protocols.

RESTORATION:	Wild Equid Population Control	Number Wild Equids Treated	Number of free-roaming equids treated with population control methods in order to achieve properly functioning condition for riparian areas and/or rangeland health standards for sagebrush communities.
Wild Equid Management	Wild Equid Gather	Number Wild Equids Gathered/Removed	Number of free-roaming equids gathered for relocation in order to achieve properly functioning condition for riparian areas and/or rangeland health standards for sagebrush communities.

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476 **3.0 Entering Data in the CED**

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Data terms are defined as follows in the CED:

- **Metadata** = the who, what, when, where, and how behind the data. Metadata for individual efforts is captured as the plans are being entered. For example, who=project contact, when=effort start and finish dates, etc. Metadata will need to be provided during batch uploads of tabular or geospatial data in order to comply with Federal Geographic Data Committee guidelines.
- **Attribute data** = the information requested in the CED for a conservation plan or project (e.g. activity, sub-activity, threat the effort is intended to help ameliorate, effectiveness information, etc.). For individual efforts, the attribute data is required information to enter the plan or project. When batch uploading tabular or geospatial data, some attribute data may be missing and will need to be provided.

3.1 Individual Plan and Projects

Detailed instructions for entering individual plans and projects are provided in a separate document: Conservation Efforts Database Help Document (Version 2.0.0). The Help Document is also available under the Help tab of the CED.

Recognizing the limited resources and working relationships our conservation partners have, we encourage the following prioritization approaches for entering conservation efforts in the CED:

- Large and/or significant efforts that are most relevant to addressing threats to sagebrush within the partners’ realm of influence are the highest priority efforts to enter in the CED.
- If partners worked together to develop or implement an on-the-ground project, we suggest that the partner that provided the majority of the funds or who led the on-the-ground effort serve as the lead and enter the project information into the CED, if practical. Partners are encouraged to work together to determine the most efficient approach for entering projects that were implemented through partnership efforts.
- Consider the merits of consolidating multiple small projects involving similar activities into one larger project for data entry purposes. This applies to actions in which the CED will not ask for spatially-explicit information. For example, if multiple fence marking projects have occurred in one targeted area and have the same implementation and effectiveness information, the registered CED user could combine those individual fence marking actions into one project entry for the CED. This would save time and effort by creating one record/entry that describes the total of the fence marking projects, rather than creating multiple individual lines with repetitive project information for each fence that was marked.

523 3.2 Batch Uploads

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525 Many conservation partners will
526 find it more efficient to batch
527 upload information from their
528 existing databases rather than
529 entering data for individual
530 projects. The Service/USGS CED
531 Team will be available to assist
532 with the batch uploading
533 process. The first step will be to
534 contact the Service CED Team
535 Lead, identified in the contact



536 section of the CED. Users will download a file geodatabase template and append their data to the
537 template. Once loaded in the CED, the database will add these skeleton projects to the CED. Users will
538 then be able to quickly complete remaining data fields using batch entry within the CED website. This is
539 a deviation from the previous batch upload process and is intended to help reduce errors related to the
540 previous batch upload process. This process is still being developed and is subject to change at any time.

541

542 3.3 Geospatial Data

543

544 CED documentation and spatial data are housed on the Landscape Conservation Management and
545 Analysis Portal (LC Map), which is built upon ScienceBase, a collaborative scientific data and information
546 management platform. LC Map is managed by the Great Northern Landscape Conservation Cooperative
547 (GNLCC).

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549 Geospatial data can be uploaded directly into ScienceBase as indicated in Appendix A of the Help
550 document (located under the Help tab of the CED). The organizational information provided by agencies
551 and organizations for the CED user registration process will also be used to organize ScienceBase folders
552 for agencies and organizations to post their geospatial data in ScienceBase.

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554 4.0 How will data in the CED be used?

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556 The CED was designed to collect information on conservation efforts in an organized and spatially
557 explicit fashion so that we could better understand the full extent to which conservation actions are
558 ameliorating threats to the sagebrush ecosystem. The specifics of how we will quantitatively or
559 qualitatively assess the extent to which threats are ameliorated are currently in development. We are
560 working closely with modeling experts and structured decision making experts to develop a process that
561 fully accounts for the actions in the CED in a transparent and objective manner, and in a way that
562 appropriately accounts for uncertainty. There is potential for the CED to help identify geographic gaps
563 (or concentrations) in conservation efforts to help prioritize future conservation actions.

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570 5.0 Reporting

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572 The CED has undergone some significant updates from CED v1.0, as it relates to reporting
573 features/functionality. While the CED will retain the functionality to perform queries and generate
574 tabular summaries of the information, you, the user, have provided (or been given access to by the
575 providing party), the CED will now be able to generate a summary of information queried, along with a
576 map illustrating the efforts included, and some simple summary calculations.

577

578 While the CED's mission and organization is focused on the sagebrush ecosystem, the CED will calculate
579 zonal statistics based on sage-grouse areas of interest and resource values (in the form of a population
580 index (Doherty et al. 2016) and breeding habitat distribution (Doherty et al. 2016). Additionally, the CED
581 will calculate the different amount of other resource information such as the resistance and resilience
582 classes described in Chambers et al. (2016).

583

584 When generating a report, there is a lag between record entry and when the data is 'available' for
585 display, query, and map calculation. Please keep this in mind if you need a report.

586

587 6.0 Project Siting

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589 At a regional scale, the CED can be used as a tool to view a variety of conservation efforts aimed at
590 sagebrush habitat improvement and/or threat reduction. By using the data viewer/map in the CED, any
591 user can view spatial data entered into the CED as well as query a smaller subset of actions or by
592 geographic area. This will allow the user to strategically site conservation efforts based on proximity to
593 other implemented actions. This approach has the potential to foster a community of collaborative
594 conservation.

595

596 Additionally, the CED has added new information in the form of spatial layers that can be displayed in
597 the background of our interactive map/data viewer. This information can provide important context to
598 geographic areas based on resource values, sage-grouse values, and some threats. Some of these layers
599 will also be used to quantify conservation benefit and/or threat reduction as mentioned above in
600 Section 5.0 (Reporting Features).

601

602 7.0 Interoperability

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604 Various partners either currently have or are developing decision support tools and databases to collect
605 information and provide a mechanism for viewing, analyzing or download that information. It is the goal
606 of the CED to work collaboratively with our partners to increase interoperability between the CED and
607 their respective tools. With that understanding, we hope to reduce the need for duplicate data entry,
608 while still ensuring the collection of all relevant information needed for long term monitoring and
609 evaluations of effectiveness.

610 The CED will not be able to provide every function needed by our partners. However, the CED can
611 connect with other tools to provide a more complete picture of the landscape, as well as help point
612 users to the tool(s) that best meet their needs. This will be a valuable feature of the CED.

613 As a part of implementation of the Integrated Rangeland Fire Management Strategy, an interagency
614 team led by the BLM and USGS has created a geospatial data catalog and enhanced data sharing tools
615 on the BLM Landscape Approach Data Portal. This effort provides many of the layers displayed in the
616 CED. The data portal provides access to data layers, map viewers, and analytical tools to support the
617 Strategy. The geospatial data catalog is a curated list of datasets and includes information from BLM,
618 USGS, FWS, and other partners.

619 Also connected to the Integrated Rangeland Fire Management Strategy, is the development of a
620 Conservation and Restoration (C&R) Strategy. A tool is being developed to provide access to information
621 in the C&R and help inform future proposed management actions at the landscape or regional scales.
622 The tool will tie into the CED to display various suites of conservation information. Additionally, the
623 USGS and BLM are building a complementary tool that will help with prioritizing and siting restoration
624 and habitat improvement projects at the site scale based on a host of characteristics including the
625 success of other treatments with similar characteristics. The CED Team is working with the development
626 of that tool to look for mutually beneficial opportunities.

627 The CED team has also worked closely to share information with our state partners to query data from
628 their existing databases including but not limited to the Oregon Watershed Enhancement Board, Utah's
629 Watershed Restoration Initiative, and Wyoming Game and Fish's databases which tracks a host of
630 information not limited to conservation actions.

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Appendix A – Glossary

Candidate Conservation Agreement (CCA): Voluntary conservation agreements between the US Fish & Wildlife Service and one or more public or private parties to address the conservation needs of proposed or candidate species, or species likely to become candidates, before they become listed as endangered or threatened. The Service works with its partners to identify threats to the species, plan the measures needed to address the threats and conserve these species, identify willing landowners, develop agreements, and design and implement conservation measures and monitor their effectiveness.

Candidate Conservation Agreement with Assurances (CCAA): Voluntary conservation agreements that provide non-federal landowners with additional incentives beyond a CCA for engaging in voluntary proactive conservation through assurances that limit future conservation obligations. One of the primary reasons for developing the CCAA program is to address landowner concerns about the potential regulatory implications of having a listed species on their land. The CCAA program specifically targets non-federal landowners and provides them with the assurance that if they implement various conservation activities, they will not be subject to additional restrictions if the species becomes listed under the ESA.

Conservation Easement: A legal agreement voluntarily entered into by a property owner and a qualified conservation organization such as a land trust or government agency. The easement contains permanent restrictions on the use or development of land in order to protect its conservation values. Easement restrictions vary greatly for each agency or organization.

Endangered Species Act (ESA): Law which serves to protect and recover imperiled species and the ecosystems upon which they depend. Under the ESA, species may be listed as either endangered or threatened.

Equids: Free-roaming horses (*Equus caballus*) and burros (*E. asinus*).

Hydrologic Unit Code (HUC): A system of dividing and sub-dividing the United States into successively smaller hydrologic units or drainage areas.

Lek: An aggregation of males that gather to engage in competitive displays to attract attending females for mating..

Range Improvement: Any activity, structure, or program on or relating to rangelands which are designed to improve production of forage, change vegetative compositions, control patterns of use, provide water, stabilize soil and water conditions, and provide habitat for livestock and wildlife. The term includes, but is not limited to, structures, treatment projects, and use of mechanical means.

Reclamation: Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves re-contouring, replacement of topsoil, re-vegetation, and other work necessary to ensure eventual restoration of the site.

Restoration: Implementation of a set of actions that promotes plant community diversity and structure that allows plant communities to be more resilient to disturbance and invasive species over the long-term. The long-term goal is to create functional, high-quality habitat that is occupied by sage-grouse.

The short-term goal may be to restore the landform, soils, and hydrology, and increase the percentage of preferred vegetation, seeding of desired species, or treatment of undesired species.

Western Association of Fish and Wildlife Agencies (WAFWA): Association which advocates for the rights of 23 states and Canadian provinces to manage fish and wildlife within their borders. The WAFWA sage-grouse technical committee developed objectives in 1999 to maintain and increase where possible the present distribution and abundance of sage-grouse.

Wildland Fire: Any non-structure fire that occurs in the vegetation and/or natural fuels. Includes both prescribed fire and wildfire.

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Appendix B – Proposed Uses/Analyses for Data Collected

Agriculture Conversion / Tillage Risk:

To more precisely evaluate the potential risk to sage-grouse from future agricultural conversion, we will replicate the analysis conducted for the 2015 greater sage-grouse status review. For a brief description of the proposed analysis, please see information below.

(Excerpts from the 2015 Not-Warranted Finding) Rates of agricultural conversion likely slowed and will continue to slow because the most productive sagebrush habitats have already been converted to croplands or pasturelands (Baker et al. 1976). Since 1982, acres of new cropland within occupied sage-grouse range have decreased in every State except South Dakota (NRCS 2013), likely due to the decreasing suitability of the remaining habitats for agriculture. However, economic incentives for biofuels and technological advances in irrigation and cultivation could potentially increase conversion rates in the future (Knick et al. 2011). In 2010, we determined that agricultural conversion would continue to affect sage-grouse in the future based on historical loss and fragmentation of sage-grouse habitat from agricultural conversion.

For the analysis, we compared a new cropland suitability model (Lipsev et al. 2015) with the Population Index (Doherty et al. 2016). The cropland suitability model uses soil and climate data to predict the probability that an area could be converted to cropland (Lipsev et al. 2015). The Population Index model identifies important sage-grouse population centers (Doherty et al. 2016). By comparing these two models, we quantified the percent of the Population Index that overlapped with sagebrush habitats in the MZ I that have a high potential to be converted to agriculture in the future. Because the cropland suitability model was only finalized for MZ I for reasons explained below, the results of this exercise specifically apply only to MZ I, but can be used to assess potential probabilities of conversion to agriculture rangewide.

The cropland suitability model was developed only for the Great Plains (MZ I), and not for the Columbia Basin (MZ VI) or the Snake River Plain (MZ IV), where agricultural conversion also occurred, due to the limited availability of land cover data, the small size of the Columbia Basin (MZ VI), and differences in the way sage-grouse use agricultural fields between these three MZs. Additionally, more of the Columbia Basin (MZ VI) has already been converted to cropland (Knick et al. 2011) and the Great Plains (MZ I) has the highest percentage (69 percent) of private lands, so the potential risk of agricultural conversion is greatest in the Great Plains (MZ I). As a result, the cropland suitability model focused only on the MZ with the greatest potential to be converted in the future, so our overlay analysis with the sage-grouse breeding distribution model could only be calculated in the Great Plains (MZ I).

We will utilize data collected in the CED, in the form of conservation easements (with the distinct purpose of preventing tillage of sagebrush habitats), wildlife management areas, and land acquisitions (acquired with the specific purpose of preventing tillage and managing for characteristics representative of healthy sagebrush habitats, to evaluate their benefit to greater sage-grouse (or other obligate species) by comparing against the Population Index model referenced above, as well as if the cropland suitability model to assess the amount of potential threat that has been addressed given the probability it contains the characteristics of suitable cropland.

Oil and Gas Development:

To more precisely evaluate the potential risk to sage-grouse from oil and gas development, we will replicate the analysis conducted for the 2015 greater sage-grouse status review. For a brief description of the proposed analysis, please see information below.

(Excerpts from the 2015 Not-Warranted Finding) For this status review, we used peer-reviewed and published methodologies (Copeland et al. 2009, entire) to model the probability of future oil and gas development impacting sage-grouse. The model focused on assessing the risk of nonrenewable energy in MZs I and II, the two areas with the highest potential for future nonrenewable energy development (Juliussen and Doherty 2017, *in press*). Although nonrenewable energy development potential exists and will continue in the Uinta-Piceance Basin (MZ VII), the model not applied to MZ VII because the relative proportion of potential development was low, even under the highest development scenario. The model used geological information illustrating potentially available oil and gas resources to map areas of likely future development (Juliussen and Doherty 2017, *in press*). We also used Oil & Gas Resource Assessments developed by the USGS to incorporate future maximum potential development scenarios into the analysis (Juliussen and Doherty 2017, *in press*). The analysis quantified potential effects to sage-grouse we quantified the percent of the Population Index (Doherty et al. 2016) as well as the modeled Breeding Habitat Distribution (Doherty et al. 2016) potentially exposed to future energy development based on the availability of oil and gas resources.

We will utilize data collected in the CED, in the form of Federal Land Use Decisions, No Surface Occupancy restrictions, and conservation easements (land include jurisdiction over subsurface mineral rights, that prevent or limit the development in the easement area), as well as other regulatory protections that can be illustrated spatially, to evaluate their benefit to greater sage-grouse (or other obligate species) by comparing against the Population Index and Breeding Habitat Suitability models referenced above, as well as if layers depicting development scenarios as described above.

Conifer Encroachment:

We are currently exploring ways to evaluate the conservation benefit from conifer removals efforts.

We are evaluating current products available to spatially illustrate where conifers are encroaching into sagebrush ecosystems. Those products include a layer utilized by the BLM National Operating Center for use in tracking disturbance as part of the BLM and USFS Monitoring Framework which could provide valuable insight. Furthermore, mapping product described in Falkowski et al. (2017) can offer valuable information as to where conifer is encroaching into sagebrush habitats.

Recently, the Rangeland Ecology & Management produced a special issue, including a series of publications that describe the benefit achieved through conifer removals which provides insight into how these actions can be effective at conservation sagebrush habitats that sage-grouse and other sagebrush dependent species rely on.

Invasives / Annual Grasses:

We are currently exploring ways to evaluate the conservation benefit from actions aimed at reducing or eliminating invasive annual grasses (cheatgrass, medusa head, etc.). We will work with subject matter

experts to not only identify the spatial information that might best illustrate where infestations occur, but also information to help evaluate [biological] effectiveness of the various efforts.

Wildfire:

We are currently exploring ways to evaluate and quantify the conservation benefit from actions aimed at reducing the impacts of wildfire, notably habitat loss and subsequent incursion of invasives annual grasses. We are also looking into ways to better quantify the conservation benefit of pre-suppression actions such as fire breaks.

Similar to invasives, we will work with subject matter experts as well as utilize information presented in the Science Framework to shape what information the CED uses to help quantify conservation benefit as well as potentially threat reduction.

Sagebrush and Sagebrush Obligate Resource Values:

We are in the process of identifying spatial information in addition to those layers that illustrate breeding habitat (Doherty et al. 2016) and relative population index (Doherty et al. 2016) for greater sage-grouse to expand to other sagebrush dependent species. Work being conducted through the WAFWA Sagebrush Conservation Strategy may provide information that could satisfy this need.

Additionally, we are including the Resistance and Resilience information (Chambers et al. 2014, 2016), and will continue to make improvements to calculate the amount of overlap between conservation efforts and these layers.

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