Connecting Collaboration to Wellbeing in Harney County:

An Introductory Guide to Using Social Science in Collaborative Processes

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WINTER 2021

ECOSYSTEM WORKFORCE PROGRAM WORKING PAPER NUMBER 102

UNIVERSITY OF OREGON
Ecosystem Workforce Program
Oregon State University Extension Service
HIGH DESERT Partnership

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Acknowledgements

I sincerely thank Brenda Smith and Chad Karges for their extensive guidance and time supporting this project. In addition, Marla Polenz, Ben Cate, and Kathy Rementeria provided reviews of the draft document. The High Desert Partnership board and members of the Harney County Wildfire Collaborative also provided valuable input through four meetings.

Funding for this research was provided by the High Desert Partnership.

Photos courtesy of Emily Jane Davis (cover, page 1 top and middle, pages 2, 8, 13, 23, 24, and back cover) and Jeremy Hill (page 1 bottom, pages 17 and 20).

Document layout and design by Autumn Ellison, University of Oregon Ecosystem Workforce Program.

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Chapter 1. Introduction

What are the connections between collaborative dialogue and wellbeing outcomes in a place? How can the collaborators and community understand those connections by engaging with relevant social science in their collaborative processes?

Many communities in the rural western United States seek the ecological, economic, and social wellbeing and resilience of their people and landscapes. In Harney County, Oregon, several community collaborative groups work towards this goal with backbone support from the High Desert Partnership (HDP), a local nonprofit organization. HDP defines "community" in the context of its collaboratives as "communities of interest" that include anyone with an interest in Harney County, while also recognizing communities of place in Harney County.[1] HDP believes that community wellbeing is having resilience, structure, and processes in place that enable individuals and the community to respond positively to stressors. Four of the HDP-supported collaboratives focus on natural resource management, one on youth opportunity, and one on business opportunity. The heart of each group's process is consensus-oriented collaboration among community members and stakeholders. This process includes stages of identifying shared vision, discussing each other's values, incorporating relevant data and scientific information, finding and articulating common ground, and learning and adapting.

Increasingly, these collaborative participants have recognized that although they have social and economic goals in the pursuit of community wellbeing, their collaborative processes, particularly in the natural resource groups, have not regularly included social science to the same extent as biophysical science. Social science can aid in collaborative decisions in several ways:[2]

- Help participants identify and assess the tradeoffs that may be associated with different management options, including ecological, economic, and social tradeoffs
- Provide insights into how decisions affect both human and environmental wellbeing, given the interplay of social-ecological systems
- Inform decisions to be more appropriate for those affected by them and their social-ecological setting
- Better anticipate and understand the variety of human interests and implications of management decisions for human communities

Further, HDP staff and board have expressed a direct desire to better understand how collaboration and wellbeing outcomes may be connected in all of their work. HDP's business plan states that they will "define and measure social, economic, and ecological benefits in Harney County as a result of HDP's ecological initiatives." **This guide is intended to support these practitioners by increasing their capacity to utilize social science in**

[1] This guide generally refers to Harney County as a community of place; but recognizes that within Harney County are many other communities of place such as municipalities or unincorporated places, as well as communities of interest.

[2] Charnley, S., Carothers, C., Satterfield, T., Levine, A., Poe, M.R., Norman, K., Donatuto, J., Breslow, S.J., Mascia, M.B., Levin, P.S. and Basurto, X. 2017. Evaluating the best available social science for natural resource management decision-making. Environmental Science & Policy 73: 80-88.

their collaborative processes to help them achieve their community wellbeing goals. In the spirit of community-led collaboration, it is not prescriptive about how collaboration should work, nor exactly how social science must be used. It introduces concepts, examples, and ideas that practitioners may bring into their work as they see fit. This guide provides starting points for understanding the realm of social science as it relates to collaboration, and offers resources for future learning, rather than attempting to be a comprehensive course on the topic.

Approach

The impetus for this guide was interest from HDP staff, board, and members of the wildfire collaborative in more meaningfully applying social science to their work. This interest was discussed and refined through conversations between HDP staff and the author to develop a scope of work: "map out" the collaborative process, and identify when and how social and economic information may be useful within it. The specific direction was then further informed and adapted based on three major points of feedback from HDP staff and board through two initial presentations and discussion:

- The collaborative process should be depicted generally and applicable to all HDP-supported collaboratives; it should not be prescribed by this guide
- There is a desire to understand how to use social science in all collaboratives, not just those focused on natural resources
- Community health and wellbeing is an underlying goal of all of HDP's work

To prepare this guide, scientific and practitioner literature was gathered and reviewed on the following topics using Google Scholar and electronic scientific journals:

- Social science in general (disciplines, methods)
- Use of social science in collaborative decision-making and management
- Human wellbeing (community)
- Any examples of community-driven social science research focused on wellbeing outcomes
- Social and economic monitoring of natural resource management

Collaboration in Harney County

HDP serves as a backbone organization for six collaborative groups (Table 1).[3] HDP views this as "leading from the back of the line", wherein community/collaborative participants determine their priorities and desired outcomes, and HDP finds ways to help implement consensus decisions. Four of these collaboratives focus on natural resource management, and two on economic and social dimensions. However, all six collaboratives place importance on the interconnections between people and place. In addition, they are linked by the support and common thread that HDP provides. This arrangement and level of interconnectivity appears unique; in many other places around Oregon, collective efforts focused on economic development and social aspects are often not well-connected or coordinated with those in natural resource management.[4]

What is the collaborative process used in Harney County?

Although there is ample information about necessary ingredients or principles for effective collaboration, there is no single definition of a collaborative process in scientific literature or practitioner guidance, particularly when this process is convened by a non-government entity with a community orientation.[5] This means that there can be flexibility in approach and design, depending on local and stakeholder interests. What follows is a list of important steps in collaborative process-

[3] Other collaborative efforts occurring in Harney County such as place-based water planning and a sage-grouse Candidate Conservation Agreement with Assurances are not directly funded or convened by HDP and therefore not included here.

[4] Davis, E.J., Moseley, C., Pomeroy, A., and Enzer, M.J. 2011. Economic Development Capacity in Public Lands Communities. Ecosystem Workforce Program Working Paper #28, University of Oregon: Eugene, OR.

[5] Pratt Miles, J. D. 2013. Designing collaborative processes for adaptive management: four structures for multistakeholder collaboration. Ecology and Society 18(4): 5. Ecosystem Workforce Program Working Paper #28, University of Oregon: Eugene, OR.

es in the Harney County context, kept general to avoid overly prescribing how those are practiced within each group or setting.[6]

- *Identifying diverse interests/stakeholders:* These are people and organizations who have interests in or impacts on a particular resource or issue; in other words, a stake in it. Collaborative processes often begin when stakeholders face a problem or opportunity, and reach out to engage each other to begin discussing it.
- *Developing shared purpose, vision, and goals:* Stakeholders discuss a problem or opportunity and their respective values, recognize their interdependence and a need for collective action, and establish shared language about why they are collaborating and what they would like to do.
- *Incorporation of available science or data:* Many collaborative processes call for science-based decision making, often termed "joint fact finding", wherein participants mutually seek and examine scientific information relevant to the issue or project at hand. In HDP collaboratives, this is called "shared science."

Table 1 Collaboratives of the High Desert Partnership[7]

Collaborative name	Year formed	Purpose	Examples of major activities undertaken or supported
Malheur National Wildlife Refuge Comprehensive Conservation Plan Collaborative	2013	To provide shared vision and goals in creating and implementing a long-term plan to restore the refuge's aquatic health, enhance wildlife habitat and revitalize relationships with stakeholders and the community	▪ Malheur National Wildlife Refuge Comprehensive Conservation Plan
Harney Basin Wetlands Collaborative	2011	To find ways to improve the aquatic health and sustainability of Malheur Lake, and the wild flood-irrigated wet meadows across the Harney Basin	▪ Strategic Action Plan ▪ Ecosystem model for Malheur Lake ▪ Several infrastructure projects in wet meadows
Harney County Restoration Collaborative	2008	To find common ground solutions to improve the declining state of sustainability on the Southern Malheur National Forest	▪ Development of consensus input on planned forest management projects ▪ Development of common ground principles
Harney County Wildfire Collaborative	2014	To proactively determine how to make sagebrush steppe landscapes more resistant and resilient to unexpected fire	▪ Supporting rangeland fire protection associations ▪ Pilot Project in Wilderness Study Area ▪ Development of input into planned rangeland management projects ▪ Shared Science Monitoring and youth crew
BizHarney Opportunity Collaborative	2017	To help rural Harney County businesses start, grow and succeed while also helping to build a thriving business environment	▪ Entrepreneurial Ecosystem Assessment ▪ Uniting three entrepreneurial programs into an 'Idea-to-Ownership' pipeline ▪ Development of a Native Seed Cooperative
Youth Changing the Community Collaborative	2016	To create opportunities that enrich Harney County's youth through a youth-informed and led initiative	▪ Development of guiding approach, goals, and potential projects ▪ Hosting of local GO-STEM workshops ▪ Harney Internship Program

[6] Material drawn from a review of the available meeting notes and documents of each HDP collaborative, as well as Selin, S. and Chevez, D. 1995. Developing a collaborative model for environmental planning and management. *Environmental Management* 19(2): 189-195.

[7] Sources: 1) High Desert Partnership website; 2) Allen, J.H., Ozawa, C., and Babcock, J. 2019. *Strengthening Your Community by Tackling Challenges Together: Lessons from the High Desert Partnership*. National Policy Consensus Center, Portland State University; 3) 2019 Harney County Entrepreneurial Ecosystem Assessment.

- *Seeking consensus on planned actions*: The process of seeking consensus involves exploring participants' values, areas of agreement, and ways to compromise or reach agreement where it is lacking. The exact process depends on the focus of the collaborative and its role. For example, a group collaborating on a specific planned resource management project on a national forest might provide the forest managers with written input documenting their desired future conditions and the types of management actions that they support to achieve those conditions.
- *Monitoring, learning, and adaptation*: These steps involve tracking the implementation and outcomes from a collaborative decision, evaluating how that information may change how a collaborative makes decisions, and learning and changing behavior as a group.[8]

What is community wellbeing?

Human wellbeing is a concept with diverse meanings in several fields from health to psychology to development. One simple definition is that it is "a positive physical, social and mental state",[9] and involves 1) objective material circumstances, 2) social aspects, and 3) subjective assessment of one's circumstances.[10] A recent key framework further establishes five domains of wellbeing: material, health, social relations, security, and freedom of choice and action.[11] Each of these domains could be understood through different indicators, both qualitative and quantitative; and by using an array of primary and secondary data sources that provide both objective and subjective evaluations. Wellbeing is also recognized as not merely a static state, but also a dynamic process.[12]

Much research and practice focuses on the wellbeing of individuals or nations, but there is also a growing focus on community wellbeing. Community wellbeing is more than the sum of individuals' wellbeing within a community; it is about "subjective aspects of local life that are not simply individual but reflect the ways in which people feel and are well together."[13] Another definition is "a state of being with others and the natural environment that arises where human needs are met, where individuals and groups can act meaningfully to pursue their goals, and where they are satisfied with their way of life."[14] This is closely related to community resilience as well, or "processes of responding to change with a view to enhancing community wellbeing over time."[15]

How does community wellbeing relate to collaboration?

Some research, primarily in Australia and Canada, examines how "community wellbeing collaboratives", place-based approaches, or citizen-led efforts can support wellbeing. These are groups that form deliberately for the purpose of improving one or more factors in community wellbeing, typically by working directly on social determinants of health. Because wellbeing can have different meanings for different communities or within

[8] Fernandez-Gimenez, M.E., Ballard, H.L. and Sturtevant, V.E. 2008. Adaptive management and social learning in collaborative and community-based monitoring: a study of five community-based forestry organizations in the western USA. *Ecology and Society* 13(2).

[9] Summers, J.K., Smith, L.M., Case, J.L., and Linthurst, R.A. 2012. A review of the elements of human well-being with an emphasis on the contribution of ecosystem services. *Ambio* 41: 327–340.

[10] Woodhouse, E., Homewood, K.M., Beauchamp, E., Clements, T., McCabe, J.T., Wilkie, D. and Milner-Gulland, E.J. 2015. Guiding principles for evaluating the impacts of conservation interventions on human well-being. *Philosophical Transactions of the Royal Society B: Biological Sciences* 370(1681): 20150103.

[11] See Table 1, page 4 of Woodhouse *et al*. 2015 for this framework.

[12] McCrea, R., Walton, A. and Leonard, R. 2014. A conceptual framework for investigating community wellbeing and resilience. *Rural Society* 23(3): 270-282.

[13] Atkinson, S., Bagnall, A.M., Corcoran, R., South, J. and Curtis, S. 2020. Being well together: individual subjective and community wellbeing. *Journal of Happiness Studies* 21(5): 1903-1921.

[14] Breslow, S.J., Sojka, B., Barnea, R., Basurto, X., Carothers, C., Charnley, S., Coulthard, S., Dolšak, N., Donatuto, J., García-Quijano, C. and Hicks, C.C. 2016. Conceptualizing and operationalizing human wellbeing for ecosystem assessment and management. *Environmental Science & Policy* 66: 250-259.

[15] McCrea *et al.* 2014, p. 2.

different segments of a community, these interventions must be locally derived and make sense within a local context, and they will be more likely to succeed if local people participated in creating them and were empowered by that process. The choice of what wellbeing means, how to improve or sustain it, and how to evaluate it should be made by a community and directed by their priorities.

A large review of common ingredients for successful community wellbeing initiatives in mental health[16] found some of the following enabling factors in collaborative processes:

- Needs and assets assessments to help define the problems and develop a positive, strengths-focused framework for addressing them
- Formation of a community-based initiative with a leadership team
- Developing a clear framework that describes vision, goals, and purpose
- Engagement with necessary outside expertise while remaining community-led
- Ensuring that all participating organizations understand each other
- Engagement with local governments and policy makers, who can help spread the message and bring resources
- Local "community champions" with strong social skills and networks act as intermediaries connecting the initiative to hard-to-reach and vulnerable community members/populations
- Use of networks and venues such as schools, sports teams, and churches to spread information and messages
- Training, support, and supervision for the leadership team and community champions
- Strong regular communication among participants
- Diverse and frequent communication with the community using multiple media
- Support of activities that foster social connection and a sense of community, and that will be enjoyable and inspiring
- Regular evaluation, assessment, and refinement of the initiative
- Reaching out to other similar initiatives in other places for peer learning and support

Collaboratives in Harney County may want to evaluate if and how their structures and actions align with these recognized factors for a collective effort that can successfully promote wellbeing. They also may want to consider how their actions may connect to wellbeing outcomes. The following chapter describes examples of specific social science research that may help do this. As a starting point, however, there are many potential connections to consider (Table 2).

Conclusion: Understanding collaboration and community wellbeing

This chapter established necessary context for the remainder of this document: the meaning of 1) a collaborative process, and 2) community wellbeing. This foundation is key to then understanding the diverse possibilities for how a collaborative process may affect community wellbeing outcomes, and how to use social science to build knowledge about those connections. Collaboration and community wellbeing are closely intertwined; existing research recognizes that any intervention to support wellbeing must be developed, led, and supported in a local context in order to be effective. Some collaborative groups form deliberately for the purpose of improving one or more factors in community wellbeing, typically by working directly on social determinants of health. Others may have community wellbeing as a more general downstream goal of their efforts to build consensus around other specific issues and opportunities. Regardless of how explicitly wellbeing is or is not part of a collaborative's mission, it is important to increase awareness of how collaboration and wellbeing may be connected. Social science can aid in this task as described in the following chapters.

[16] Breslow, S.J., Sojka, B., Barnea, R., Basurto, X., Carothers, C., Charnley, S., Coulthard, S., Dolšak, N., Donatuto, J., García-Quijano, C. and Hicks, C.C. 2016. Conceptualizing and operationalizing human wellbeing for ecosystem assessment and management. Environmental Science & Policy 66: 250-259.

Table 2 Potential collaborative actions and aspects of wellbeing

Example collaborative action	**Harney County collaboratives that take or might take this type of action**	**Wellbeing domain** *Domains of Woodhouse et al. 2015*	**Potential wellbeing aspects related to this action** *Note: the collaborative action alone would not typically be the sole causal explanation for an outcome, as other factors contribute (e.g., the ability of a land manager to implement a collaborative's recommendations). Understanding some of these outcomes would necessitate integrating social and other types of science to observe ecological or other changes as well.*
Recommending management actions/ treatments that reduce the risk of uncharacteristic wildfire	Restoration collaborative Wildfire collaborative	Material	▪ Jobs and economic activity supported by implementation of management actions (e.g., contracting, timber sales, grazing) ▪ Avoided material losses from wildfire (e.g., property) ▪ Avoided business losses from smoke of large wildfires (e.g., recreation, tourism) ▪ Outputs of products (food, fiber)
		Health	▪ Amount and/or frequency of wildfire smoke from treated areas (impact on physical health) ▪ Impact of wildfires or lack of wildfires (impact on mental health) ▪ Resilience of, safe access to areas or values important for mental or spiritual health
		Social relations	▪ Collaborative dialogue and agreement
		Security	▪ Sense of safety or preparedness relative to wildfire events
		Freedom of choice and action	▪ Ability to enjoy values and activities unimpaired by fire (smoke, area and road closures, etc).
Supporting landowner/ manager use of flood irrigation	Wetlands collaborative Malheur NWR plan collaborative	Material	▪ Provision of winter hay for livestock ▪ Sustaining or creating wildlife habitat that creates economic impact through recreation ▪ Increased landowner access to infrastructure improvements
		Health	▪ Ability to birdwatch and other outdoor activities that support mental and physical health Impact of wildfires or lack of wildfires (impact on mental health)
		Social relations	▪ Increased landowner and agency dialogue about managing wetlands
		Security	▪ Living with more variability of water (uncertainty; could be viewed as "negative" outcome)
		Freedom of choice and action	▪ Ability/willingness to take voluntary conservation action
Establishing agreements for cooperation between rangeland fire protection associations and fire management agencies	Wildfire collaborative	Material	▪ Avoided material losses from wildfire (e.g., property) ▪ Avoided losses of wildlife habitat ▪ Avoided business losses from smoke of large wildfires (e.g., recreation, tourism) ▪ Provision of equipment and resources for fire suppression
		Health	▪ Amount and/or frequency of wildfire smoke from treated areas (impact on physical health) ▪ Impact of wildfires or lack of wildfires (impact on mental health)
		Social relations	▪ Relationships between landowners, and between landowners and fire managers
		Security	▪ Sense of safety or preparedness to respond to wildfire events
		Freedom of choice and action	▪ Prevention of involuntary conservation regulations
Creating youth-led vision and goals for future	Youth collaborative	Material	▪ Youth employability from effective education ▪ Youth access to resources
		Health	▪ Access to resources, activities that support physical/mental health ▪ Presence of safe places
		Social relations	▪ Dialogue with each other and community about vision and priorities ▪ Sense of being respected and included ▪ Learn values and skills for civic engagement
		Security	▪ Confidence in skills and abilities
		Freedom of choice and action	▪ Ability to pursue activities, employment, lifestyles desired
Providing a hub for business resources and encouraging collaboration among businesses and supporting organizations	Business opportunity collaborative	Material	▪ Jobs and economic activity supported by local entrepreneurs ▪ Presence of businesses that allow community members to meet material needs locally
		Health	▪ Stress and mental health impact for business owners ▪ Presence of types of businesses that can support community health locally
		Social relations	▪ Communication and collaboration among businesses
		Security	▪ Sense of support and resources for businesses ▪ Common support in face of stressors or crisis
		Freedom of choice and action	▪ Broader set of options for establishing and/or sustaining businesses according to one's goals

Chapter 2. Potential Social Science Approaches to Understand the Relationship Between Collaboration and Community Wellbeing

The purpose of this chapter is to increase awareness about how social science might be used in a collaborative setting to produce knowledge about the relationship between collaboration and community wellbeing outcomes. It provides examples of social science research and community-led activities related to wellbeing that could be relevant and valuable in Harney County, focusing on examples that actively engaged the participant community in the research process. These examples are briefly summarized (Table 3) then discussed in more length.

Wellbeing indicator development

What is it?

Indicators are criteria for observing and gauging outcomes, particularly through measurement and remeasurement over time to track change. In a community wellbeing context, they may be best seen as "statistical tools for translating broad community goals into clear, tangible and commonly understood outcomes and for assessing and communicating progress in achieving these goals."[17] However, not all indicators must be quantitative; they may be qualitative, so long as they are developed and tracked consistently using scientific standards for qualitative research.

Example: Puget Sound Partnership Quality of Life Index[18]

The Puget Sound Partnership is a government agency tasked with the protection and recovery of the Puget Sound Ecosystem in the state of Washington. Two of its six statutory goals directly address human wellbeing: "A healthy human population supported by a healthy Puget Sound that is not threatened by changes in the ecosystem" and "A quality of human life that is sustained by a functioning Puget Sound ecosystem." Of their 21 initial indicators ("Vital Signs"), five were originally focused on wellbeing, and data were collected

[17] Bauer 1966, Cobb and Rixford 1998; cited in Cox, D., Frere, M., West, S. and Wiseman, J. 2010. Developing and using local community wellbeing indicators: Learning from the experience of Community Indicators Victoria. *Australian Journal of Social Issues* 45(1): 71-88.

[18] Stiles, K., Bidenweg, K., Wellman, K., Kintner, L., and Ward, D. 2015. Human Wellbeing Vital Signs and Indicators for Puget Sound Recovery: A Technical Memorandum for the Puget Sound Partnership. Puget Sound Partnership Technical Report 2015-01.

Table 3 Examples of social science approaches to learning more about the relationship of collaboratives to wellbeing

Example social science activity	Potential applications for Harney County collaboratives and/or HDP
Wellbeing indicator development	Developing a comprehensive set of wellbeing indicators with a focus on social determinants of health might be best undertaken at the Harney County scale, through a group of HDP board members/staff/stakeholders with representation from all six collaboratives. Could build on material wellbeing types of indicators already gathered in 2019 assessment for Biz Harney Opportunity Collaborative.
Human ecology mapping	For the natural resource collaboratives, focus in areas of public land open to access and not revealing private property owners' information. For the wildfire collaborative, use mapping to identify areas of group priority and agreement about important values and risks, perhaps through the Potential Operational Delineations process. For the youth collaborative, youth could complete this exercise in a selected area of the county or anywhere in the county to create a spatial picture of what matters to them and location of their values.
Economic monitoring of natural resource management actions	Build on existing monitoring for the Harney County Restoration Collaborative's CFLRP landscape with presentations and group discussions to examine the relationship between what the collaborative recommends for forest restoration treatments and the economic outcomes of those treatments. Seek similar economic impact analyses can also be performed in the context of rangelands or wetlands to show how specific projects supported by these collaboratives led to economic outcomes. The wildfire collaborative may also want to examine economic aspects of rangeland management and wildfire such as avoided losses to cattle, forage, hay, sage-grouse habitat, or other values from wildfire; and how their recommended management approaches in projects affect the productivity of rangelands for producers and the provision of economic activity from recreation.
Participatory visual storytelling	Use in the context of a specific project, collaborative, or at the HDP/Harney County scale. This could be a formal research project to collect data, or be a community activity. The youth collaborative may want to organize a group of local youth to take photos of things and places that constituted wellbeing or illbeing for them, and share it in a community exhibit or webpage, and lead a discussion about the common themes. The wildfire collaborative and landowners within the Stinkingwaters landscape could conduct a participatory photo exercise to gather visuals of values of importance and at risk to them. Could also be combined with data from a human ecology mapping exercise to create a story map.
Social network analysis	For any collaborative or at the project/community scale to analyze how individuals were connected to whom, who served as bridges, who was influential, and/or who connected to non-participating stakeholders or external resources.

in three sub-regions. Over several years, the Partnership undertook a large project to evolve from these indicators to a more comprehensive Quality of Life index for the whole Sound region.[19] This was a substantial collaborative effort involving over one hundred local partners and scientists. It included two scientific reviews of potential indicators, engaged multiple regional social science experts, and incorporated multiple opportunities for regional stakeholders and partners to provide input through a survey and facilitated workshops. The result was 22 proposed indicators and a plan to track them, with over half to be captured in a biennial Human Wellbeing Survey and the remainder through other means. The indicators fell into the following categories:

- Human health
  - » Outdoor activity
  - » Air quality
  - » Local foods
  - » Drinking water
- Human quality of life
  - » Economic vitality
  - » Cultural wellbeing
  - » Good governance
  - » Sense of place
  - » Sound behavior

How could this relate to a collaborative process in the Harney County context?

The entire process of developing wellbeing indicators is itself intended to be highly collaborative, following common collaborative steps such as building a shared vision of what wellbeing means among different people, and bringing in relevant data. Therefore, it does not pertain to only one point in a collaborative process. Some indicators of objective material wellbeing and some demographic information were reported in the 2019 Entrepreneurial Ecosystem Assessment for the BizHarney Opportunity Collaborative; these could be more systematically collected and tracked on a regular basis. However, developing a comprehensive set of wellbeing indicators with even more explicit linkages to social determinants of health might be best undertaken at the Harney County scale, through a group of HDP board members/staff/stakeholders with representation from all six collaboratives, rather than within an individual collaborative. Participation from other entities not currently engaged in the collaboratives would also be essential, such as the county health department, senior citizens, the Burns Paiute Tribe, early childhood service providers, social service providers, and education organizations. A county-level approach may be suitable in part because there are secondary data sources of some material/objective wellbeing indicators that are only collected at that scale. Another similar exercise could be a "resilience assessment" to understand strengths, weaknesses, and potential stressors for a community or place. Going through a process of this kind would likely increase participants' awareness of how to evaluate human wellbeing and partner with social scientists. If implemented and sustained, it could provide long-term data about Harney County's changes in wellbeing over time. However, it would require participants' time and capacity, and as it would not be focused on a tangible project or on-the-ground work, it may not appeal to some. This would also necessitate focused facilitation and engagement from researchers who are both experienced in wellbeing and able to work effectively with community partners.

Human ecology mapping

What is it?

"Human ecology" refers to the connections and interactions between humans and the environment. Mapping these connections involves capturing both these visible and invisible connections—in other words, how humans interact physically, materially, spiritually, and/or emotionally—with places and features, and representing those through spatial data. Some of the questions that human ecology mapping can address include:

- The presence or absence of meaningful places and values, and where those may be located, co-located, concentrated, or dispersed
- Where recreational activities occur
- The potential relationship of biophysical and built features with social values

[19] See page iii of Stiles *et al.* 2015 for the full portfolio of proposed human wellbeing indicators.

Example: Olympic Peninsula Human Ecology Mapping Project[20]

Researchers from Portland State University and the USDA Forest Service Pacific Northwest Research Station collected data on meaningful places and outdoor activities from 169 Olympic Peninsula residents through mapping workshops held in eight communities and open to the public. At each workshop, small groups of participants were assigned to tables with paper base maps of the Olympic Peninsula overlaid with clear plastic mylar. Participants were asked to complete two separate mapping exercises using markers: 1) map up to five particularly meaningful places and assign values to each, choosing from a list of 14 values such as aesthetic, recreation, home, and economic; and 2) think of three activities they did outdoors, and map up to five places where they did these activities.[21] Participants used the same color marker for both exercises, which allowed the researchers to link each individual's meaningful places map to their activities map. This study found that the highest densities of meaningful places were primarily on the Olympic National Forest, along the western edge of the Olympic National Park, or on state trust lands; and that the highest densities of outdoor activity sites were in these areas as well as in small areas along the Pacific coast, in the Enchanted Valley northeast of Lake Quinault, and at Hurricane Ridge.

How could this relate to a collaborative process in the Harney County context?

In the example above, individuals were working in groups to share limited physical resources for doing the exercise (e.g., maps, mylar sheets), but were not being asked to reach consensus or combine their data in any way. Further analysis by the researchers helped show areas of density or overlap in values, but that was not part of the exercise itself. This is similar to a mapping exercise that researchers from Oregon State University and the University of Oregon conducted with some members of the Crane Rangeland Fire Protection Association in 2015 through individual interviews.[22] Harney County collaboratives could use the same process to ask people about how they value and use places in specific project areas, or in general in the county. Comparative analysis could be done to understand if and how these values differed for people in different demographic groups, or those who had lived in the county for different lengths of time. For the youth collaborative, youth could complete this exercise in a selected area or anywhere in the county to create a spatial picture of what matters to them and where their values are located. For the business opportunity collaborative, residents and visitors could map out which businesses they engage with and for what purposes. For the natural resource collaboratives, this would be best done with a focus in areas of public land open to access and not revealing private property owners' information. For the wildfire collaborative specifically, the approach could be adapted into a collaborative one that was focused on seeing areas of group priority and agreement about important values and risks, rather than just collecting individual data, and this could occur or may already be occurring through the Potential Operational Delineations process that has been underway. Regardless of how human ecology mapping would be used, there are some important considerations for this approach. First, individuals or organizations may not wish to share information about places that is cultural, personal, or otherwise sensitive. Research design and sharing of spatial products would need to respect this. Second, appropriate GIS capacities would be needed to input the data, and create and maintain useful products. Third, spatial data alone can provide powerful visualizations, but cannot explain *why* or *how* something might be; they are best combined with other forms of research such as interviews for further context and explanation.

[20] McLain, R., Cerveny, L., Besser, D., Banis, D., Biedenweg, K., Todd, A., Kimball-Brown, C., and Rohdy, S. 2013. Mapping Human-Environment Connections on the Olympic Peninsula: An Atlas of Landscape Values. *Occasional Papers in Geography* No. 7.

[21] See Tables 2 and 3, pages 5-6 of McLain *et al.* 2013 for lists of the values used in this exercise.

[22] Project story map available at: https://uo-online.maps.arcgis.com/apps/MapSeries/index.html?appid=95411f8de94f42edb0504f8a42de673a.

Economic monitoring of natural resource management actions

What is it?

Monitoring the economic impacts of natural resource management involves the measurement and analysis of economic indicators to evaluate changes over time relative to specific management actions. These impacts can include economic activity generated as a result of the implemented work (e.g., jobs supported, income from contracting and sale of any goods such as timber), proportion of economic activity captured locally, estimates of avoided costs, or impacts to businesses. Importantly, economic monitoring of implemented actions provides direct information about the economic outcomes of those actions, not the economic context more generally.

Example: Southwest Crown of the Continent Collaborative Forest Landscape Restoration (CFLRP) Monitoring

The Southwest Crown of the Continent is one of the landscapes within the Forest Service's CFLRP program. The expected economic outcomes of forest restoration funded by the CFLRP nationwide are local job creation and a reduction in wildfire management costs. The economic monitoring of the SW Crown collaborative therefore focuses on job creation, impacts on local businesses, contract attributes, and forest treatment costs and benefits.[23] Specific tools and activities used in this analysis included:

- The Treatments for Restoration Economic Analysis Tool (TREAT), developed by Forest Service economists as a standard interface to estimate employment and labor income impacts from current and/or proposed restoration activities across all CFLRP projects.
- The Risk and Cost Analysis Toolkit (R-CAT), which estimates suppression costs (pre-and post-treatment), treatment implementation costs and revenues, and duration of treatment effectiveness, aiding understanding of avoided costs.
- Contractor interviews to understand business characteristics and capacities, how CFLRP work affected them, and costs.
- Analysis of "local capture" or how much of the contracting work offered through the CFLRP was obtained by local contractors. A finding of this component was that local capture was higher for technical or equipment-intensive work, versus labor-intensive work or timber sales.

How could this relate to a collaborative process in the Harney County context?

Economic impact analysis relates or could relate to several collaboratives in Harney County. First, the Harney County Restoration Collaborative is within a CFLRP landscape on the Malheur National Forest, therefore TREAT estimates are already produced for forest restoration work that the collaborative has supported. There has also been some research studying local capture of CFLRP contracts, and interviewing contractors affiliated with the ten-year stewardship contract.[24] However, this knowledge could be explored more deeply by having presentations and group discussions that further articulate the relationship between what the collaborative does and what happens economically. For example, how well do the types of restoration treatments that the collaborative supports align with local business and workforce capacity? How operationally and economically feasible are these treatments for those contractors and workers who implement them? How might the collaborative use this knowledge in planning future projects for local economic impact?

Second, similar economic impact analyses can also be performed in the context of other ecological settings such as rangelands or wetlands to show how the specific projects supported by these collaboratives led to economic outcomes. An economic contributions analysis of wetlands in the Harney Basin was already performed, which reported on the goods and services directly supported by surface water: flood-irrigated pasture, fishing, and

[23] https://www.swcrown.org/social-and-economic-monitoring/

[24] See Bennett, D., Davis, E.J., White, E.M., & Ellison, A. 2015. Economic Impacts from the Malheur 10-Year Stewardship Contract: Evaluating Year One. Ecosystem Workforce Program Fact Sheet #5, University of Oregon: Eugene, OR.

bird viewing.[25] The wetlands and wildfire collaboratives might both more strongly connect their work to this kind of contributions analysis by looking at the effects of the specific management actions they have recommended on these goods and services. The wildfire collaborative may also want to engage economists able to examine economic aspects of rangeland management and wildfire such as avoided losses to cattle, forage, hay, sage-grouse habitat, or other values from wildfire; how their recommended management approaches in projects affect the productivity of rangelands for producers and the provision of economic activity from recreation; and the economic impacts of implemented fuel break and restoration activities.

Monitoring is a tangible way to connect what a collaborative does to various outcomes, and may be more useful and valuable for collaborative participants who are interested in those outcomes than other social science efforts, which may be seen as more abstract or conceptual. However, one challenge is how to appropriately link something that happened on the ground to a collaborative's input when the collaborative itself is not the land manager or implementer, and may influence but is not in control of when and how management actions are implemented.[26] For example, economic monitoring may report that a certain number of jobs were created from a federal land management project that had collaborative input. But it can be difficult to know if and how that number was affected by collaborative input, and if it was any different than projects without collaborative input. Additional data collection such as interviews can help incorporate qualitative information, such as how the collaborative process may have shaped agency decision making and management options.

[25] Bair, L.S., Flyr, M., and Huber, C. 2020. Economic Assessment of Surface Water in the Harney Basin, Oregon. Unpublished/draft report. US Geological Survey.

[26] Davis, E.J., Santo, A., & White, E.M. 2019. Collaborative Capacity and Outcomes from Oregon's Federal Forest Restoration Program. Ecosystem Workforce Program Working Paper #92. University of Oregon: Eugene, OR.

Participatory visual storytelling

What is it?

Some research is participatory action research that directly engages community members and uses diverse forms of media for them to directly share their perspectives. This goes beyond a researcher interviewing a research subject and reporting their words through a scientific lens. A primary example used in health and other research is Photovoice, an established method of documentary photography wherein community members present their experiences through photos or videos, and accompanying narratives. Photovoice or similar approaches can be used in research as a qualitative method, an assessment tool, or to otherwise collect some kind of data from citizens; or they can be entirely led by communities as a form of collective storytelling without an explicit research component.

Example: Participatory video in the Districts of Kilwa and Rural Iringa, Tanzania

A researcher from the University College of London undertook a mixed methods study including participatory video to examine the connection between community forestry and wellbeing in four villages in this region of Tanzania.[27] Two of the villages had a community forestry arrangement, and two did not. Participants were chosen to represent a range of political affiliations, age, gender, and leadership roles. The process took place in a seven-day period in which the participants received training in use of video cameras, created rough video cuts, screened them, and obtained input from others. The researcher directed the participants in several exercises, including taking pictures of three things that constituted well-being and three things that constituted ill-being to them, encouraging participants to reflect and describe their reasons for selecting or not selecting indicators of well-being, and creating lists of well-being and selecting the top five themes for their communities. The participatory video phase was followed by additional data collection using a survey questionnaire and focus group discussions, exploring the top themes found through participatory video. Taken as a whole, the study was focused on exploring why there was strong social support for community forestry when other research had not found evidence of its local benefits; the participatory video component in particular showed that all four villages had similar perceptions and values of wellbeing, regardless of if they had or did not have a community forestry arrangement.

How could this relate to a collaborative process in the Harney County context?

Participatory visual storytelling could be used in the context of a specific project, collaborative, or at the HDP/Harney County scale. This could be a formal research project to collect data, or be a community activity. It is particularly useful for populations who are marginalized or who have insights to contribute that may not be readily shared in the format of verbal discussions and traditional types of meetings. For example, the youth collaborative may want to organize a group of local youth to take photos of things and places that constituted wellbeing or illbeing for them, share it in a community exhibit or webpage[28], and lead a discussion about the common themes. This could then lead toward articulating questions for future research, or help the collaborative further focus on specific common opportunities and challenges in supporting youth wellbeing. Another possibility would be to have members of the wildfire collaborative and landowners within the Stinkingwaters landscape conduct a participatory photo exercise on a field tour or series of tours, capturing examples of values of importance and at risk to them. Collectively-sourced photos could also be combined with data from a human ecology mapping exercise to create a story map that included spatial data and visual representations of important places, values at risk, or other features of a landscape.

[27] Gross-Camp, N. 2017. Tanzania's community forests: their impact on human well-being and persistence in spite of the lack of benefit. *Ecology and Society* 22(1):37.

[28] For example: https://www.pictureofhealthncw.org/stories

Social network analysis

What is it?

Information can be gathered about nodes (individuals or groups) and how they are connected, and mapped out in visual representations to identify highly central nodes, densities of connections, cliques, and other network patterns. Researchers collect data from individuals about their connections in an interview or survey format, and then enter that data into a software program to create diagrams and calculations of these networks.

Example: Stakeholders in the management of the Peak District National Park, United Kingdom[29]

A team of researchers from three universities in the UK wanted to understand how the stakeholders of this national park were viewed by each other and connected, in order to inform park management decisions that were controversial for some stakeholders. In particular, they wanted to analyze the similarities, differences, connections, and conflicts between these stakeholders. Using a structured interview approach, they asked stakeholders about their frequency of communication with each other, and to what extent their views overlapped or differed. The data gathered resulted in two networks—frequency of interaction and similarity of views—which were then subjected to betweenness centrality analyses of the number of times an actor rested between two others who were not connected, signifying that that actor might serve as a bridge. This analysis identified three cliques (water companies and conservationists, game keepers and farmers, and recreation), one of which was not connected to others; and two prominent stakeholders who served as bridges and could be useful for future communications and relationship building around management planning for the park.

How could this relate to a collaborative process in the Harney County context?

Any of Harney County's collaboratives could use a social network analysis to depict the networks of their participants to understand how their members were connected to each other and to others outside of the collaborative, who served as bridges, who was influential, and/or who could connect the collaborative to non-participating stakeholders or external resources. This knowledge could help a collaborative more strategically lean on the networks of its participants to share its messages with a larger community or networks elsewhere, or bring in new members to ensure a diversity of stakeholder perspectives. This could also be used in the context of a specific project area, community, or even business to understand patterns of interaction around specific landscapes, places or places of business that connect people in some way.

How might these social science approaches be used within a collaborative process?

A primary interest of the HDP and associated collaboratives is to understand more specifically how and when to apply social science during the collaborative process. However, there is no detailed roadmap for exactly how the collaborative process looks within or across each of the collaboratives—and a desire to avoid prescribing one. Therefore, the following offers some possible ideas for applying these social science approaches at general stages of a generic collaborative process (Table 4).

Conclusion: Relevant social science

This chapter provided examples of social science research related to wellbeing that could be conducted in the setting of HDP-supported collaboratives. These examples included both qualitative and quantitative data collection and analysis approaches. They share a common emphasis on actively engaging the participant community throughout the research process. This active engagement offers both demands and rewards for collaborative participants. It requires their time and energy, and participants may have differing appetites and abilities to contribute. At the same time, well-designed social science projects may offer useful insights that improve a collaborative's ability to produce its desired outcomes. The following chapter outlines some considerations for the effective engagement of social science and scientists.

[29] Hubacek, K., Prell, C., Reed, M., Boys, D., Bonn, A., and Dean, C. 2006. Using stakeholder and social network analysis to support participatory processes. *The International Journal of Biodiversity Science and Management* 2(3): 249-252.

Table 4 Possibilities for using science at different stages in a collaborative process

Stage of collaborative process (regardless of content focus of collaborative) May be collaborating on a general issue or opportunity, or a specific spatial area or project	**Example questions that social science might help address at this stage**	**Possible social science activities**
Identifying diverse interests/ stakeholders relative to what is being collaborated on	▪ Who are the stakeholders of what we're collaborating on? » How are they connected to each other? » What are their values? » How do they interact with the biophysical and/or built landscape?	▪ Social network analysis ▪ Interviews about stakeholder perspectives and interests ▪ Stakeholder-led participatory video or photo documentation of their values and/or how they interact with places ▪ Human ecology mapping of valued places and places where recreation, business, or other activity occurs
Developing shared purpose, vision, and goals	▪ What are some best practices for identifying shared purpose, vision, and goals? ▪ How might best practices for collaboration vary culturally, based on the population you are working with (e.g., Tribes, natural resource managers, youth, business owners)?	▪ Syntheses of best collaborative practices (both scientific and practitioner literature)
Consideration of available science or data *Seeking available science is often called "joint fact finding" in a collaborative context. Available science may be biophysical or social. Social science may inform the process or using biophysical data, or be useful in contributing social/economic information itself.*	Quite dependent on what is being collaborated on: ▪ What are potential economic tradeoffs of one planned action versus another? In the short and long term? ▪ Who will benefit from this planned action? Who may be harmed? In the short and long term? ▪ What is the estimated economic feasibility of the planned actions? ▪ How will this action create or limit opportunities for local businesses or landowners to participate in implementation? ▪ What is the social acceptability of the planned action, generally, in our state, and/or locally (e.g., prescribed fire, intensive grazing?) ▪ What are best practices for reviewing and evaluating diverse sources of science?	▪ Modeling potential economic impacts ▪ Modeling avoided costs ▪ Local contractor/business capacity analysis through interviews, analysis of contracting records ▪ Interviews with landowners in area ▪ Interviews with business owners about their information needs. ▪ Surveys of youth to understand their interests and barriers to engagement. ▪ Review existing literature about social acceptability of various management actions for general insights; conduct surveys or interviews to obtain more locally-specific perspectives ▪ Review existing literature about using science and data in collaborative processes (joint fact finding, science in policy decisionmaking, etc).
Development and documentation of agreement (consensus seeking) about planned actions	▪ What are some best practices for seeking consensus? ▪ How might best practices for seeking consensus vary culturally, based on the population you are working with (e.g., Tribes, natural resource managers, youth, business owners)?	▪ Syntheses of best collaborative practices (both scientific and practitioner literature)
Monitoring, learning, and adaptation	▪ What are the social or economic impacts of the actions the collaborative agreed upon? ▪ What are best practices for adaptation and learning in a collaborative context? ▪ What social effects occurred for members of youth crews engaged in monitoring?	▪ Social and economic monitoring of implemented actions ▪ Review of literature about adaptive management, social learning ▪ Interviews and focus group with youth crew members

Chapter 3. Considerations for Working with Social Science and Scientists in a Collaborative Setting

The objective of this chapter is to provide an introductory overview of social science that can help Harney County practitioners learn more about what it is, how it is conducted, and how they might engage with social science and scientists.

What is social science?[30]

A good starting point for understanding social science is to look at both parts of this term. First, "science" typically indicates knowledge that has been gathered and organized systematically, using techniques for making observations, interpreting results, and generalizing them. Scientific knowledge should meet four standards: it should be logical, confirmable, repeatable, and scrutinizable. The broad goal of science is to offer and revise theories that explain phenomena, both by gathering data to empirically test existing theories and by developing new concepts. Importantly, however, science does not offer single or complete answers:

> *"Sometimes, there may not be a single universal truth, but rather an equilibrium of 'multiple truths.' We must understand that the theories, upon which scientific knowledge is based, are only explanations of a particular phenomenon, as suggested by a scientist. As such, there may be good or poor explanations, depending on the extent to which those explanations fit well with reality, and consequently, there may be good or poor theories."* [31]

The other component of "social science" is the word "social." This means that social science is focused on understanding the behaviors of individual people or collections of people. Within the broad category of social science, there are several disciplines. There is not necessarily a single agreed-upon list of disciplines included in social science, and it varies from source to source, and country to country. Commonly included, however, are:

[30] Material in this section is substantially drawn from Bhattacherjee, A. 2012. *Social science research: Principles, methods, and practices*. Available at: https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1002&context=oa_textbooks.

[31] Bhattacherjee 2012, p. 5.

- Psychology: the science of human behaviors
- Sociology: the science of social groups
- Anthropology: the science of humanity
- Political science: the science of governance
- Human geography: the science of how people and the environment interact
- Economics: the science of businesses, markets, and economies; and efficient allocation of resources

Sometimes, disciplines such as history are included as a social science, but history is more often regarded as being part of the humanities. In addition, disciplines such as communications studies and social work may be also included in the social sciences, but are recognized as more applied types of research that also overlap with and draw on the other social science disciplines. Each social science discipline has its own history, standards, and common approaches. But each also has a wide range of topics and methods, which not everyone may agree on; and that has changed over time as society itself has changed, and as researchers continually question how to best produce knowledge.

In science in general, there has also been a growing trend towards inter- or trans-disciplinary research wherein an individual researcher or team of researchers may use and integrate concepts, theories, and tools from more than one discipline to build more complete knowledge about complex phenomena. This may include a combination of different social science disciplines (e.g., an economist may model economic impacts of a change in a forest policy, and a sociologist may study how social groups such as business owners affected by that policy change perceive it), or a combination of biophysical and social science disciplines (e.g., an anthropologist may gather ethnographic data about how a community is using a particular resource, and a remote sensing geographer may detect and monitor changes in vegetation cover in that same area to understand possible relationships to community behavior). Many funders of research require interdisciplinary approaches, and many communities like Harney County recognize that their goals are inherently intertwined across human and physical realms. But it often remains challenging for researchers from different disciplines to work together because they have different training, and it is not always possible to defensibly identify causes and effects in how their findings relate.

How is social science conducted?[32]

Social science studies can generally involve qualitative and/or quantitative research methods. Methods are the approaches that researchers take to structuring their inquiry, gathering and analyzing data, and preparing results. Qualitative research is non-numeric and quantitative is numeric. These approaches can be used separately or combined. In addition, variables may quantify qualitative phenomena. For example, a survey might ask a respondent to rate how they feel about something using a point scale, which allows a subjective feeling to be captured numerically and makes it available for statistical analysis. Another example is that qualitative interview data can be coded using content analysis that counts the frequency of themes. For community practitioners, these two sets of methods are suited for different kinds of questions. For example, quantitative studies may put the weight of numbers to an issue, yet leave out important contextual details or explanations about why a phenomenon is occurring.

Social science research may rely on primary or secondary data sources. Primary data collection is that conducted by the researcher themselves. Some common primary data collection approaches are:

- *Interviews:* The researcher asks one research subject a series of questions. These questions may be fairly structured, or more open-ended and conversational.
- *Surveys:* The researcher asks a number of research subjects to complete a questionnaire

[32] Material in this section is drawn from 1) Bhattacherjee 2012; 2) Patton, M.Q. 1990. *Qualitative evaluation and research methods.* SAGE Publications, Inc.; and 3) Ulrich, D., Davis, E.J., and Friesen, C. 2016. Social Science Forum U.S. Forest Service, Region 6- A Synthesis of Learning.

(typically through the mail or online). These questions may be structured and quantifiable, or open-ended. Surveys can be of the general population, or of a more targeted group.

- *Focus groups:* The researcher convenes a group of research subjects and asks them questions; they observe the dialogue in response.
- *Participant observation:* The researcher participates in a phenomenon while also observing it and taking detailed field notes, acknowledging their role and positionality within it.

Secondary data may also be useful to a community seeking to understand its wellbeing. Secondary means that the researcher themselves did not collect the data, but are analyzing and reporting it. Common sources of secondary data are federal, state, and local governments, who annually or otherwise regularly collect, compile, and make available information from populations and categories within those in a standard way. This can include demographic information about social and economic characteristics such as age, gender, income, employment, education; and information about health such as epidemiological reports. Statistical analysis of these data can be used to understand trends over time or compare different places. Secondary data can help answer descriptive questions of who or what (e.g., how many students in our county receive free or reduced lunch?), but alone cannot explain why (e.g., what factors are causing these students to need free or reduced lunch?). Nor can it alone typically be used to prove an outcome (e.g., because of our collaborative's new program, we see a change in how many students are receiving free and reduced lunch) without the support of additional data collection to identify possible variables affecting this outcome and how they function. Some secondary data is often reported at the county level, which can mean there is not information specific to unincorporated areas and individual towns and cities.

What are some important considerations in using social science?

Despite both being sciences, social science and natural science differ

Both social and natural science are valid forms of producing knowledge based on scientific standards.[33] However, they are inherently different, as social science studies human phenomena, which are social objects and "highly variable." This makes it less "deterministic" and more "ambiguous" than some natural sciences that are based on laws of nature. For example:

> *"…if you measure a person's happiness using a hypothetical instrument, you may find that the same person is more happy or less happy (or sad) on different days and sometimes, at different times on the same day. One's happiness may vary depending on the news that person received that day or on the events that transpired earlier during that day. Furthermore, there is not a single instrument or metric that can accurately measure a person's happiness. Hence, one instrument may calibrate a person as being 'more happy' while a second instrument may find that the same person is 'less happy' at the same instant in time. In other words, there is a high degree of measurement error in the social sciences and there is considerable uncertainty and little agreement on social science policy decisions."*[34]

This does not mean that social science offers no value to practitioners, but that there is potential for social science studies on the same phenomenon to produce different results. Indeed, this can occur with biophysical science as well. It is important for practitioners to therefore understand how study design features such as type of instrument used or size of research subject population may affect a study's findings and the extent of their applicability.

[33] For discussion of further challenges in perceptions of social science, see Bennett, D., C. Barnwell, K. Freedman, S. Smutko, T. Wittman, and J. Western. 2019. Developing a social science research agenda to guide managers in sagebrush ecosystems. University of Wyoming, Laramie, WY: Ruckelshaus Institute of Environment and Natural Resources.

[34] Bhattacherjee 2012, p. 2.

There are ways to assess best available social science[35]

Natural resource management often emphasizes use of "best available science" to guide decision making. "Available" indicates that the science exists at the time that the management decision process is underway, although it may require further interpretation for use. It is important to recognize that best available science[36] can include different formats:

- *Scientific information:* "Produced using the scientific process to understand principles governing cause and effect relationships (why and how things work)."
- *Suggestive information:* "Empirical data, detailed observations, outputs from modelling or other simulation exercises, and estimates that are gathered using scientific methods (which should be clearly articulated and evaluated for their scientific rigor), that can contribute substantively to the knowledge base. Unlike scientific information, however, it does not explain cause-effect relationships or offer in-depth understanding of complex interactions and processes. It is often used when there is insufficient scientific information relevant to a particular management question."[37]
- *Supplementary information:* Used when there is no or limited scientific or suggestive information; primarily consists of expert opinions or knowledge that is substantive but not widely known.

It is helpful to regard available information using these three categories to clarify its basis and value, and how well it may or may not address a collaborative's questions. It is also important to recognize different principles for best available science in a qualitative approach, which does not have the same positivist orientation, and particularly when the research is originating with/from the community.[38]

[35] Material and quotes in this paragraph are drawn from Charnley *et al*. 2017.

[36] Bisbal, G.A. 2002. The best available science for the management of anadromous salmonids in the Columbia River Basin. *Canadian Journal of Fisheries and Aquatic Sciences* 59(12): 1952-1959.

[37] Charnley et al. 2017, p. 84.

[38] See Table 2, page 83, in Charnley et al. 2017 for criteria for evaluating best available qualitative social science.

Different disciplines use different concepts, or use different words for similar concepts

Many social science theories or concepts that matter to community practitioners such as those in the HDP-supported collaboratives are not studied solely within one discipline, often have emerged separately in separate disciplines, and are not equivalent to a discipline. For example, "collaboration" has been studied as a governance approach to public administration within the discipline of political science, as a behavior of companies in the discipline of economics, or as a learning strategy within the discipline of sociology. Even more complex is that it is related to, but not the same as, numerous other concepts such as collective action, networked governance, or partnerships. Researchers from different disciplines tend to publish in different journals and use different terms for similar concepts—and those may not the same terms that people in a community use to talk about what they are experiencing. Therefore, social science that may be relevant to Harney County's collaborative efforts is not simply found within one discipline, journal, or researcher; and scientists and practitioners may use different terms to talk about the same phenomenon. This lack of common language can challenge the conversation between social scientists and practitioners; hence, time to explain each other's terms and what they mean to each person using them is essential when bringing social science concepts into collaborative dialogue. Establishing early shared understanding about a collaborative's questions and true interests, and the capacity of available or new social science to answer them, may improve the ability of the scientist to aid the collaborative in exploring what they really want to know.

Science interacts with values in a collaborative process and is not the sole arbiter of decisions

Earlier traditions of science held that it provided objective facts that were separate from values, and that a scientific finding clearly pointed to a management solution.[39] However, scientific, suggestive, or supplementary information is part of a collaborative process, along with participants' social values. Moreover, uncertainty will always remain: this information cannot likely fully answer all questions or address all possible scenarios. In other words: "A common misconception of nonscientists is that science can provide objective answers to the thorny question, 'how should we manage this ecosystem or resource?' Such questions can be answered only by reconciling the socially constructed values and expectations of the stakeholders at the policymaking table." [40] In a collaborative setting, science may be best seen as a "discussion support tool", rather than a "decision support tool", as it provides insights, but does not solely direct decisions.[41] Another analogy is that science offers a campfire (a place to gather with light and warmth) but is not a crystal ball. Moreover, social science does not automatically indicate clear solutions that will be accepted by all, just because it is science that concerns humans. Social science cannot guarantee social license. But it may help illuminate areas of conflict or controversy, explain why those exist, and suggest tradeoffs or approaches to address them. Within a collaborative, it may be useful to have clear expectations and strong facilitation for the process to incorporate science (of all types) alongside values with respect for both. For example, during and after presentations by a scientist/s, dialogue should create opportunities for collaborative members to openly discuss how what they have learned may connect to not only their but also others' values; i.e., one stakeholder might be asked to recount what they value and their desired outcomes, and another asked to then describe anything that they heard in the science shared that would help inform the other's interests and meet their goals.[42]

[39] Pielke Jr, R.A. 2004. When scientists politicize science: making sense of controversy over The Skeptical Environmentalist. *Environmental Science & Policy* 7(5): 405-417.

[40] Sullivan, P.J., Acheson, J., Angermeier, P.L., Faast, T., Flemma, J., Jones, C. M., Knudsen, E.E., Minello, T.J., Secor, D.H., Wunderlich, R., and Zanetell, B. A. 2006. Defining and Implementing Best Available Science for Fisheries and Environmental Science, Policy, and Management. Marine Sciences Faculty Scholarship. Paper 30. Available at: http://digitalcommons.library.umaine.edu/sms_facpub/30

[41] Hughes, J.R. 2015. Exploring Roles for Scientists and Simulation Models in Collaborative, Science-Based Ecosystem Restoration. Thesis, Master of Public Policy, Oregon State University.

[42] Seager, S.T., Ediger, V., and Davis, E.J. 2015. Aspen Restoration and Social Agreements: An Introductory Guide for Forest Collaboratives in Central and Eastern Oregon. The Nature Conservancy, Portland, OR. 64 p.

Social science may not always be what is needed

When facing a social issue or conflict, it may be reasonable to assume that social science must be needed to better explain the situation and identify possible solutions. However, there are times when scientific information and systematic data gathering is not what is needed, or not solely what is needed. For example, a collaborative might experience a surge in acrimony and a breakdown in how members interact with each other. Indeed, an external party might offer a valuable service by interviewing these members to gather their perspectives, and presenting the patterns and findings in a consistent way. Such a task could be performed by a scientist, but many scientists need their work to allow them to build theories and concepts, and publish peer-reviewed results. It may not be suitable for the collaborative to have its situation analyzed through a particular conceptual lens, nor for its members to have to wait a long time for published results in order to obtain information to address a pressing issue. A change in facilitation approach, seeking a mediator, or otherwise directly addressing the situation as a collaborative might have more immediate value than pursuing a social science project.

Scientific and collaborative processes have different structures and incentives[43]

There can be structural impediments to scientists working directly with human communities, even in the context of social science. This is because the scientific and collaborative processes are not the same. The scientific process requires the scientist to identify researchable problems and questions that, if answered, contribute to scientific theories and concepts. They have to then determine the appropriate methods to answer those questions, using scientific standards for gathering and analyzing data, interpreting and reviewing results, and writing up and submitting the findings for peer review. If they are doing research with "human subjects", as is the case with much social science, they need to obtain ethics approval from their Institutional Review Board. Some questions that a community may have are not readily researchable or may be as suitable for publication in a peer-reviewed setting, so they may not be feasible or desirable for a scientist to pursue. Scientists at an academic or government institution generally are evaluated on their productivity in publishing research, teaching classes, serving on committees, and other duties. However, not all of positions are the same. Some have Extension components, which allow the scientist to spend time developing research needs with practitioners and helping apply knowledge practically. If a collaborative is interested in working with a scientist, it would be useful to learn more about that person's job duties, funding sources, and if and how the collaborative's interests fit with those; as well as the person's skill sets and orientation towards doing applied and community-driven research. Practitioners often ask for a graduate student to perform the work, which may offer an ideal approach, but the research questions and process would need to be possible for a student to conduct effectively while still meeting their graduate program requirements. In addition to a scientist's areas of expertise and job duties, personality matters for working in a collaborative setting. For example, flexibility, good communication skills, the ability to face scrutiny and conflict, the patience to handle changes in timeline and process, and the respect to not dictate the collaborative process are key. Further, different collaborative stakeholders may have their own differing views and experience with relevant science and scientists, and may ask to bring together scientists who do not agree, creating the potential for professional and interpersonal conflict among these scientists and with the collaborative. A well-designed collaborative process for engaging with "dueling science" can help mitigate the challenges of this situation for all involved.[44]

Collaboratives and communities can take steps to support effective application of social science

Collaboratives can have an effect on how productive their engagements with social scientists are, and increase the likelihood of social science being useful for their decisions in several ways. Ideally, this guide and associated resources help collaborative members recognize that: 1) there are different

[43] Material in this section is drawn from Davis, E.J. ed. 2018. Science and Collaborative Processes. Technical Brief #2. Go Big or Go Home? Technical Briefing Paper Series. Available at: http://gbgh.forestry.oregonstate.edu/technical-briefs

[44] Davis, E.J., Nuss, M.L., & Hughes, J.R. 2015. Science and Collaborative Decision-Making: A Case Study of the Kew Study. Case Study Research Brief #3, Forest Research Laboratory, Oregon State University. Available at: http://hdl.handle.net/1957/56559.

ways to gather data, 2) some are better suited than others depending on the research question(s), and 3) different approaches demand different types of involvement from community members. Researchers are trained in these methods, and should be able to make decisions about which data collection approaches will allow a research question to be addressed, based on their expertise. However, community members will want to ensure that the research questions from the start reflect their interests, and that the demands for their participation in the data collection are appropriate. This is important not just for one project, but over time if multiple researchers are engaging with the community. "Research fatigue" can occur rapidly, particularly with qualitative research involving the same participants.[45] A few possible recommendations for the Harney County setting are for collaborative participants/HDP to:

- Spend time within collaboratives discussing what kinds of social or economic information is needed, why members feel it is needed, and specifically how they imagine using it in the context of a particular project or process. Take detailed notes that capture this discussion. Consider developing a community research agenda to proactively present to researchers interested in working in the area.[46]
- Organize or work with a partner to organize a series of presentations and discussions with researchers who have conducted social science in Harney County to date. This could be in a workshop or webinar format. Provide very specific guidance to speakers, asking them to clearly explain their research, and its implications and limitations. Provide ample space for researchers to identify the common themes and future research questions that they see as relevant from their perspectives; and for collaborative and community members to ask questions and explain their interests.
- If social science questions are emerging, try to determine if they require new research to be answered. For example, a literature review/synthesis of existing knowledge or "joint fact-finding" may in fact be needed to locate all available knowledge on a topic. Or, engage a scientist on a relevant topic to provide a primer or an overview presentation of foundational terms and concepts to learn more.
- If engaging with a scientist or team of scientists, begin by developing shared, written expectations for the process. This helps both the collaborative and researcher understand how much time to allocate and ensures there is open communication. This process should include check in points for presentations and discussion. Additionally, require written or other products that present results and management implications in clear language.

Conclusion: Using social science successfully

For successful application of social science in a collaborative setting, practitioners will benefit from basic understanding of what it is (and is not), and how it may be conducted. It is essential to recognize that although all science has standards and methods, social science studies human phenomena and is therefore less "deterministic" and more "ambiguous" than some natural sciences that are based on laws of nature. Moreover, neither social or natural sciences are the sole arbiter of collaborative decisions; they must interact with the values of participants. It is important to assess the quality and rigor of available social science, determine if and how a collaborative's interests may be best addressed through engaging with it, and find scientific partners with the skills and capacities to work effectively with collaboratives.

[45] Clark, T., 2008. We're Over-Researched Here!' Exploring Accounts of Research Fatigue within Qualitative Research Engagements. *Sociology* 42(5): 953-970.

[46] For example: http://www.clayoquotalliance.uvic.ca/Research/communityhealth.html.

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