THE CENTRAL GRASSLANDS ROADMAP APPENDICES

GUIDING US TOWARDS RESILIENT AND CONNECTED GRASSLANDS AND HUMAN COMMUNITIES

Updated June 21, 2022

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Appendix A: Explanation and Metrics for Goal 1

Important Note: *The Scorecard goals, corresponding metrics, and approaches to collecting data on these metrics are in different phases of development for each goal. What is described here is an explanation of where this goal is at in its current iteration as it's being developed by a task force.*

GOAL 1: COMMUNITY SUPPORT

Each year, Indigenous/First Nation, ejido, rancher alliance, and family rancher communities across the biome report the ability to both sustain their working operations and access sufficient financial and technical assistance resources that support their land management and stewardship decisions.

METRICS TO MEASURE PROGRESS

- Respondents report sufficient access to financial and technical assistance resources. This access increases over the baseline year for Indigenous, ejido, and agricultural communities who feel that generational, local, and/or Indigenous Traditional Ecological Knowledge for land management relevant to each community is intact
- The capacity of regional collaboratives to improve long-term ranching and rural community viability and vitality in the Central Grasslands increases above the baseline year (could be measured in terms of number of staff, stability of funding, or expansion of collaboratives)
- Voluntary participation in financial and technical assistance conservation programs grows year-over-year and is a more-than-satisfactory experience for participants
- Through these voluntary financial and technical assistance conservation programs, Roadmap partners can support grazing production on ranches that are managed to enhance, improve, or restore grasslands for productivity, profitability, and sustainable wildlife and habitat conservation:
- Additional considerations:
    - Bison herds under Indigenous management will increase X% in the number of herds and the total number of bison in the herds
    - Livestock production in the Central Grasslands will remain steady relative to baseline year in terms of the number of livestock produced and the number of ranching entities
    - Examine consumer willingness to participate in different programs. For example, purchasing bird-friendly beef, growth in ranchers participating in the BFB program, and rancher and consumer contentment with the BFB program
    - More local processing and infrastructure is available, increasing the ability to support locally produced products as well as increased capacity for grass finished beef

Option 1

Work with network partners to develop a sample of individuals from Indigenous, ejido, and agricultural communities and collaborative groups. These individuals and collaboratives agree to participate in a short annual (or every other year) survey that can be efficiently implemented (e.g., email based in addition to phone interviews when needed) to monitor dynamics in these communities over time.

> ***Benefits:*** A custom survey tool specific to the Roadmap ensures that 1) the questions asked are directly tied to the initial vision and goals of the Roadmap, and 2) results are more relevant to the influence and specific actions of Roadmap partners.
>
> ***Challenges:*** 1) These data are not preexisting, 2) a custom survey would need buy-in among individuals from Indigenous, ejido, and agricultural communities (the sample might not be broadly representative of those populations), and 3) additional capacity would be needed to collect and organize data.
>
> ***Need:*** Funding for survey design, identifying a lead metric, and distribution

Option 2

Identify preexisting data sources (e.g., Census of Agriculture in US, Canada, and Mexico) to track key metrics. Goals could be organized by specific communities such as Indigenous/First Nations, ejidos, and agricultural producers.

> ***Benefits:*** Data already exist and will continue to be collected at set intervals
>
> ***Challenges:*** 1) Many preexisting indicators are unlikely to be available annually (e.g., every 5 years for US census of agriculture), and 2) there are likely many dynamics impacting communities largely beyond the scope of the Roadmap network, so specific goals will not be able to be closely tied to Roadmap efforts

KEY QUESTIONS TO EXAMINE

- Is it worth patching together some annual data or sacrificing that more regular data for a more irregular but spatially consistent dataset?
- Who is included in the metrics and what is their voice saying?
- What are the questions relevant to each community?

RESOURCES

- Sustainability Indicators: https://www.sciencedirect.com/science/article/pii/S1550742421001020
- Regional Scale Analysis to determine how much land is switching hands and overall land use transition (WWF Plowprint?)

- OnX might be helpful to track ownership: https://www.onxmaps.com/hunt/app
- U.S. Farm journal annual data from subscribers - might be more biased than the census
- Field to Market collects data annually collaboratively on and with landowners.
- American Farmland Trust (east Great Plains more than west): https://farmland.org/project/midwest-policy-priorities/
- Leveraging the NEON Airborne Observation Platform for socio-environmental systems research: https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.3640
- Perhaps the provincial Environmental Farm Plans are a way of measuring landowner / land management change. Where Food Comes From (and other similar companies) conduct third party verification. Tracking an increase in verification of biodiversity (as example) might be useful.

Appendix B: Explanation and Metrics for Goal 2

Important Note: *The Scorecard goals, corresponding metrics, and approaches to collecting data on these metrics are in different phases of development for each goal. What is described here is an explanation of where this goal is at in its current iteration as it's being developed by a task force.*

GOAL 2: LANDSCAPE CONSERVATION

By 2032, hundreds of millions of acres of grass will be improved, restored, or kept intact for the benefit of people and nature across the biome.

Keep in mind the following described in the beginning when considering this goal*:*

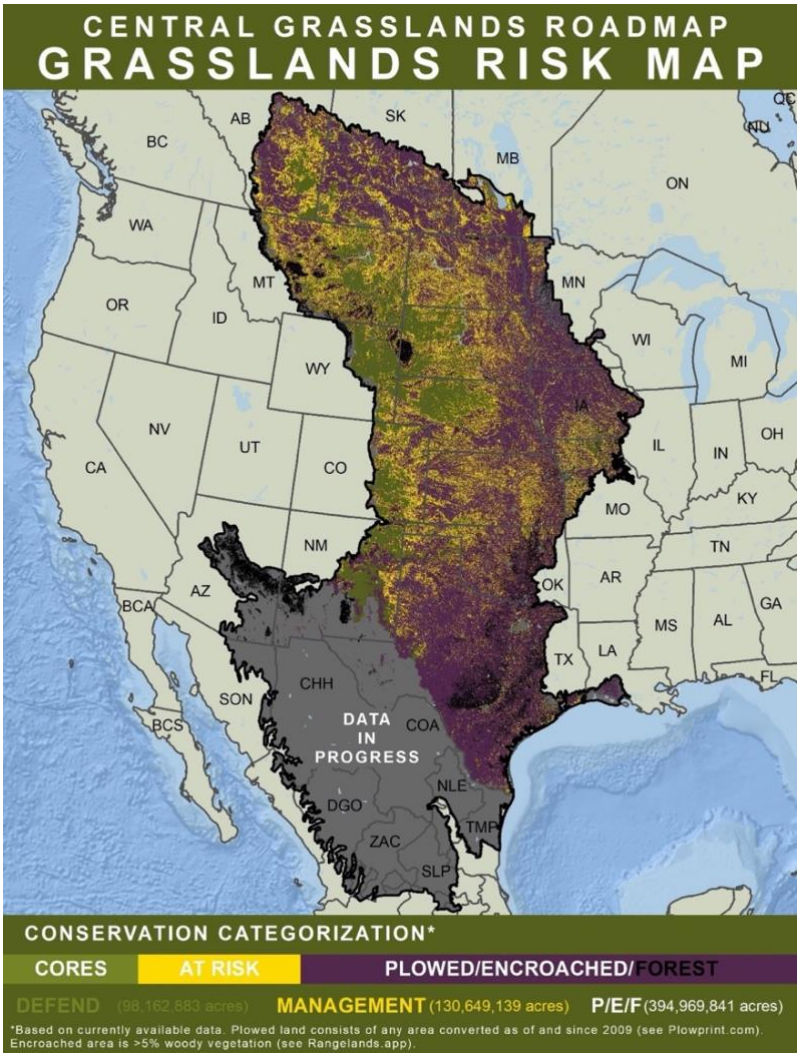
These Principles create a Framework for the Roadmap that values working lands and local communities. Focusing on working lands ensures:

- Effective locally- and regionally-adapted conservation delivery practices.
- Sustainable livelihoods for Indigenous/First Nations, ranchers, and rural communities.
- Sustainable populations for pollinators, birds, mammals, and a diversity of species.
- Healthy ecosystems, including stable soil, water resources, & carbon sequestration.
- Profitable herd production supported by healthy and diverse plant communities.
- Conservation through voluntary actions, agreements, easements, and leases.

Additionally, this a high-level goal with metrics to measure collective progress, so while some are provided as examples, **not all prevention, mitigation, enhancement, and other conservation delivery strategies for grasslands are listed here**. More specific priorities and actions can be found in the Strategy Areas and Actions in the next section.

MAP METHODS WITH HIGH-LEVEL VALUES FOR IMPROVE, RESTORE, & KEEP IN-TACT

The Grasslands Risk Map (below) was developed using a combination of cropland conversion and woody encroachment data, recognizing that all acres are not equal and that prioritization on the landscape will need to happen. Plowed areas were defined using 2019 Plowprint data (WWF; www.plowprint.com), and conversion risk (areas at risk of cropland conversion) was derived from Olimb and Robinson (2019). Encroached areas (>5% woody cover) and encroachment transition areas were defined by the Rangeland Analysis Platform (2021, www.rangelands.app). The acreage estimates derived from these methods were used to set the current state of grasslands in the biome.



> ***Note**: Canada and US data current to 2019 for cropland conversion and 2020 for woody encroachment; Mexico data is in-progress with an anticipated completion date in spring 2022.*
>
> *Acreage estimates and targets will be updated as new numbers become available]*

Map Citation

Morford et al. 2021. Biome-scale woody encroachment threatens conservation potential and sustainability of U.S. rangelands. doi: https://doi.org/10.1101/2021.04.02.438282

Olimb, S., Robinson, B. 2019. Grass to grain: Probabilistic modeling of agricultural conversion in the North American Great Plains. Ecological Indicators 102:237-245.

METRICS TO MEASURE PROGRESS

- **Improve:** Ensure or increase ecological function and reduce the risk of conversion across 104 million of the 130 million acres (21% of Central Grasslands) at risk of conversion or encroachment of woody or other invasive species. [***Note**:* The yellow ("at risk") on the map

indicates intact grassland as of 2020 at high risk of conversion to cropland or woody plant encroachment].

- At current rates, 2 million acres/year of Grasslands are being lost to conversion. Beginning in 2023, reduce the rate of conversion by 75-90% annually from the previous year. This annual reduction will lead to nearly no new conversion by 2032, by providing ranchers, landowners, and public land managers the support and resources they need to maintain profitable grass-based economies through more sustainable grazing management, prescribed fire, and invasive species management. Also, through voluntary protection instruments (perpetual easements, short and long-term leases, voluntary programs, etc.).
- Grassland losses to woody encroachment now occur at rates similar to agricultural conversion. Halt major economic losses for grass-based economies by preventing woody encroachment. The *Early Detection, Rapid Response* approach in the U.S. can help prevent dispersing seeds and recruitment of young woody plants at an average of 2 million acres/year for the next decade**, totaling 20 million acres by 2032**.

- **Restore:** Through active restoration, grassland cover is increased across the 395 million acres (63% of Central Grasslands) of already converted or encroached land to anchor, grow, and connect intact grasslands, mitigate impacts to wildlife, and better support grass-based economies. [***Note****: The purple ("converted/encroached") on the map indicates* historic grassland converted to cropland or encroached by woody plants (with >5% cover)].
  - By 2032, restore 30% (7.5 million acres) of the 25 million acres of current cropland that has been converted on soils of low quality for crop production. These croplands have lower yields and require greater inputs and are more likely to be retained as grassland once restored, therefore are most suitable for restoration while still supporting crop production on highly productive soils.
  - By 2032 restore 50% (25 million acres) of the approximately 50 million acres of grassland that have been encroached (now >5% cover) by woody plants since 1990. Emphasizing low (< 5%) and moderate (< 15%) cover encroachment is most cost effective and impactful for preventing loss to grassland wildlife and grass-based economies. Nevertheless, targeting high cover encroachment (> 20%) is necessary to strategically expand intact grassland areas of high conservation value or when mitigating for critical habitat loss.
- **Keep Intact:** Preventing more loss of intact habitat is necessary for maintaining ecological function, protecting critical habitat, supporting grass-based economies, and anchoring restored and improved areas. Continue to conserve the remaining 98 million acres (16% of Central Grasslands) of core grassland. [***Note****: The green ("cores") on the map indicates* grassland as of 2020 at lower risk of conversion to cropland and least compromised by woody plant encroachment].
  - Prevent further agriculture conversion of intact grasslands with low cropland potential through voluntary protection instruments (such as the CRP grasslands program and

other perpetual easements, short and long-term leases, voluntary programs etc.) and improved/enhanced management (more sustainable grazing management, prescribed fire, invasive species management, etc.)

- Prevent further loss of intact grasslands to woody encroachment by using prevention methods to prevent dispersing seeds and recruitment of young woody plants in this 98 million acres of core as well to prevent compromising the grasslands protected from land use conversion.

TRACKING PROGRESS

Joint Ventures (JV8): Spearhead for grassland conservation delivery for the Roadmap, it is important that acreage metrics are directly informed by what JV's are preparing to deliver. The JV8 metrics committee is working on rolling up targets and ensuring harmonization of targets between JVs to provide the figures that would theoretically fill in the blanks. Additionally, a joint study is underway with ECCC, BCR, WWF, and JV8, which will answer questions on the habitat and bird population numbers at a broader scale.

Land Enhancement: Similarly, dozens of other organizations with the capacity to enhance land are working towards these major objectives with restoration, protection, and improvement/enhancement, such as nonprofits like World Wildlife Fund, National Wildlife Federation, Bird Conservancy of the Rockies, Pheasants Forever, Quail Forever, American Bird Conservancy, Ducks Unlimited, Audubon and *many* others (we cannot be comprehensive here but have provided some key partners as examples), as well as Federal Agencies such as the Working Lands for Wildlife Grasslands Framework from NRCS.

Quality Biodiverse Plant Communities: Recognizing that not all acres are the same these efforts should be cross walked with sensing data regarding structure and richness of grasslands plant communities: do these acres have some of the short grass to medium grass to tall grass? What is the heterogeneity of the landscape?

Scorecard Report: As described earlier in the Scorecard, **all specific conservation delivery and mitigation contributions will be reported and compiled annually through the various tools to understand collective progress.** If the sum of annual acreage reports is below the estimates in these metrics, the collaboration of the Roadmap will know that additional actions and support will be needed to meet the collective goals.

Appendix C: Explanation and Metrics for Goal 3

Important Note: *The Scorecard goals, corresponding metrics, and approaches to collecting data on these metrics are in different phases of development for each goal. What is described here is an explanation of where this goal is at in its current iteration as it's being developed by a task force.*

GOAL 3: SPECIES

By 2032, wildlife populations will remain stable if common, become stabilized if declining, and have population trends reversed and recovering if in steep decline, understood through a chosen suite of insects, birds, herpetofauna, and mammals.

The species list is established to catalyze collaboration by:

- Aligning with other major efforts (R2R, BCC, JV, SGCN)
- Creating urgency through at-risk species
- Keeping common species common
- Engaging Geographic Representation
- Providing Habitat/Eco-tonal Diversity
- Diversifying enough for a broad understanding of how efforts are adding up without getting mired in detail

INSECTS

Challenge and Purpose

More than 40% of insect species are declining, and one third are endangered. The rate of extinction is eight times faster than that of mammals, birds, and reptiles. The total mass of insects is falling by 2.5% a year, according to the best data available, suggesting they could vanish within a century. The Roadmap seeks to develop a list of insect species that will catalyze collaboration amongst scientists, ranchers/producers, and all sectors involved in the effort. Much like the other Roadmap goals, relying on and/or expanding monitoring of the following species will provide diverse angles from which to understand the challenge, progress being made on-the-ground, and/or gaps that need to be met with additional resources, education, and programs.

Metrics and Species to Measure Progress

1. **Monarch Butterfly**
    - ***Goal:*** Distribution returns to pre-19xx levels, and population health is stabilized with at least adequate habitat to maintain that population preserved in perpetuity throughout its migratory range. MJV IMMP https://monarchjointventure.org/mjvprograms/science/immp

- ***Monitoring:*** Measurement of progress towards goal over 3-year averages from 2022 - 2025, 2025-2027, 2028-2031… 100s of sites across the U.S. are already being monitored for monarch butterflies.
- ***Benefits:*** It's currently a well-funded effort and a lot of thought and effort went toward developing stratified random sampling design.
- ***Gaps:*** Late season monarchs are likely impacted by Great Plains management, but the population is highly driven by factors outside of the Great Plains and early season monarch data are likely not as useful for understanding the impact of changes in Great Plains grasslands management.
- ***Other Opportunities:*** If you could convince folks to monitor other butterflies (or other insects) at the same sites, that might yield very useful data for a Grasslands Roadmap. It takes longer to get to the sites than it does to do the monarch monitoring.

2. **Bumble Bees**
    - ***Goal:*** Population decline is stopped by 2025 (sooner?), with population increases documented and observed year-over-year from 2028-2031.
    - ***Monitoring*:** Bumble Bee Atlas (BBA) program is getting into place to support monitoring from KS to ND (e.g. see https://www.nebraskabumblebeeatlas.org/ or https://www.mobumblebeeatlas.org/).
    - ***Benefits:*** Bumble bees in general are good genera to track, especially with the BBA efforts underway; BBA tracks the habitat type, landscape, flowers in landscape, and the bumble bee data collection is stratified across landscape (i.e. volunteers adopt grid cells spread across the region to avoid problems of oversampling in urban areas); data collection is not lethal.
3. **Dung beetles**
    - ***Goal:*** Dung Beetles, which indicate healthy grasslands and sustainable rangeland practices, are stabilized by 2025.
    - ***Benefits:*** Dung Beetle populations demonstrates impacts by ivermectins, and also show the impacts of different grazing management practices.
    - ***Gaps:*** Plant diversity may influence dung beetle communities (e.g. pivot corners planted to prairie increase dung beetle activity in adjacent fields (after cattle feed on corn stub))
4. **Common wood nymph**
    - ***Benefits:*** Has a very broad range and is impacted by grazing, probably impacted by fire … It also nectars, so needs flowers … this species is likely quite palatable to grassland birds compared to other butterfly species, and therefore potentially may be one indicator of "bird food."
5. **Regal Fritillary** (as an example of regional specificity and health)
    - ***Goal:*** Populations are stabilized and increasing year-over-year by 2025. en.wikipedia.org/wiki/Regal_fritillary#/media/File:Speyeria_idalia_range_map.JPG

- ***Monitoring:*** NE Game and Parks annual surveys with volunteers and staff; ND past work that NRCS funded with USFWS. Several efforts to track them already.
- ***Benefits:*** Good indicator of grassland management and broad range across the Great Plains; Non-migratory, less variable year to year and more dependent on-site management
- ***Gaps:*** Changes you see in a population will be dependent on weather and predator/prey, but also much more impacted by management compared to other species that move around a lot (e.g. monarch, painted ladies, etc.)

Considerations

- One thing that might be missing in the insects list is the relationship between wetlands/aquatic habitats and water quality and insect abundance; opportunity for crossover with water metrics.
- Better understand migratory and grassland bird diets and include insects directly related to diet

Resources: Statewide pollinator monitoring efforts

- ND: NDSU county surveys: Tori Hovick, Chyna Pei (bees), Cameron Duquette (butterflies), sweep netting for bees, e.g. Clint Otto and USGS bee survey work on Farm Bill conservation lands
- NE: UNebraska scientists have gone back to look at historic bumble bee surveys and the challenges with changes in survey methods over the years; Butterfly pollard walks in eastern NE for 20+ years … this model Led by Ted Burke could be a model to expand.

BIRDS

Challenge and Purpose

As reported in the 3 billion birds study, birds are declining at alarming rates and the guild of Grasslands Species is faring worse than most. The Roadmap seeks to develop a list of bird species that will catalyze collaboration amongst scientists, ranchers/producers, and all sectors involved in the effort. Much like the other Roadmap goals, relying on and/or expanding monitoring of the following species will provide diverse angles from which to understand the challenge, progress being made on-the-ground, and/or gaps that need to be met with additional resources, education, and programs.

Objective

Collaborate as a community to affirm an overarching goal for grassland birds: In the next 20 years, 25+ representative species will be kept stable if common, stabilized if declining, and/or reversing the trend and recovering the populations if in steep decline, understood through a dashboard of existing tools.

This is not a prioritization list, but it affirms 25+ species that can catalyze collaboration and track Roadmap progress across the biome. Keeping in mind that:

- The urgency to stop species declines and avoid threatened or endangered listing, or worst of all, extinction, outweighs and supersedes the need to define the perfect model just to get started: we can and will learn more, but we know enough to continue, hypothesize, and try things out
- The Roadmap develops a biome vision and biome goals, but interventions are designed and happen at the regional and local levels, potentially including (but not limited to) planting practices, rangeland practice, and locally focused social science to help know how those interventions will be implemented
- Species not on the list will not get dropped from priorities and will not lose resources, as the list is meant to catalyze collaboration and track progress not determine priorities
- The intended bi-annual scorecard report will provide updates regarding tools available for each species, what data are available, and ideally help define why species are in decline

Development of the Species List

Designing a bird species list that will catalyze collaboration and engage the diverse efforts, science, monitoring, and conservation programs already happening across the Central Grasslands biome is no straightforward or simple task. To do so, the following process was implemented:

1. A small task force started with species already identified as at-risk by cross walking the Road to Recovery list with the lists of Birds of Conservation Concern and the Eight Joint Ventures list of priority species. Beginning with existing lists of at-risk species motivates a level of urgency.
2. The at-risk list created a solid foundation, but it lacked enough geographic representation to span the entirety of the Biome. Additional indicator and geographically important species were added, which also elevated the need of representing common, less at-risk species.
3. Similarly, the additions of the initial geographic representative species did not provide adequate representation of habitat diversity and the list was expanded a bit more.
4. Furthermore, there was a need identified to ensure the overall species list provided diversity in use of the biome including breeding, wintering grounds, and migration.
5. The Task Force then hosted a two-day forum with participants from every U.S. Central Grasslands State, Canada, and Mexico. The first day was spent reviewing and discussing the list. The second day reviewed existing tools and monitoring resources, and how those tools might be further integrated to monitor species on the new list.
6. The workshop resulted in adding five more species to the list to increase geographic and habitat diversity, and to highlight significantly important regional and cultural species.
7. While longer than expected, the new draft of the bird list/matrix should serve as a tool to track collective progress and catalyze collaboration.
8. A second sheet was added to the matrix document, not as decision-making criteria, but to understand additional information regarding species distribution, historical breeding bird

survey, and availability of full annual life cycle research underway to address known conservation needs in various parts of a species' range.

9. The February 2022 review process seeks to solidify the list and build on the high-level of confidence participants reported in the list at the end of the October 2021 workshop.

Download the refined bird list/matrix here: https://www.grasslandsroadmap.org/bird-species-listmatrix

Metrics to Measure Progress

- Work is underway to integrate population trends, spatial prioritization, and set targets to improve our collaborative work (e.g., use of BBS, IMBCR, eBird, etc.)
  - ***Shovel-ready:*** Barry Robinson, JV8, and CWS … extending density models
- Continued regional work by JVs (which includes acreage in the U.S., Mexico, and Canada), to identify habitat acreage targets that are linked to population objectives so we can better target where and how much habitat is needed on the landscape
- Effectiveness monitoring and adaptive feedback will be essential to the success off the metrics especially as they relate to best management practices
  - Population monitoring and use of various bird models, including Conservation outcome monitoring, NRCS Monitoring Work, and/or FWS.
- Leveraging IMBCR to work on open count data

Considerations

- Further code the list for social science decisions: game bird, landowner, tribal, Mexico
- Consider grouping species on the current list by cross walking threats and habitat needs
- Continue to expand the knowledge base about one another's work and great initiatives already underway across the biome
- Further integrate social scientists and land managers applying research on the ground to strengthen the implementation of this work

HERPTEFAUNA

This work is yet to be completed. Some starting points for those that take it on:

- ***American Fishery work:*** lots of legwork that could be integrated
- https://www.fishhabitat.org/files/uploads/Great%2BPlains%2BFHP%2BStrategy%2BSept%2B2020.pdf?msclkid=99a69165b51911ecbb69107a59a4bb1e

MAMMALS

A team has not yet solidified to replicate objectives for Mammals but will be added as soon as that work is complete. To potentially include prairie dogs, grazers, ferrets, etc.

Appendix D: Explanation and Metrics for Goal 4

Important Note: *The Scorecard goals, corresponding metrics, and approaches to collecting data on these metrics are in different phases of development for each goal. What is described here is an explanation of where this goal is at in its current iteration as it's being developed by a task force.*

GOAL 4: WATER

By 2032, extractions from groundwater and surface water sources will be reduced as necessary to sustain dynamically stable groundwater levels, baseflows, and lake levels.

METRICS TO MEASURE PROGRESS

Groundwater levels remain stable or increase over time, fluctuating within natural ranges of interannual variation. (Key variables: water table elevation or potentiometric surface, averaged over monthly or annual timescales)

- Water levels within ponds, lakes, or wetlands remain stable or increase over time, fluctuating within natural ranges of interannual variation (Key variables: surface water elevation, averaged over monthly or annual timescales)
- "Baseflow" (groundwater discharge) rates within rivers and streams remain stable or increase over time, fluctuating within natural ranges of interannual variation (Key variables: baseflow rates, averaged over monthly or annual timescales)

JUSTIFICATION

Maintaining dynamically stable or increasing water supplies is crucial to the long-term health and sustainability of both human communities and natural ecosystems across the Central Grasslands. This goal focuses on the stability of groundwater resources, which are the primary water sources supporting human water needs in many Great Plains states and provinces. Groundwater is also a critically important source of water for river, wetland, lake, and terrestrial ecosystems, helping to maintain water levels, soil moisture, temperature, oxygen content, and unique chemistry required by plants and animals. For example, shallow groundwater tables maintain water levels in wetland and prairie pothole ponds, and groundwater discharges into streams (known as 'baseflow') commonly supply or supplement summer river flows with cool, oxygenated water and creates focal areas of groundwater discharge that provide important localized habitats crucial to the survival of certain species or aquatic food webs in warm summer rivers.

KEY DISCUSSION ISSUE

The Central Grasslands region is already experiencing a trend toward a drier south and a wetter north due to climate change. These trends are expected to become more pronounced by mid-century. How should this goal address hydrologic changes driven by climate change?

Appendix E: Explanation and Metrics for Goal 5

Important Note: *The Scorecard goals, corresponding metrics, and approaches to collecting data on these metrics are in different phases of development for each goal. What is described here is an explanation of where this goal is at in its current iteration as it's being developed by a task force.*

Additional Note: *This was integrated with an earlier goal that just looked at carbon sequestration, but it was further clarified that goal related directly to this goal on soil and should be integrated.*

GOAL 5: SOIL

By 2032, comprehensive soil health will be improved to increase drought resilience, availability of livestock forage and wildlife habitat, and net carbon sequestration.

METRICS TO MEASURE PROGRESS

- Rates of carbon sequestration are at least maintained at current levels in the Central Grasslands, with the goal of a 30% increase of sequestration by 2032.
- By 2025, a coordinated, collaborative program of soil health outreach and monitoring will be expanded throughout the Central Plains Grasslands. Two types of complementary metrics will be monitored, including: (1) several direct measures of targeted outcomes that result from improved soil health that are easily sampled, visually-based, and inexpensive, to be conducted by landowners and rangeland managers (including % bare ground, % non-invasive vegetative plant cover, soil bulk density and/or infiltration rate); and (2) NGOs, soil governmental agencies, and/or university staff will conduct complementary laboratory analyses of soil organic carbon and at least one measure of soil biological health, such as active carbon or microbial respiration.
- By 2025, remnants of undisturbed, intact grassland soils will be identified (e.g. preserves, cemeteries, old fence rows) and protected within each sub-region of the CPG to serve as soil health reference sites. These remnant sites are not intended as static endpoints to strive for in management or restoration, but rather will provide: (1) insights into the natural suite of local biophysical processes that are critical to a self-sustaining, healthy soil and grassland; (2) a diagnostic tool for evaluating specific soil properties which may need improvement; (3) a reservoir source of soil microbes and seedbanks for restoration of degraded grasslands; and (4) a valuable education tool to demonstrate what is possible to achieve within each region. Inclusion of data from these remnants will be a critical component of the data repository.
- By 2025, soil health data, both current and historic, collected from throughout the CPG will be integrated into a newly-created, web-based, and publicly available data repository. This repository, modeled after the successes of the USGS's powerful national water quality data website, will be a critical tool for monitoring changes in soil health, improving local and

regional land management, providing a framework for carbon investments, and as a ground-truth verification mechanism for increasing remote-sensing as a tool for monitoring soil health at the regional scale. First steps will need to identify the appropriate organization/agency for data management, address issues of data ownership and website maintenance, and get consensus on acceptable protocols for data collection and submission.

- By 2030, gaps between current soil health condition and that of the nearest reference remnant will be used to define goals and appropriate soil management or restoration strategies, where needed. Soil health revitalization through regenerative agriculture practices or restoration on the most severely degraded lands using organic matter amendments will be underway on 5% of grasslands within each sub-region of the CPG. *(Maharjan, B. Acharya. 2020). Soil health gap: a concept to establish a benchmark for soil health management. Global Ecology & Conservation 23. E01116).*

Appendix F: Explanation and Metrics for Goal 6

Important Note: *The Scorecard goals, corresponding metrics, and approaches to collecting data on these metrics are in different phases of development for each goal. What is described here is an explanation of where this goal is at in its current iteration as it's being developed by a task force.*

GOAL 6: FOOD SUPPLY

Food companies, agribusinesses, and supply chain actors, immediately work to increase the positive impacts of agricultural production and stop grassland conversion.

METRICS TO MEASURE PROGRESS

- Relative to current trends, regenerative agriculture practices (on already converted land) increase on an average of __ acres with a total of __ acres by 2032.
- Throughout the Central Grasslands, reduce pesticide use by 50% year-over-year.
- Given that a million acres per year* [see citation in Goal 2] are being lost to conversion, support the Mitigation objective in Goal 2 to reduce native grassland conversion to crops to less than 100,000 acres/year by 2032.

APPROACH TO TRACK PROGRESS

Regenerative agricultural practices will likely be through voluntary reporting from partnering organizations (e.g., General Mills), while the Plowprint report will provide necessary information on conversion in the Biome. Determining pesticide use decrease will need to be further studied.

Appendix G: Explanation and Metrics for Goal 7

Important Note: *The Scorecard goals, corresponding metrics, and approaches to collecting data on these metrics are in different phases of development for each goal. What is described here is an explanation of where this goal is at in its current iteration as it's being developed by a task force.*

GOAL 7: LOW-IMPACT PRODUCTION

Transportation and energy industry companies immediately work to ensure intentional siting of energy, transportation, and other commercial or industry developments for all projects including wind, solar, oil, gas, coal, and transmission.

METRICS TO MEASURE PROGRESS

- New facilities are sited in existing rights-of-way
- New facilities and expansion of current facilities avoid disturbing native habitats
- Solid mitigation work is conducted when projects have to go through existing grasslands
- Investment is being made in rural infrastructure that has dual purposes, such as power distribution
- Native, locally adapted grasses and forbs are used when restoring areas disturbed by development; soils are protected to promote better plant growth

APPROACH TO TRACK PROGRESS

Currently, these metrics will need to be self-reported by Roadmap partners and are designed to encourage participation and highlight high priority actions that will help achieve the Roadmap's vision and priorities.

Appendix H: Example Actions Contributed Towards Goals from Roadmap Partners

Note: A complete list of these will be available in the "output activities" document over time.

- McDonalds, Cargill, Walmart Foundation and World Wildlife Fund collaborate in a five-year project to support ranchers implementing regenerative grazing practices across 1 million acres in the Northern Great Plains
- NFWF, Sysco and Cargill partner to scale sustainable grazing practices across 1 million acres of grassland in the Southern Great Plains
- Cargill to advance regenerative agriculture practices across 10 million acres of North American farmland by 2030
- NRCS and Great Plains initiative: 10 million acres in five years
- JV8 Contributions by region
- The NGPJV is targeting 2M acres of grasslands conservation over the next 5 years in cooperation with regional conservation partners.
- General Mills commits to 1 million acres of Regenerative Agriculture having achieved __ acres
- The Weston Foundation in Canada has committed $25 million to Grasslands Conservation
- Audubon has committed to __ ranches in their Conservation Ranching Program
- Oaks and Prairies JV has committed to 300,000 acres in their GRIP Program
- "_____ commits to reducing pesticide use by __ % by 2030 so as to address declines in species
- WWF and Playa Lakes Commitments to Water
- The North Dakota Meadowlark Initiative will ensure diverse wildlife and habitat, and improve outcomes for ranching and livestock by reducing and offsetting industry impact (no net loss to habitat – offset residual impacts, increasing quality of life through ecosystem benefits, and advance grassland ecosystem recovery through education and advocacy.

  NRCS's RCPP in North Dakota will co-invest with partners to implement projects, (13 contributing partners, $7.1M) to convert 20,000 acres of marginal crop to native veg, enhance 50,000 acres of existing and reconstructed native grasslands, and restore and enhance 10,000 acres of wetlands within reconstructed grassland complexes

Appendix I: Acronym and Terminology Glossary

Below are both an acronym and terminology glossary. Definitions of these terms vary between individuals and across cultures, and it's critical that the Roadmap Community recognizes and works within this variability. The following definitions have emerged during the Roadmap process and are an attempt to be as inclusive and representative of the full Community as possible.

ACRONYM GLOSSARY

Note: *Does not include acronyms found only in the Appendices.*

GIS: Geographic Information System(s)

JV8: The Eight Migratory Bird Joint Ventures

LOI: Letter of Intent

MOU: Memorandum of Understanding

NAGCA: North American Grasslands Conservation Act

NGO: Non-Governmental Organization

RAWA: Recovering America's Wildlife Act

TERMINOLOGY GLOSSARY

Actions: To achieve each identified priority, more specific actions are suggested by the Roadmap Community. These actions might not be applicable in all contexts and regions, but when achieved will help meet the vision of the Roadmap. These actions are also what individuals, organizations, workgroups, and regional collaborations might further add to when action planning locally.

Conservation: *Definition Forthcoming*

Ejido: A land tenure system in Mexico in which the land is communally held and mainly used for agriculture including farming and ranching. Ejidos own over 50% of the land/natural resources in Mexico. Community members in ejidos are called "ejidatarios." Ejidatarios farm and own designated plots and collectively own and maintain communal holdings. Ejidos vary in size and number of ejidatarios.

Executive Summary: Serving as the introduction to the Roadmap, it contains the core elements of the Roadmap including the Vision, Principles for collaboration, Scorecard Goals, and Strategy Areas. This is the section most widely shared with leaders and delegates. Along with the scorecard and individual action plans, this is what people are asked to make commitments towards.

Grasslands Scorecard: The Scorecard provides a method to measure the collaborative progress and impact of the Roadmap and is organized around seven goals that are designed to catalyze collaboration.

Intact Grasslands: *Definition Forthcoming*

Large tracts of high-quality grasslands: *Definition Forthcoming*

Outreach and Engagement: Built into the collaborative process of the Roadmap is a fundamental need to elevate the voices of ranchers, landowners, producers, rural communities, and Indigenous/First Nations. To this end, many of these voices gave incredible talks at the 2020 Summit, and we continue to hold discussions with regional collaborators/networks.

Overarching Objectives: Found under each strategy area to further define & clarify that area of work.

Ploughed or Cultivated Land: *Definition Forthcoming*

Principles: During the Roadmap Summit process, many concepts arose that were not specific priorities or actions, but rather offered further guidance for collaboration. Likely the most important statements in the entire Roadmap, these are informed by the Roadmap Community and help focus the Roadmap's three Strategy Areas within the intended scale and context. The Roadmap recommends that any priority actions undertaken by the Community should follow the Principles.

Ranchers, Landowners, Land Stewards, Land Managers, Producers: There is no single term that encompasses everyone included in this sector, so these terms are used interchangeably throughout the document. What is intended is to elevate the voice of those working and living on the land, and/or those who are charged with managing and caring for the land.

Rangelands and Grasslands: Used interchangeably by different sectors and different groups of Delegates. The Roadmap predominantly uses grasslands, but rangelands is appropriate to indicate 'working lands' that emphasize grazing and livestock production. Other terms, such as prairies, which are distinct to geographic locations or distinct conditions (such as the Mississippi Valley), are only used in those specific contexts.

Regenerative Agriculture: Regenerative agriculture focuses on building soil for carbon sequestration to address climate change. This can result in better habitat for birds, or increased productivity for row crops which are not habitat. Regenerative agriculture is not an interchangeable term for conservation delivery but is an important piece of the puzzle: https://regenerationinternational.org/why-regenerative-agriculture/

Roadmap: Together during the Summit, we developed a draft, unified Roadmap that identified 12 key priority areas in which to focus Grasslands efforts, along with shared decision-making criteria and values. Overall, the Roadmap offers a "collaborative voice of reason and opportunity," guiding innovative and connected conservation, ensuring viable human communities and livelihoods, and achieving major benefits for birds, pollinators, and

mammals across the landscape of one of North America's most bio-geographically unique areas.

Structure for Collaboration: The Roadmap is built on the premise and best practices of Collective Impact. See that section of the Roadmap for several resources explaining this approach.

Summit (2020): We brought together a cross-section of leaders and experts (delegates) that live and work in the Central Grasslands from Canada to Mexico – including ranchers, landowners, and producers, Indigenous/First Nations, federal, state and provincial agencies, foundations, private sector/industry, and nongovernmental organizations including land trusts, tribal representatives, and academia.

Support and Contributions: Leaders and organizations sign on to letters of support to show alignment with the Roadmap's Vision, Principles, and three Strategy Areas. Regional collaborations and organizations can develop action plans that describe their specific output activities and contributions to the Goals and Priorities. The Scorecard is organized around a series of goals designed to help further catalyze collaboration; it is not used to evaluate individual commitments, but used to measure the progress and success of the collective.

Sustainable Grasslands: Shorthand for sustainable, resilient, and thriving wildlife, ecosystems, soil, and water even with variability in climate.

Sustainable Human Communities: Shorthand for sustainable, resilient, and thriving economies and communities within Indigenous/First Nations, rural towns, and other land-based communities.

Three Strategy Areas: Partnerships & Engagement, Policy & Funding, Research & Evaluation are an organizing tool for big buckets of work that need to be accomplished. Each Strategy Area includes overarching objectives, principles of practice, and priorities and output activities.

Twelve Collaborative Priorities: Four Priorities are used to break down each Strategy Area into concrete and specific recommendations. Each of the Priorities are at a high enough level to be regionally or locally adapted across the Central Grasslands. Some priorities stand-alone while others are interrelated within or across the Strategy Areas.

Working Lands: The Roadmap utilizes a framework that values working lands and local communities. Focusing on working lands ensures:

- Effective locally- and regionally-adapted conservation delivery practices.
- Sustainable livelihoods for Indigenous/First Nations, ranchers, and rural communities.
- Sustainable populations for pollinators, birds, mammals, and a diversity of species.
- Healthy ecosystems, including stable soil, water resources, & carbon sequestration.
- Profitable herd production supported by healthy and diverse plant communities.
- Conservation through voluntary actions, agreements, easements, and leases.

CONFERENCE OR TRAINING WORKSHOP SUMMARY

The Roadmap represents a diverse coalition striving to coordinate grassland conservation efforts. It involves the perspectives and priorities of eight sectors; private land owners/producers, Indigenous communities and First Nations, provincial and state agencies, industry, academia, non-governmental organizations, foundations, and federal governments. Spanning USA, Canada, and Mexico, it is scaled to face the region's conservation challenges. We are addressing declines in grassland condition, wildlife populations, water, and economic challenges of the region. Over two years, >500 people have contributed their perspectives on policy and funding needs, partnerships, communication, and science. We are identifying soil, range, economic, wildlife, and community metrics that will track and help ensure resilience for the future. Near the middle of this vast ecoregion, Kansas plays a crucial role for tall- and mixed-grass systems. The future of our native biodiversity depends upon reversing declines of threatened species and promoting healthy human and wildlife communities. While in some regions, local engagement has been strong, many key sectors in this process remain under-represented in Kansas. We urge the diverse participation of organizations represented at KNRC to contribute expertise, formalize commitments to conservation via this initiative, and advance the common goals of sustaining healthy grasslands for coming decades.

Appendix J. Additional Roadmap Structure Figures

These figures describe 1) the Theory of Change employed by the Roadmap, and 2) how the Collective Impact model was built for the Roadmap.

Figure 1. *Theory of Change*

The Five Conditions of Collective Impact	
Common Agenda	All participants have a shared vision for change including a common understanding of the problem and a joint approach to solving it through agreed upon actions.
Shared Measurement	Collecting data and measuring results consistently across all participants ensures efforts remain aligned and participants hold each other accountable.
Mutually Reinforcing Activities	Participant activities must be differentiated while still being coordinated through a mutually reinforcing plan of action.
Continuous Communication	Consistent and open communication is needed across the many players to build trust, assure mutual objectives, and create common motivation.
Backbone Support	Creating and managing collective impact requires a separate organization(s) with staff and a specific set of skills to serve as the backbone for the entire initiative and coordinate participating organizations and agencies.

Figure 2. *Roadmap's model of Collective Impact*

Appendix K: Letter of Support

Upon reviewing the Roadmap, we invite leaders, organizations and anyone working on the Central Grasslands to provide a letter of support for this effort. A template is provided here; simply copy and paste into a word document, make any necessary changes, and email us at info@grasslandsroadmap.org

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Organization: Organization Name
Lead contact: Leader of Organization or Main Liaison
Date: xx/xx/22
Re: Letter of Commitment to the Central Grasslands Roadmap

Dear Roadmap Steering Committee and Leaders,

As an organization [/individual/leader/rancher/Indigenous community/corporation] that works to steward and conserve a portion of the Central Grasslands biome, we are committed to the vision, priorities and guidance set forth in the Central Grasslands Roadmap as outlined in its Executive Summary. We are committed to the Roadmap collaboration to ensure that our way of life and one of the most important ecosystems on the planet, remains intact.

The Central Grasslands are needed to support pollination, prevent erosion, and provide habitat for wildlife. Healthy grasslands also filter sediment, nutrients, and bacteria that otherwise end up in waterways, threatening fish and drinking water. Most importantly, the Central Grasslands ability to sequester carbon and help stabilize the climate is extensive, all while simultaneously producing critical food supplies and serving as the economic backbone of rural communities.

Our fish and wildlife, water, climate, food supply, and way of life are dependent on the collective effort laid out in the Roadmap. By working together and committing to mutually beneficial actions we can conserve essential habitat for future generations with ranchers, producers, and Indigenous communities at the center of the solutions, and provide sustainable economic opportunities where those are needed most.

[optional step] ***Specifically, to help achieve the vision, we are focused on the following actions:***

- Improved management (with measured changes in soil carbon, water infiltration, plant and bird diversity and abundance) on 1 million acres in the Northern Great Plains by 2025 (with McDonald's and Walmart Foundation via WWF)
- Scale sustainable grazing practices across 1 million acres of grassland in the Southern Great Plains (with Sysco, via NFWF)
- Reseed 8,000 acres of marginal cropland back to native grassland in the Northern Great Plains (with Burger King via WWF)

Sincerely,

Appendix L: Citations and Credits

PEER REVIEWED RESEARCH

Appendix D

Dieter, C.A., Maupin, M.A., Caldwell, R.R., Harris, M.A., Ivahnenko, T.I., Lovelace, J.K., Barber, N.L., and Linsey, K.S., 2018, Estimated use of water in the United States in 2015: U.S. Geological Survey Circular 1441, 65 p., https://doi.org/10.3133/cir1441. [Supersedes USGS Open-File Report 2017–1131.]

Other

USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

Most of Dr. Rebecca Phillips' papers I referred to are online (e.g. doi:10.1016/j.rse.2007.02.027 (usda.gov), https://d1wqtxts1xzle7.cloudfront.net/46478216/Integration_of_geospatial_and_cattle_nut20160614-27449-18uqq3a-with-cover-page-v2.pdf?Expires=1646347572&Signature; Landscape estimation of canopy C:N ratios under variable drought stress in Northern Great Plains rangelands (wiley.com).

3) One of the studies Rebecca did for us evaluating the utility of measuring grassland structure heterogeneity. Here is one paper from that effort: Mixed-Grass Prairie Canopy Structure and Spectral Reflectance Vary with Topographic Position | SpringerLink. It was this study that I thought might be of utility in trying to find cost-effective, scalable monitoring of grassland management.

Resources? Including:https://www.facetsjournal.com/doi/10.1139/facets-2020-0005

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Appendix M: Overview of Past Actions

This is a running historical record of the planning, actions, and events that helped the Roadmap effort arrive at its current point. Each time an action or milestone is completed on the timelines above, it should be moved to this area for record of what has been accomplished to date. For additional visualization of the progress to date, see Roadmap Input and Process and Roadmap Priorities and Actions figures.

GETTING STARTED

2019

The Bird Conservancy of the Rockies elects to lead a Central Grasslands conservation initiative. They begin by:

- Finding sponsors
- Sharing information about the plans at the America's Grasslands Conference in Bismarck, ND
- Inviting people to join a leadership team
- Hiring a coordinator

PHASE 1 ~ THE SUMMIT

Spring 2020

Leadership team prepares to gather eight stakeholder groups together during the Summit by:

- Inviting stakeholders, speakers, and representative delegates in addition to:
- Creating a website
- Surveying Summit delegates to determine support for the Roadmap vision and the decision-making criteria and to create an initial set of priorities for collaboration to conserve the Central Grasslands (115 people completed the survey)
- Securing speakers and workgroup facilitators

Summer 2020

The Roadmap Summit is moved to a virtual gathering due to COVID:

- More than 30 Grasslands Summit speakers and more than 250 people and Delegates contribute to a first draft Roadmap with 21 priorities by
- Meeting virtually to listen to presentations and meeting in 22 work groups to discuss and refine Roadmap priorities

PHASE 2 ~ REFINING & FOCUSING

August 2020

Representative leadership team revises the first draft Roadmap by:

- Grouping and sequencing the 21 priorities based on a timeframe for implementing them, and narrowing down to 12 priorities with key actions
- Making small adjustments to the language of the priorities to ensure consistency (identifying and eliminating wording that is strategy or action rather than a priority)
- Refining the guidance, principles of practice and overview sections of the Roadmap
- Creating draft measurable goals to reach by 2030

Fall 2020

- The new draft of the Roadmap is distributed to Delegates, Leaders and Stakeholders
- A second survey is open to provide comment and seek overall consensus with clarified explanation of implementation.
- The leadership team creates working groups and/or communication channels to launch implementation and action planning:
    - Designing a communication strategy and structuring ongoing collaboration
    - Exploring alignment with other collaborative efforts (e.g., JV8, Industry efforts, several existing efforts and groups in Canada, Bringing Back 3 Billion Birds, the Grasslands Declaration, and the Buffalo Nations Grasslands Alliance)
    - Catalyze other work groups to help with either scaling or drafting action plans for priorities and solutions

PHASE 3 ~ CONTINUED FEEDBACK, ACTION PLANNING, AND IMPLEMENTATION

Winter 2020-2021

- Communication team sends out updated Long Form of Roadmap
- Leadership team continues to synthesize feedback on the Roadmap heard from delegates, leaders, workgroups, and outreach conversations, and refines as needed
- Workgroups are established to focus on a single issue, action, or strategy until it is achieved (such as the Green Policy Framework or the Metrics/Measurable Goals) or be an on-going initiative such as a team working on research needs or internal communication.
- Workgroups established include:
    - Multiple connections to landowner collaboratives through a landowner/steward/rancher leadership advisory team

- Indigenous/First Nations Workgroup
- Canada Workgroup
- Mexico Workgroup
- Metrics and GIS Layers Workgroup
- Funders Workgroup
- Private Sector and Industry Workgroup
- State Workshop led by State Advisory Team
- Federal Partners
- Farm Bill Exploration
- Communications and Messaging Team
- Planning Committee
- Leadership Advisors (Individual and small-group discussions)
- Executive Committee

Spring 2021 (Phase 3 Continued)

April 21st: Communications Workgroup ~ Discuss RAWA Framework … William to present outline of plan/ "one-pager concept" with guidance from Sean Saville. + Go over upcoming action emails & late May (summer) newsletter.

April 21st: Metrics Workgroup ~ Finalize Scorecard Draft and confirm GIS/Map Layers and Strategy … see drafted concept document and draft agenda.

April 22nd: Missouri River Basin Group ~ Continue to Pilot Rancher/Landowner Collaborative Feedback during virtual meeting discussion and through a follow-up survey sent (Matt and Tammy to deliver meeting, still need to identify survey analysis strategy).

April 27th: Commitments/Scorecard Drafting ~ Work with core WWF team to advance draft and prepare for other incoming feedback.

April 28th: Rancher/Landowner Workgroup ~ Review outcomes/experience of Missouri River session with Ranchers/Landowners Advisory group, discuss process for implementation including outlining future feedback meetings and use of the follow-up survey.

April 30th: Draft Commitments/Scorecard Ready ~ Incorporated feedback from core WWF team and Metrics workgroup, next draft prepared to share with Planning Committee (Appendix B).

May 5th: Canada Workgroup Focus Clarified ~ Christian continues to catalyze Canada Workgroup, defining focus areas and consistent meetings. Canada Workgroup has hub for diverse Grasslands efforts in Canada.

May 6th: Planning Committee ~ Additional scenario planning regarding summit (determining goals for a Summit, whether in-person or virtual). Go over this timeline and discuss needs to achieve sprint goals. Update Scorecard Concept with committee.

May 11th: Industry and Private Sector Workgroup Follow-up ~ Reconvene group from 4/6 to discuss draft Commitment/Scorecard Concept … how might you commit? What are next steps/needs now that KPIs are identified?

May 17th (week of): Tri-Lateral Agreement or LOI ~ Leadership team/ad-hoc work group including Tammy, Arvind, Greg, Christian, Charles Francis and Ryan of Canada as well as Humberto from MX and Joelle, Brian, Ken and Eric of USFWS. Team will have a call before the tri-lateral and consider the 2016 AFWA State Resolution as baseline. Arvind has draft outline.

May 19th: Communications Workgroup ~ Work with Communications Team to adapt and distribute any action items or communication pieces, encouraging folks to share with their organization's communications person, + Go over upcoming May (summer) newsletter.

May 20th: Mexico Workgroup Focus Clarified ~ Determine focus area for Mexico Workgroup, Arvind/Irene/David/Humberto on lead.

May 25th: State Advisory Team ~ Met to discuss next steps after state workshop and different ways to follow-up, including:

- Provide tangible opportunity for participants to contribute to the gap analysis
- Ensure that language in the Roadmap affirms/elevates the need for monitoring AND encourages making science useful such as accompanying decision-support tools
- On a leadership level, continue to pursue linkages with RAWA, and provide examples of creative opportunities to handle Federal funding, such as J.V.s and others managing/matching/partnering on projects.
- Continue to pursue connection points with J.V. to manage regional mapping effort.

May 26th: Policy Workgroup Stood Up ~ Using the Draft, *Towards a Sustainable Future for the Great Plains* form workgroup to address and build on policy priorities.

May 27th: Summer Newsletter ~ Communication material shared with Roadmap Community with articles and updates from key partners, and reminders and announcements about the Summit and other opportunities for involvement.

June 2nd: Martha and Aviva re-working/updating Policy document

June 3rd: Planning Committee Meeting ~ Barry's presentation on JV Data Approach + continued Summit discussion, Scorecard Review, and Policy and Communication Updates.

- Actions following up from Policy Workgroup are shared and requested

June: Martha follows up with Industry/Private Sector Workgroup on Draft Commitments, (currently outlined and expanding in the Draft Commitments/Scorecard (Appendix B of this doc)).

June: Indigenous/First Nations Workgroup is putting together a questionnaire, identifying folks to send it to, and then identifying folks who will follow up and help shepherd https://drive.google.com/file/d/1BU7hxr1z0pTnGWgLofLNH1iGNHRlfZka/view?usp=sharing

June 29th: Metrics Workgroup Provides final Red Flag Review from their perspective of the Scorecard/Metrics document as it is now

June: Policy Workgroup connecting with Deb Haaland and other influencers to move policy framework forward … might be a conservation-based organization movement, but might also fit under Roadmap umbrella (at least it's heavily informed by the Roadmap principles)

PHASE 4 ~ SIMULTANEOUS FEEDBACK AND IMPLEMENTATION

Continued Roadmap implementation, developing leaders, refining key documents, and summit planning + leaders empowered to chair teams to move work forward such as:

Ranchers: Tammy to coordinate with Bill Milton, Steve Jester and others to lead Landowner-Rancher-Producer Advisory Group and relevant feedback conversations and survey

Indigenous/First Nations: Aimee and Monica help catalyze, additionally making connections to Mexico via Diana Crider, Libby helping in Northern Plains, and Diandra(?) in Canada

Canada: Christian to coordinate with Barry to lead Canada Workgroup

Mexico: Arvind to coordinate with Irene, David, and Humberto to lead Mexico Workgroup

Regions: Graeme to continue to lead and make connections to regional work via JVs

States (w/ NRCS): *Tammy/Tim/Jim, c*ontinued communication to 4/8/21 attendees, in addition to the NRCS collaborative meeting on 8/26 and launch of JV8 Strategy

Industry/Private Sector*:* Martha leading workgroup, specifically around commitments

U.S. Federal: Greg Butcher, Joelle, and Brian Smith continue to connect regarding MOU, Trilateral and other mechanisms (work with Seth as well)

Funding: Seth spearheads private funding and foundation conversations, seeking commitments to on-going Roadmap collaborations and priorities

Communications: William to lead Communications Team regarding RAWA/Farm Bill/NGCA key communications and action alerts.

Metrics: Develop shared, measurable goals and related map layers at the biome and now regional level. Utilize OPJV and NGPJV to demonstrate a regional mapping prototype

Policy: Under Alison and Tammy's catalyzing, workgroup drafts, *Towards a Sustainable Future for the Great Plains* framework to address/build priorities within suite of legislative priorities/initiatives

July 1st: Discussion and Feedback to Seth from Federal Partners on MOU: along with continued discussion with Joelle and connections to Federal Council agreements/LOIs. [Then used as a model for CA and MX?]

Related/Continued: Steward and Move Tri-Lateral Agreement/LOI Forward ~ Led by Arvind, reconnect with ad-hoc work group including Greg, Christian, Charles Francis and Ryan of Canada as well as Humberto from MX and Joelle, Brian, Ken and Eric of USFWS. Team will have a call to discuss outcome of the tri-lateral and consider the 2016 AFWA State Resolution as baseline(?)

July 1st: Planning Committee Meeting ~ Diana's presentation on Indigenous initiatives across U.S./Mexico Border + continued Summit discussion, along with key Policy and Communication Committee updates and actions.

July 12th: Discussion and Feedback on Federal MOU so it can be considered by leadership

July 12th: Communication Team meets to discuss infographic regarding the importance of Grasslands; elevate others' work; share action emails and quarterly newsletter to keep network informed

July: JV8 Strategy document is launched (Graeme and JV8 Coordinators)

Purpose: Demonstrated a biome-scale collaboration of conservation delivery of the Roadmap

July 15th: Policy Committee met to review revised Policy document and discuss ways to disseminate: Towards a Sustainable Future for the Great Plains

Purpose: To inform such initiatives as America the Beautiful, RAWA, Farm Bill, and NGCA

August 24th: Publish Summer Newsletter with Summit updates, partner initiatives and calls to action

August 24th: Industry/Private Sector Workgroup meets to discuss Draft Commitments

Purpose: Continued feedback and refinement of the Scorecard/Commitments

Next Step: Plan caucus with larger group to communicate and discuss priorities in 2022?

August 26th: Multi-state NRCS Partner meeting regarding the summit, JVs and Great Plains framework

Purpose: sharing progress, discussing better ways to integrate, and confirming metrics

August 31st: Metrics Workgroup Meeting (on-going refinement of Scorecard/Commitments/Metrics)

Purposes: 1. Discuss and review progress and input from Industry/Private Sector, 2. Discuss mapping boundaries, and 3. Review progress of JV Regional Mapping, North and South Examples

September 2nd: Planning Committee Meeting (monthly meeting to move the Roadmap forward)

Purpose: Review this timeline, JV8 progress, communication efforts and Scorecard

September 8th: Funders meet to coordinate and discuss mobilizing grasslands priorities

Late September: Meeting to go over survey results with landowner advisory council on survey results

September 15th: Share results of landowner survey and recommended actions to follow-up; this set of responses is a baseline for how the landowner voice can contribute to the Roadmap strategy

Purposes: 1. Continued Engagement with landowners/producers/ranchers to build network and increase trusted messenger approach and understanding, 2. have discussions when and where possible as opportunities arise with groups, and 3. continue to elevate local/community driven opportunities and identify what resources are needed for support

Fall(?): Policy Committee Reconvenes to review dissemination of *Towards a Sustainable Future*

Purpose: To inform such initiatives as America the Beautiful, RAWA, Farm Bill, and NGCA

Fall: Indigenous/First Nations Workgroup putting together a questionnaire and outreach list,

Purpose: Broaden Indigenous/First Nations participation in the Roadmap and its impact

Fall: Canada Workgroup monthly meeting first Wednesday of the month ; looking at policy?

Purpose: Continue connection points and networking for Canadian-based efforts in Grasslands, in particular advancing two contract ideas this fall: 1) Communication products recognizing importance of Grasslands and 2) Solidifying Canadian First Nations participation

October 27th and 28th: Science Workshop to focus on BCC list from USFWS (solid list for grassland birds), Longspurs, SPPI, BAIS, SEOW, Bobolink, Henslow's Sparrow, MOUP, as well as a continental focus, and BCR birds of conservation concern … What objectives can we meet in 10 years, 30 years from population trends and birds saved

November 3rd – Policy Committee: Document influencing and informing policy, of its own and others

Winter 2021: MOU being taken "up" to leadership levels

Purpose: Move towards official signing/commitment by spring 2022 and prepare for the LOI?

December: Mexico Group/Forum

Winter 2022: Launch Survey in Mexico and Canada to better understand Rancher's perspective

Winter 2022: Determine better translation path and process for this document

December 13th- Meeting with Landowner at D.C. level … we hear positive things about cattle within the biome and Ngo reps locally, but not from the national level

December 2021: Several metrics workgroup and sub-goups meeting to shore up water, soil, human dimensions, finalize bird and pollinator list etc, and update maps

TIMELINE FOR PHASE 5 ~ PUBLISHING THE ROADMAP & PLANNING THE 2022 SUMMIT

January 7th - 14th: Planning Committee Red Flag Review of Feedback Process

January 15th -17th: Edits and updates to documents

January 18th - 27th: Translation of all relevant documents

February 1st: Launch Delegate and Leader online Feedback Process

March 1st: Close Feedback Process

March 1st - 15th: Summarize Feedback and Proposed Changes

March 15th - April 15th: Two-hour meetings in workgroups to address feedback and incorporate changes

Workgroups include: Indigenous/First Nations, Canada, Mexico, Ranchers/Producers and NGOs, Industry/Private Sector, Scientists (Human Dimensions, Ecology, and Biology), State and Federal agencies, Funders/Foundations, Metrics, Planning Committee, and Communication

May 5th – May 20th: Publish Roadmap and ask for letters of support to "sign on"

May 2022: Tri-national LOI ~ Letter signed, commitment at 'Secretary of' levels

+ Timing works for summit next spring to get commitment at secretary levels for MOU

May 22nd – May 26th: 2022 Roadmap Summit in Fort Collins Colorado

Monthly Meetings (w/ lead coordinators)

Planning Committee (Matt)

Communications (William)

Canada (Christian)

Indigenous/First Nations (Emily)

Mexico (Alejandro)

Forums in Planning

March: Canadian First Nations

Early April: U.S. and Mexico Indigenous/First Nations

Early April: Mexico

Thursdays in April: "Grasslands" with Denver Museum of Nature and Science

Late May 2022 ~ Summit 2022: Meet to refine, polish and solidify Roadmap priorities and governance

Celebrate: Highlight accomplishments so far

Commit: Using diverse mechanisms developed (Trilateral LOI, Federal Agency MOU, State (and Province?) Resolution, Funding Commitments, Pledges of support from leaders, and Conservation Commitments from Private Sector/Industry, NGOs and others, formally adopt Roadmap based on whatever mechanism is appropriate for each organization.

Plan: Revise and refine action plans of sectors and workgroups for the next set of Priorities