WOLF

LOCATION SHARING
FINDING COMMON GROUND

WESTERN LANDOWNERS ALLIANCE

Table of CONTENTS

Avery Shawler collars a wolf near Meeteetse, Wyoming in 2021 in collaboration with Wyoming Game and Fish Dept. and UC Berkeley. Photo: Will McDonald

How can collaboration on sharing wolf location information strengthen relationships and lessen conflict?

WOLF location information sharing between wildlife agencies and livestock producers has been a long-standing challenge across many western states. Producers often seek this information to better protect their livestock and livelihoods, but agencies face legal, technical, and biological constraints that limit how, when, and with whom such sensitive data can be shared. These tensions can hinder wolf conflict reduction efforts and jeopardize existing producer-agency relationships and projects, affecting trust and collaboration. As an alliance of landowners dedicated to sustaining whole and healthy lands across the American West, Western Landowners Alliance (WLA) seeks not only to ensure producers have access to the best available management tools to protect their livestock and livelihoods but also to foster stronger relationships between producers and agencies that are essential for long-term conflict reduction. To help address this widespread and persistent challenge, WLA hosted conversations with producers, agency staff, and other stakeholders from around the West. This document summarizes these discussions by describing technical limitations, defining challenges, identifying how information is shared across western states, and by offering practical recommendations to improve information sharing and communication in support of more effective conflict reduction

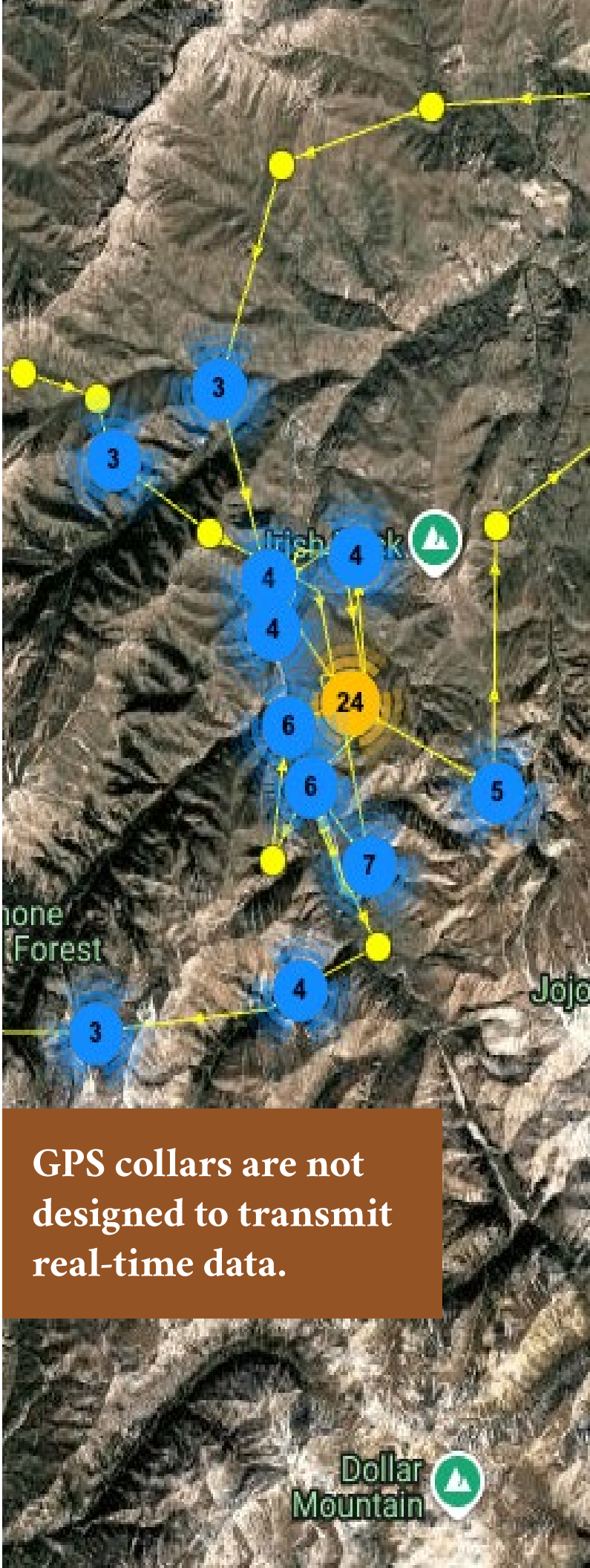
A sedated Mexican wolf lays on a table as staff conduct a health check. Photo: Mexican Wolf Interagency Field Team

Technical and logistical limitations of wolf collars

Much of the discussion around location-sharing has focused on GPS collar data for wolves—that is, the precise coordinates of wolf locations. This is distinct from broader wolf location information, which may include generalized data from GPS collars as well as other types of data. GPS collars are not designed to transmit real-time data. They are programmed to record and upload locations at intervals that balance upload frequency with collar battery life, resulting in delayed and sometimes infrequent updates. When data are uploaded, they are often GPS points that were collected several to many hours prior, so current wolf location information is not available. Increased frequency of uploads drastically reduces battery life, requiring wolves to be caught and re-collared more often – a time-consuming, expensive, dangerous and logistically difficult process. And still, real-time knowledge of wolf location would never be possible. In the time between

data capture and transmission, wolves can cover great distances, making the precise location data less useful. Further, transmission can be disrupted and delayed by weather, topography, or dense forest cover, and collars often fail due to technical issues or physical damage.

Some agencies monitor wolves using both GPS and VHF (Very High Frequency) collars. VHF collars emit radio signals or frequencies that require proximity to the collared animal to manually locate using radio telemetry receivers and antenna. They are cheaper, more durable, and typically have longer battery life than GPS collars. GPS collars also emit VHF signals yet can remotely transmit locations via satellites producing high-resolution data that significantly improves population modeling and understanding of wolf movements, territory shifts, and dispersal events—especially in response to harvest or conflict removals. Both GPS and VHF collars can provide mortality notifications. However, GPS collars make it easier to track dispersing wolves, while VHF-collared wolves often go undetected once they leave an actively monitored area unless picked up opportunistically or systematically during telemetry flights. Despite their limits, VHF collars remain useful for certain monitoring objectives due to their cost-effectiveness and battery life In some cases, wolf VHF collar frequencies and telemetry equipment have been shared with producers and range riders to reduce conflicts.



GPS collars are not designed to transmit real-time data.

Constraints on data sharing

Agencies may also have regulatory restrictions on sharing location information and the legal status of wolves varies from state to state. Agencies often limit access to wolf location data due to concerns that sharing it could set a precedent for broader public access, raising the risk that individuals might use the information to harm wolves. Further, some producers experienced members of the public using data to trespass with intentions of viewing wolves. Not publicly sharing data is also intended to protect landowners' private property rights. The context of wolf status in different states also adds a layer of complexity; where legal lethal options exist (e.g., lethal control, hunting), data may be increasingly likely to be misused, and some states are experiencing significant increases in illegal killing of wolves. Some states have statutory requirements that restrict sharing of wildlife location data to protect multiple species that can be hunted or trapped. Furthermore, in some areas, funding for collaring wolves may be pulled if wolf location sharing violates specific criteria. With no collaring, no information is available.

Budget constraints and staffing shortages also limit agencies' ability to collar wolves, troubleshoot communication systems, and provide consistent outreach to the many producers they serve. Additionally, the substantial time and money spent on wolf collaring can also divert resources from other agency goals related to wolf and other species management. However, it's important to recognize that producers, like agencies, operate under significant financial and resource constraints. Many are managing daily ranch operations, tending to livestock, and addressing threats from wolves - often without additional staff or funding.

Wolf location information in conflict reduction efforts

There are conflicting opinions regarding the usefulness of wolf location information for reducing wolf-livestock conflict. Because data is not transmitted in real time, the interpretation of data to discern general patterns, or information, can be shared with producers to deploy tools, change livestock management, etc. Many producers recognize that location information is just one tool—not a silver bullet—and that they shouldn't rely on it exclusively. Still, they find it valuable. Some report instances of moving their livestock away from an area after receiving location updates, while others have unknowingly moved livestock near active den sites, which may have been avoided with better communication from the agency. These examples underscore the situational value of sharing location information. Many producers consistently express frustration that timely wolf location information is not being shared — information seen as essential for more efficient and effective implementation of proactive conflict reduction measures. Lack of or limited data sharing erodes producers' trust in wildlife agencies and can also be seen as agency mistrust of producers, making it harder for producers to trust or build a working relationship with the agency. In some areas, this breakdown of trust has reached a point where agencies are no longer welcome on ranches, hindering other private land conservation efforts. In the absence of information from agencies, some producers are collecting and sharing their own on-the-ground

Many producers recognize that location information is just one tool—not a silver bullet—and that they shouldn't rely on it exclusively.

Jami Kalsta sets a game camera at the Kalsta Ranch in the Big Hole Valley in Montana. Photo: Zach Altman

A male wolf is seen after being tranquilized from a helicopter and fitted with a tracking collar in Colorado.
Photo: Colorado Parks and Wildlife

location information among producer networks to more effectively manage livestock in proximity to wolves. Using wolf location information to determine where to focus conflict reduction efforts also has important limitations. Because capturing and collaring wolves is dangerous, expensive, and logistically difficult, often only a small percentage of wolves are typically collared. In states with larger populations like Idaho and Montana, only 2–3% of known wolves are collared. Although some states with more recent wolf recovery efforts may have a high proportion of collared individuals, this percentage will inevitably decline as wolf populations continue to grow. Maintaining collars on wolves in conflict-prone areas is especially difficult, as these animals are often killed at higher rates than those outside such areas. Having only one or two collared individuals in a pack seldom captures the movements of the entire group - particularly in summer, when packs are less cohesive. As a result, collar data rarely provides a representative picture of wolf activity on the landscapes. This can not only lead to misalignment between GPS collar data and producers' on-the-ground observations but also create a false sense of security or cause deterrence measures to be focused on the wrong places. Additionally, wolf presence near livestock does not always signal imminent conflict; both biologists and producers have observed wolves in or near herds without incident. In some cases, producers or range riders with access to VHF frequencies have increased protections when a collared wolf with a history of conflict is nearby. However, depredations can still occur. For these reasons, many agencies and producers have emphasized that closely monitoring wolf sign (e.g., using camera traps) and livestock behavior on the ground often offers a more accurate and timely understanding of wolf activity than relying on collar data.

Agency wolf location information sharing efforts

Agencies have explored different location sharing approaches but often struggle to identify solutions that are both responsive to producers' needs and feasible within budget and regulatory constraints. Advances in collar technology can create expectations that can be challenging to consistently fulfill. For example, some agencies have reported that when only VHF collars were available, producers were mostly satisfied with weekly generalized location updates. However, as GPS collars have become more popular, requests for more frequent updates on location information have increased. In some cases, location sharing efforts—whether through automated systems or direct communication—have created an increased workload that agencies may be unable to meet. This often can lead to relationship breakdowns as demands increase, rather than improved trust. Producers report frustration when automated updates are infrequent or delayed, and some interpret those delays as a lack of transparency or even intentional withholding. In these cases, efforts to build trust can backfire, especially when communication systems are not consistently maintained.

A range rider in Arizona tracks collared Mexican wolves using telemetry equipment. Photo: High Country News

A yearling male wolf in Siskiyou County is released into the wild after being outfitted with a collar.
Photo: California Department of Fish and Wildlife

Sharing wolf location information as a catalyst for building trust

While many producers find wolf location information useful, both producers and agencies recognize that it creates value in relationship-building. Direct communication, especially from agency field staff, helps build trust by showing producers that agencies are paying attention and care about the impacts on their operations. Some agency efforts, such as automated mapping platforms or online alert systems, aim to improve transparency but can unintentionally reduce meaningful interaction. For example, public online maps have been seen by some producers as a positive step, but many emphasize that such tools should not replace proactive, personal outreach. Producers and agency staff consistently highlight how valuable regular communication between the two parties is, particularly when it includes wolf location updates. However, not all field staff have strong producer relationships, and limited agency capacity can make ongoing, direct communication challenging.

Wolf location sharing across western states

A state-by-state snapshot of wolf populations, collaring, mapping, and legal status, drawn from agency reports and management plans

	Arizona/New Mexico	California	Colorado	Idaho	Montana	Oregon	Washington	Wyoming
Wolf pop. estimate	162 in NM 124 in AZ 286 total	~50	15	~1,235	~1,091	204	230	330 total; 163 in Wolf Trophy Game Mgmt. Area (WTGMA)
% of wolves collared	39% (112 in both states)	26% (~13 wolves)	All reintro. wolves	~2% (typically <20 wolves)	~3% (24 wolves)	14% (28 wolves)	13% (29 wolves)	39% of wolves in WTGMA
Date updated	end of 2024	early 2025	end of 2024	May 2024	end of 2024	end of 2024	end of 2024	end of 2024
Collar type	mostly GPS	all GPS	all GPS	all GPS	mostly VHF	mostly GPS	mostly GPS	~⅔ VHF ~⅓ GPS
Map available	public online map	public online map	public online map	NA	NA	public online map	private online map	NA
Location info scale	3.14 miles² hexagons	4.6-mile diameter hexagons	watershed HUC (Hydrologic Unit Code) 10 level	NA	NA	pack area	Actual GPS coordinates	NA
Map update freq.	weekly	daily - every morning	monthly on the 4th Wednesday	NA	NA	annually, and as new packs are identified	every couple of days	NA
Agency	Arizona Game & Fish Dept. (AZGFD), New Mexico Dept. of Game & Fish (NMDGF), US Fish & Wildlife Service	California Dept. of Fish & Wildlife (CDFW), US Fish and Wildlife Service	Colorado Parks & Wildlife (CPW), US Fish and Wildlife Service	Idaho Dept. of Fish & Game (IDFG)	Montana Fish Wildlife & Parks (FWP)	Oregon Dept. of Fish & Wildlife (ODFW), US Fish and Wildlife Service	Washington Dept. of Fish & Wildlife (WDFW), US Fish and Wildlife Service	Wyoming Game & Fish Dept. (WGFD)
Wolf status	The Mexican wolf is listed separately from the gray wolf as a federally endangered subspecies.	Listed as endangered under federal and state law (California Endangered Species Act).	Listed as endangered under federal and state law (Colorado's Nongame, Endangered, or Threatened Species Conservation Act).	Wolves have been federally delisted since May 2011.	Wolves have been federally delisted since May 2011.	Wolves are federally endangered west of Hwys 395/78/95 and are delisted on the eastern side of these highways. Wolves are not listed under state ESA.	Wolves are federally endangered in the western two-thirds of the state and are delisted in the eastern third of the state (east of Hwys 97, 17, and 395)	Wolves have been federally delisted since April 2017.

Arizona & New Mexico: The Mexican Wolf Reintroduction Project has a program for limited loan of radio-telemetry receivers to private individuals who meet established criteria to help monitor wolves near their livestock for the expressed purpose of aiding in detection and prevention of livestock depredation. Interagency Field Team (IFT) can provide location information to producers affected by depredation. GPS clusters (not den/ rendezvous areas) where wolves have been absent for ≥3 days can be shared with producers with active depredations if lead agency personnel are asked.

California: When wolves are at den and rendezvous sites during the pup-rearing season (typically April-August), hexagons in those areas are not activated on the map. CDFW biologists will also share cluster locations with producers when they identify potential kill/feeding locations near livestock.

Colorado: In time, the proportion of the wolf population that is collared will drastically decrease as a very high proportion is currently collared due to the active reintroduction that is occurring. Long term, the Wolf Restoration and Management Plan calls for the maintenance of 2 collars in each pack, likely one GPS and one VHF. More detailed information is shared with producers when wolves show a tendency to locate in a specific area.

Idaho: IDFG cannot share specific location data outside the agency. IDFG uses a genetics-based mark-recapture approach to estimate populations instead of collaring and pack counts. IDFG uses GPS collars to respond to livestock depredations and focuses collaring in areas with high depredation risk. If a producer calls asking if they have a collared animal in an area of interest, IDFG will answer that question and give them some general information on where that animal has been frequenting.

Montana: State law restricts sharing of recent wildlife locations for hunted or trapped species. FWP uses the Integrated Patch Occupancy Model (iPOM) to estimate wolf populations. State law requires at least one collared wolf in each pack near areas prone to conflict, but there is high collar turnover. Many FWP biologists are in close communication with producers when wolves are nearby.

Photo: Oregon Department of Fish and Wildlife

Oregon: State law requires data sharing agreements for sensitive wildlife data. From 2013-2017, there was an automated text notification system with polygons for producers but seemed to not reduce conflict or meet expectations. Oregon will switch to a population model in the near future. ODFW and Wildlife Services can share information with producers that need it. Biologists prioritize sharing locations with producers when the risk is highest but also rely on producers calling them.

Washington: The Sensitive Wolf Location Data Sharing Agreement allows producers and range riders to sign a formal agreement to access wolf locations via a password-protected website, with access blocked from April 1st to July 15th to safeguard den sites. Collars are programmed to record two locations per day and upload every day; however, location uploads may be delayed a couple days.

Wyoming: Collar data is not publicly available in Wyoming pursuant to state statute and WGFD policy. Within the WTGMA, WGFD conducts intensive aerial and on-the-ground monitoring and generally has a collar in every known pack. Some producers have reported that WGFD field staff will share when wolves are on or near their property.

Location sharing maps by state

Arizona & New Mexico

California

Colorado

Oregon

Casey McFarland of CyberTracker gives ID instruction at a Track and Sign workshop in Rifle, CO. Photo: Matt Collins

Recommendations

Finding solutions to improve wolf location information sharing is challenging due to the needs of producers and capacity constraints within wildlife agencies. Both producers and agencies recognize that this issue can strain relationships and hinder other projects across private working lands, and they are actively seeking solutions. While it can be difficult to identify approaches that meet the needs of all parties, highlighting the challenges of each side can foster mutual understanding and lay the groundwork for more constructive dialogue that considers the complexity of the issue. These recommendations attempt to bridge this gap and help producers and agencies strengthen relationships and enhance their ability to reduce conflict together.

Sharing collar location information is a powerful way for both agencies and producers to more effectively manage wolves and strengthen their working relationships.

Establish clear and consistent information sharing methods and expectations

Prioritize direct agency to producer communication: When possible, agencies should focus efforts on directly contacting potentially affected livestock producers when GPS locations might indicate a potential conflict. Direct communication with multiple producers, such as group texts or emails, can be just as effective as one-on-one interactions while increasing efficiency. This communication provides a human element, which automated systems lack, by showing that agency biologists are also keeping track of wolves near producers and providing some acknowledgment that they are aware of producers' concerns.

Work with producers to determine what information is needed: While agencies often have data sharing restrictions on wildlife location data, many are able to share more generalized location information with producers. Engaging producers in conversations about their specific needs—such as when, where and how (text, email, phone calls) they want wolf location updates—can help tailor information in ways that support conflict reduction. Asking how producers plan to use the information can help agencies identify additional ways to support their efforts or determine which information will be most useful.

Meeting with livestock producers, Colorado Parks and Wildlife staff, outfitters, and county commissioners to discuss wolves in Colorado. Photo: Meg Soyars Van Hauen - Sky-Hi News

Designate points of contact: In some places where there are large numbers of producers wanting access to wolf location information, it might help to have a producer point of contact. Work with producers to designate and communicate a point of contact who will receive wolf location information from agencies and disseminate to a broader group of producers.

Set regular communication intervals: Work with producers to determine how often wolf location information will be shared. Having clear expectations that both agencies and producers agree on will increase accountability and reduce frustrations related to miscommunications. When communication intervals change, such as when field staff take time off, promptly notify producers.

Plan regular meetings to discuss wolf activity: Some producers have expressed interest in regular (e.g., monthly) meetings with the agency to specifically discuss wolf locations and activity with agency biologists. Others have proposed meetings outside of the grazing season where agencies bring heat maps of seasonal wolf locations for producers. Not only is this a good opportunity to meet outside of conflict periods but also information on past wolf locations can be helpful for producers to understand patterns of space use and adjust grazing plans based on wolf location plans where feasible.

Increase understanding of mapping platform preferences and limitations: Mapping platforms with updated wolf location information can help fill the gap as agencies build capacity to improve communication with producers. However, if agencies are looking to move forward on a map, they should work with producers to ensure it's at a scale that is meaningful (e.g., polygons with 1-2 mile diameters) and that the platform has features that make it accessible to producers (e.g., phone compatibility). Most importantly, agencies should recognize that mapping platforms are not the preferred mode of information sharing for producers and should not be seen as a replacement for direct communication. Additionally, the potential repercussions of publishing a public map should be considered as it will allow anyone to have access to wolf location information.

Build shared understanding of collar data capabilities and constraints

Wolf capture in 2024 in Yellowstone National Park Photo: NPS - Jacob W. Frank

Increase outreach on collar data functionality and limitations: Clarify communication on how collars function, as well as their technical limitations, and increase awareness of the limitations of using GPS collar data for conflict reduction. Outreach could include direct one-on-one conversations, short videos, tabling at conferences or in-person meetings/workshops hosted by agencies or other organizations trusted by producers.

Communicate agency restrictions and policies clearly: Agencies in states with statutes or regulations that limit the sharing of wildlife location data should clearly explain these restrictions to producers along with providing the specific statutory or regulatory language. Being straightforward and transparent about other policy constraints and the reasons behind them can help build shared understanding. Producers and agencies should work together to address regulatory and policy restraints that inhibit sharing location data.

Agencies should recognize that mapping platforms are not the preferred mode of information sharing for producers and should not be seen as a replacement for direct communication

Emphasize that wolf location information is only one tool in the toolbox: Many producers who have experience using wolf collar location information emphasize that it is just one tool that helps inform their conflict reduction efforts. Direct observations of wolf sign and monitoring livestock can often be more informative of what's going on conflict-wise than the locations of collared wolves. Promoting range riding programs and producer-focused training and workshops on identifying wolf sign and learning wolf behavior can assist in understanding how conflict is occurring on the ground.

Direct observations of wolf sign and monitoring livestock can often be more informative of what's going on conflict-wise than the locations of collared wolves

Increase outreach on the importance of maintaining collars on wolves: Collaring wolves is extremely costly and logistically challenging. Thus educating the public on the value of keeping collars on wolves and keeping collared wolves alive could have benefits for wolf monitoring and management. Many people might not realize that killing a collared wolf can hinder wolf-livestock conflict management efforts because having collared individuals can help with conflict mitigation and aid in population monitoring.

Strengthen producer-led communication and information sharing

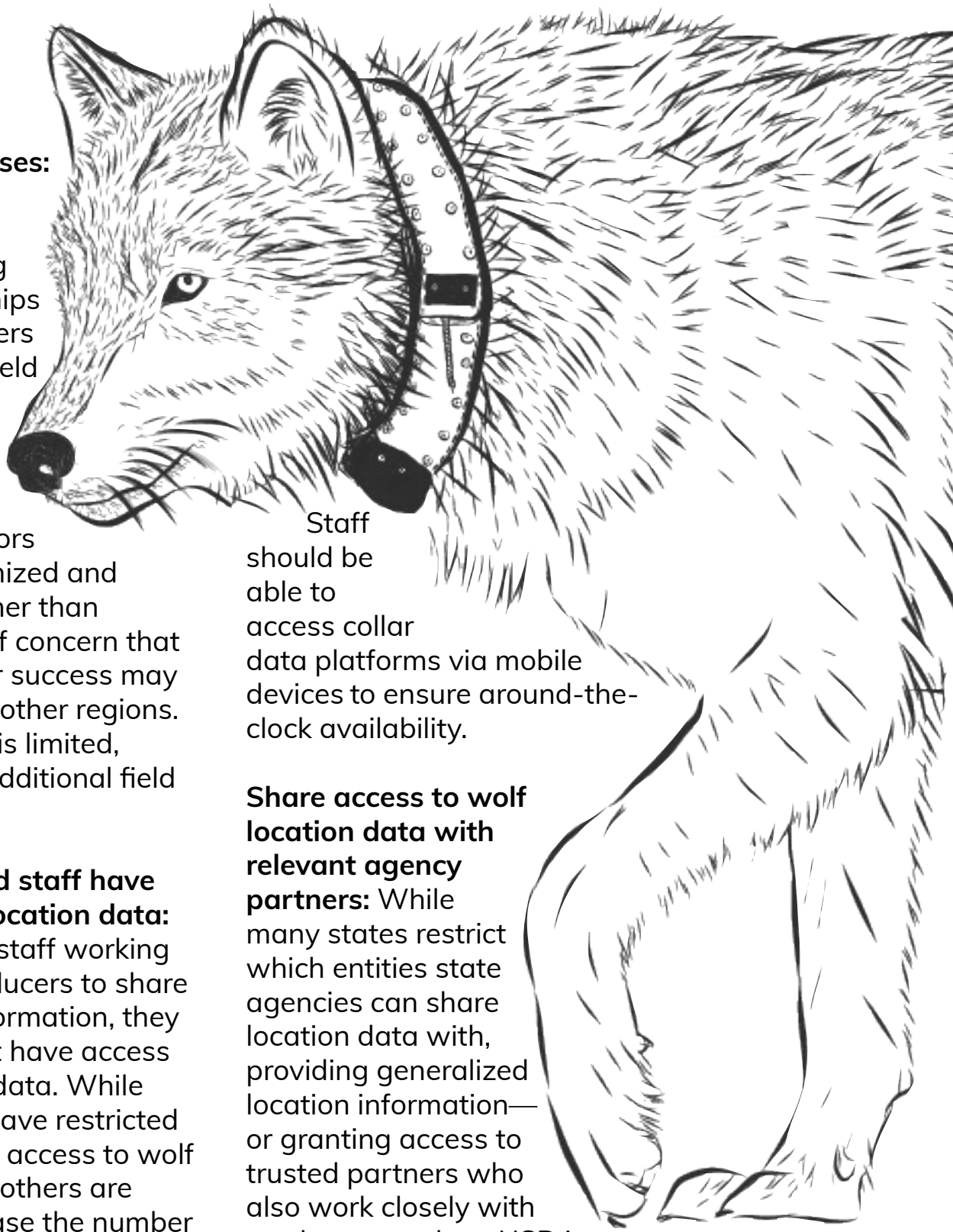
Casey McFarland of CyberTracker gives ID instruction at a Track and Sign workshop. Photo: Zach Altman

Support producer-led data collection: Developing producer networks and information-sharing platforms can allow producers to record and share their own data on wolf sightings, sign, and conflict. This could take the form of a secure webpage or app with a mapping feature where producers can upload geotagged and timestamped camera trap photos, sighting reports, and wolf sign observations. Protecting sensitive information should be a priority in the design of these platforms. Ideally, these platforms should be mobile-friendly and function offline, allowing producers to record observations directly in the field.

Encourage two-way information sharing between agencies and producers: If there is enough trust in the agency, producers can choose to share their wolf data, which can help inform agency collaring efforts on conflict packs and even contribute to state population monitoring. This two-way information sharing can bolster relationships and collective understanding of wolf activity. Before sharing information with agencies, it should be determined whether or not that information can be obtained by outside sources through open records requests.

Promote producer-to-producer communication and coordination: Many places that have successfully reduced conflict with wolves and other large carnivores have done so through place-based community efforts that improve communication and coordination among neighboring ranches. Highlight and support the benefits of informal communication channels among producers, such as “ranchers’ hotlines” or text trees, for sharing localized wolf activity and coordinating management efforts - strengthening community resilience in dealing with wolf presence. While many such groups do not rely on wolf location information, increased producer and community led monitoring and conflict reduction efforts can be integrated with wolf location observations from agencies for informed decision making.

Enhance agency and producer collaboration

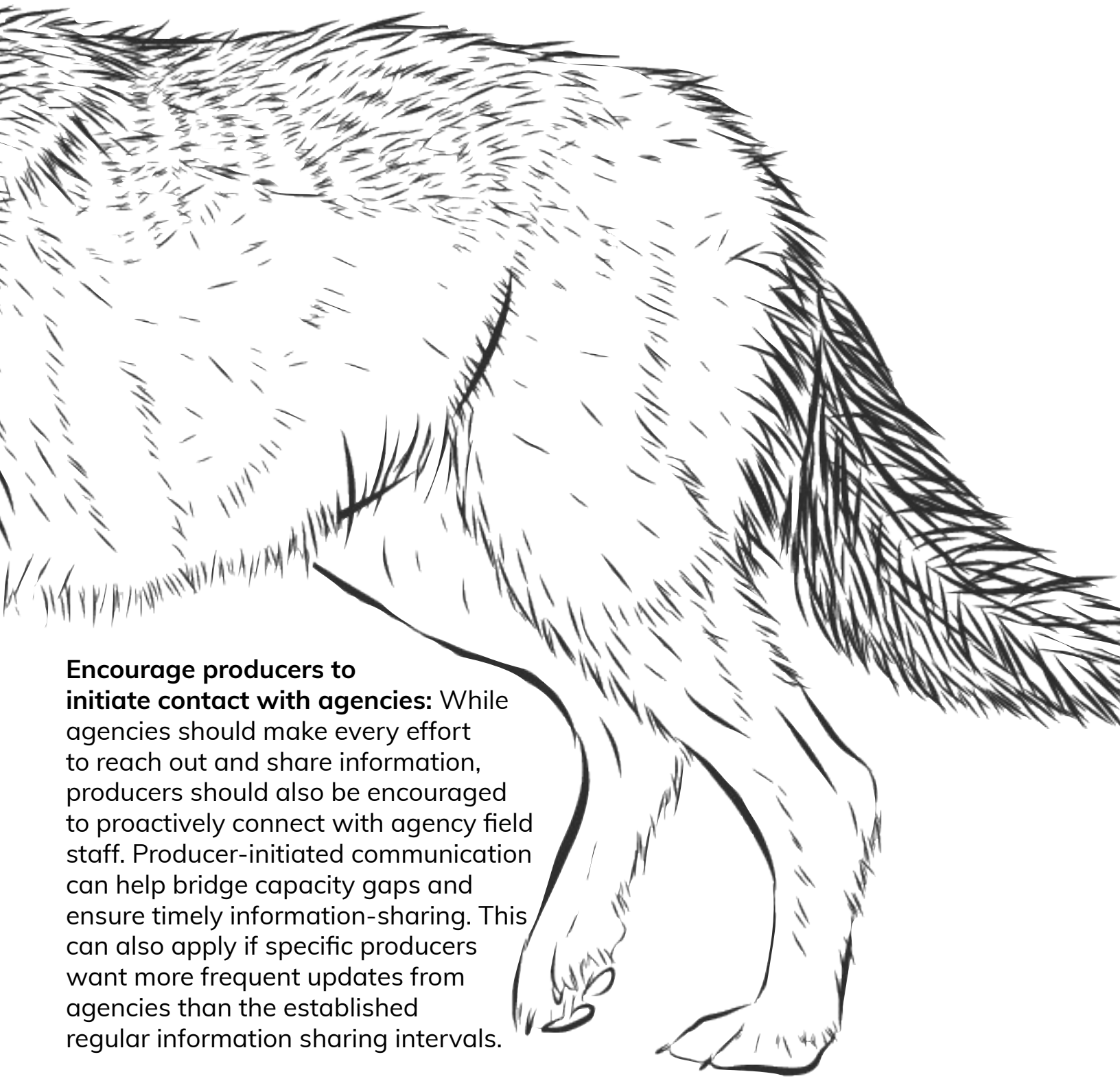


Support local field staff and highlight successes:

Agencies should prioritize building strong relationships between producers and field staff. Field staff who have built relationships and serve as key communicators should be recognized and empowered, rather than overlooked out of concern that highlighting their success may reflect poorly on other regions. Where capacity is limited, consider hiring additional field staff.

Ensure local field staff have access to wolf location data: In order for field staff working closely with producers to share wolf location information, they themselves must have access to wolf location data. While some agencies have restricted which staff have access to wolf GPS collar data, others are starting to increase the number of staff who can access it. This allows for faster and more direct communication to producers. Staff should be able to access collar data platforms via mobile devices to ensure around-the-clock availability.

Share access to wolf location data with relevant agency partners: While many states restrict which entities state agencies can share location data with, providing generalized location information—or granting access to trusted partners who also work closely with producers, such as USDA Wildlife Services—can help improve communication and coordination.



Encourage producers to initiate contact with agencies: While agencies should make every effort to reach out and share information, producers should also be encouraged to proactively connect with agency field staff. Producer-initiated communication can help bridge capacity gaps and ensure timely information-sharing. This can also apply if specific producers want more frequent updates from agencies than the established regular information sharing intervals.

Photo: Louise Johns

Collaborate on creative solutions: Many producers and agencies emphasized the importance of thinking outside the box when exploring ways to share wolf location information. Suggestions have included developing alert systems that notify producers when collared wolves approach livestock or cross designated boundaries. This could involve updated technology in wolf collars with geofence features, radio-activated guard (RAG) boxes, or even livestock-mounted devices such as collars or ear tags. Advances in virtual fencing and livestock monitoring technology are creating new opportunities to test these kinds of innovative approaches. Other ideas have included establishing research agreements with agencies where producers with access to wolf location information (e.g., GPS clusters) could collect data when checking these sites.

Highlight broader benefits of increased information sharing: Sharing collar location information is a powerful way for both agencies and producers to more effectively manage wolves and strengthen their working relationships. While concerns about the potential misuse of wolf location information—whether intentional or unintentional—are valid, agencies should carefully weigh these risks against the substantial benefits. Most producers do not use collar information to harm wolves, and increased transparency can help build credibility and goodwill. Recognizing that trust developed through sharing location information can lead to better outcomes for wolf management, conflict reduction, and broader private land conservation efforts is essential. Agency leadership should elevate this perspective and consider how strategic information sharing can advance long-term conservation and stewardship goals.

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This document reflects the insights of many individuals who engaged in conversations on wolf location information sharing between May and July 2025. Participants in the Practitioners Call and Conflict Reduction Consortium discussions, as well as agency wolf biologists shared valuable perspectives and provided feedback on drafts. We are deeply grateful for their contributions, which were essential to shaping this document together.

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