OKANOGAN COUNTY BACKROADS STUDY

PHASE 1 REPORT

1. INTRODUCTION

In 2017 the Okanogan Council of Governments (OCOG) adopted its first long-range regional transportation plan. The *2040 Regional Transportation Plan for the Okanogan Region* identifies transportation issues and opportunities of consequence to the region. It spells out specific strategies to address those issues and harness the opportunities that benefit from regional partnerships.

A priority strategy identified in the regional plan is a "Primitive Roads Study.[1]" The intent of the recommended study is to establish a better understanding of the uniquely rural transportation network made up of primitive, gravel, and unimproved roadways that support highly rural mobility needs and identify practical ways to improve coordination and collaboration between agencies in managing this critical asset. An extensive system of backroads provides critical support for public safety, recreation, and economic development all across the Okanogan Region.

In late February 2019, an RFP was issued by the OCOG to collect and assess data needed to support this effort and identify a reasonable implementation strategy that allows work to progress through multiple funding cycles. Work got underway in mid-April. This report is a product of that effort.

In the pages that follow, the *Okanogan County Backroads Study* describes

Photo Credit: George Mazur

the study effort, results, and findings of the initial investigation. It highlights some key considerations derived from the background work that inform the recommended implementation strategy. This *Backroads Study* Phase 1 report outlines the recommended strategy and offers some practical grouping of activities that can be accomplished within a financially constrained budget scenario. Documentation that supports future work is included in the Appendix.

In addition to the work described in this *Okanogan County Backroads Study*, a website was developed to make the process and data accessible to more people and support future engagement activities. That website can be found at www.ocog.org. A copy of this report and a selection of the geospatial mapping products that it references will be found there.

THE OKANOGAN REGION

The Okanogan Region shares the same geography as Okanogan County. The Okanogan Council of Governments, or OCOG, is the state-designated Regional Transportation Planning Organization (RTPO) for the Okanogan Region. Its members include all of the jurisdictions within the region as well as the Confederated Tribes of the Colville Reservation and the North Central Region of the Washington State Department of Transportation. OCOG members work together on consequential transportation issues that transcend jurisdictional boundaries or which are better approached in a coordinated fashion. More information on OCOG and its role in transportation planning can be found on the organization's website at www.ocog.org .

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[1] See the Appendix for the project description included in the regional transportation plan.

1.A   STUDY PURPOSE

The purpose of the *Okanogan County Backroads Study* is to identify a highly rural road network[2] of gravel, dirt, and primitive roadways that function as the primary network providing critical access and rural connectivity regardless of jurisdiction or land management agency boundaries, as well as strategies for improving interagency collaboration and coordination in the designation and management of this essential network. A highly rural road network functions as the rural equivalent of arterials and major collectors on the more familiar functional classification system of urban streets and roads. As the recognized backbone of the region's rural system of backroads, this network will designate the primary through-routes across the region and critical connectors that provide ingress and egress to rural communities, work sites, recreational destinations, essential public facilities, and other regionally significant places across rural Okanogan County.

The objective of this Phase 1 study effort is to establish a baseline understanding of available resources and background issues sufficient to outline a Phase 2 implementation strategy to move this effort forward in a highly constrained funding environment.

1.B   STUDY NEED

Several factors drive the need for this project.

1. The vast majority of roadway miles in the Okanogan region are unpaved or primitive, and are owned and managed by numerous local, state, federal, and tribal agencies, as well as private landowners. Each agency builds and maintains roads that support its mission within the constraints and protocols specific to that agency. While some consideration is given to connectivity with roads owned and maintained by an adjacent agencies, regular coordination and collaboration between agencies does not happen. The map below, from the 2013 Okanogan County Community
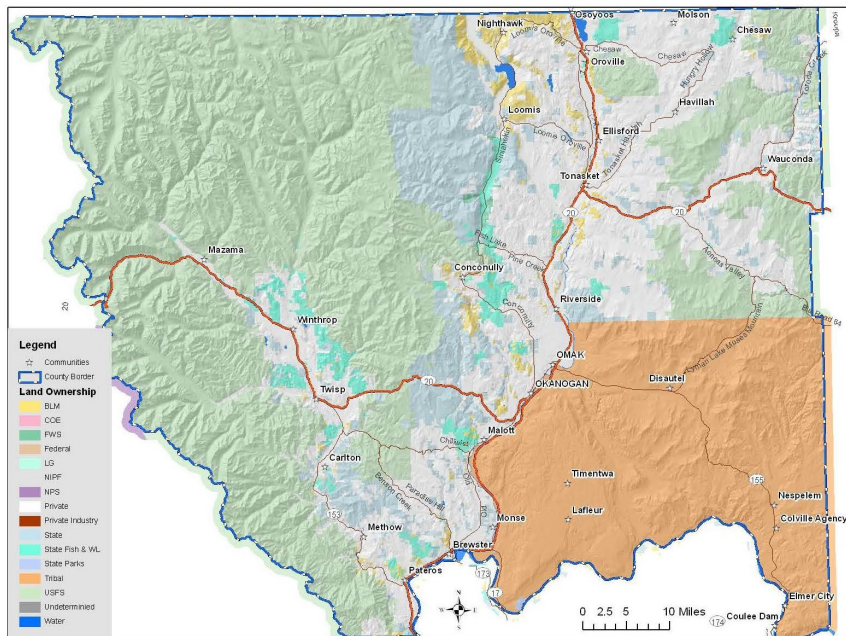
Wildfire Protection Plan, illustrates the complex land ownership of rural lands in the Okanogan Region.

2. The Okanogan Region is characterized by a diverse array of highly rural land use activities. Historically dominant activities like timber harvesting and mining are declining while agricultural uses, year-round outdoor recreation activities, and residential uses are increasing. Backcountry roads provide access to these activities from highways and local roads as well as provide access to essential public facilities such as rural public-use airports, utility corridors, and telecommunications facilities.

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[2] For purposes of this *Backroads Study*, the "highly rural road network" refers to those roadways that support critical area-wide access in the rural parts of the Okanogan County region and which operate seamlessly across land management agency boundaries. These roadways may be gravel, dirt, or paved, and may be designated as "primitive" in some cases. These are roadways intended to be passable in season by passenger vehicles.

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3. Severe wildfires experienced in 2014 and 2015 highlighted vulnerabilities associated with the region's sparse paved roadway network and uncoordinated rural roads network as critical access routes were cut off by fire, leaving more people reliant on unimproved gravel roads for emergency response and evacuation. The best available science indicates that fires and extreme weather events will increase in both frequency and intensity in the future. The reliance of future emergency response activities on gravel roads is likely to increase, too.

4. Economic resiliency in rural areas depends on reliable access. That access, often on primitive or gravel roads, may rely on facilities owned and maintained by two or more land management agencies. Deterioration of these roadways impacts economic productivity. Coordination of agricultural, mining, or forestry access needs with roadway plans and standards of adjoining land management can help ensure that critical economic routes are recognized and are designed and maintained appropriately for their function.

5. Land management agencies (LMA) responsible for building and maintaining their roadway networks each face significant funding deficits to maintain their systems. This means that some routes do not receive the maintenance and upgrades that each agency would like to provide if more resources were available. Every agency must make difficult decisions about what to fund, what to defer, and in many cases, what to decommission or simply quit maintaining due to lack of resources. Absent any kind of coordination between agencies it is likely that critical segments needed to ensure route continuity or redundancy over a large area will be relegated to a lower standard for maintenance, creating vulnerabilities in the overall system. Better coordination can help each agency to manage its own system more cost-effectively and in ways that support broader agency and shared objectives.

State highways and local arterials are the primary backbone of the traditional roadway system serving the region's cities, towns, and communities. These facilities operate seamlessly across jurisdictional boundaries, intersecting with secondary or lesser routes and providing critical access to key destinations, places, and activities throughout developed areas of the region. A highly rural equivalent of this network would function seamlessly across the borders of different land management agencies, supporting vital access to key places, destinations, and essential public facilities located in remote areas of the Okanogan Region.

Designation of a highly rural road network requires understanding and agreement amongst the various land management agencies as to which of the many routes are most important for resiliency and route redundancy given the terrain and land use activities in the rural reaches of the region.

2.   STUDY BACKGROUND

The Phase 1 investigation began with a resource scan to identify and review other rural regions that had conducted similar multiagency coordination in the realm of highly rural roads. It seemed logical that other places had already confronted this challenge of coordination amongst LMAs in establishing a priority rural road network to support mutual needs. These precedents would provide a baseline understanding of how different LMAs reconciled differences in their missions and needs to identify key routes that all supported. Prior studies would reveal the methodologies that had proved fruitful in the identification of "priority routes" in a highly rural, geologically complex environment. In addition to online searches and review of the Transportation Research Record maintained by the Transportation Research Board (TRB), discussions were initiated with staff at the Western Federal Lands Highway Division (WFLHD) of the Federal Highway Administration (FHWA) to get insights from other large western states and at the County Road Administration Board (CRAB) to get insights from other rural Washington counties.

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No comparable studies or initiatives were identified though some useful multiagency federal transportation planning initiatives were identified. To the best of the research team's knowledge, this OCOG *Backroads Study* initiative to develop a highly rural road network in coordination with other land management agencies is an original effort without precedent. Any information to the contrary by subsequent reviewers of this report is appreciated.

The pages that follow outline the Phase 1 study effort approach, highlighting early findings and key take-away considerations that shaped Phase 2 recommendations. It offers a strategic outline of the recommended approach as well as potential funding mechanisms to accomplish the work. It also proposes some potential applications for this work when it is complete and identifies leverage opportunities that support additional regional objectives.

Though it was informed by numerous in-depth interview discussions and extensive review of relevant plans, timing precluded meaningful opportunity for review and refinement of this proposed strategy with key stakeholders. Final implementation activities will reflect input and feedback from study partners as they have time to review the recommended approach as presented in this study report.

2.A   OVERVIEW OF PHASE 1 BACKGROUND INVESTIGATION

Two concurrent and intersecting tracks characterized the Phase 1 *Backroads Study* effort. One track focused on data collection and assessment while the other focused on research and engagement with land management agencies and other key stakeholders.

2.A.1   DATA COLLECTION AND ASSESSMENT

The scale of the Okanogan Region and its thousands of miles of highly rural roadways, the multitude of land management agencies responsible for building and maintaining some part of those rural roadways, and the rugged terrain and far-flung destinations served by rural roads all underscore the importance of building a solid data analysis platform to support the identification and evaluation of priority facilities.

Relevant geodata sets were acquired from a variety of sources. The aim initially was to simply ascertain availability and value to this effort. "Database Documentation," in the appendix, provides an overview of the roadway data sources collected and reviewed.

Upon receiving the data and assessing the value to this project, a composite layer of linear roadways with their associated attribute characteristics was developed for the full extent of the region, regardless of LMA or ownership. This results in a substantially complete roadway coverage of the entire region. While the extent of the coverage is good, the data attributes associated with roadways from each LMA are not uniform across the region.

Attributes describe any number of characteristics associated with roadways: travel width, surface material, maintenance frequency, ownership, design speed, etc. Some roadway data sets have more extensive attribute information than others, or are updated on a more frequent basis. Initial review, however, suggests that most of the data needed to conduct the requisite desktop analysis for something of this magnitude is available while much of what might be missing can probably be supplied through local area knowledge. Field investigations will be valuable later in this process, but they will be highly targeted.

One concern going into the study effort was allayed. There had been questions as to whether the "edges" of datasets would match at the boundaries of each LMA. Minimal edge-matching was needed to reconcile differences between the datasets. On the next page Table 1 – *Primary Roadway Attribute Layers* summarizes which of the datasets evaluated were ultimately selected for use in developing a composite roadway database to support this study effort.

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Okanogan County Backroads Study: Multi-Agency Dataset Analysis
An inventory of available agency datasets and their attributes based on project relevancy and area coverage.

Table 1 - Primary Roadway Attributes Layers

Data Attributes → / Provider/Source ↓	Road Name	Segment Ownership	Maintenance Responsibility	Segment Identifier	Availability Status	Segment Class/Level	Physical Characteristics	Maintenance Level	Use Volumes	Dataset Notes:
DNR - Active Roads Feature Service	☑	☑	☑	☑	☑	☑				Primary data layer used between jurisdictions. Will Function as baseline for future layer development. *Automatic Oracle database triggers updates.*
Okanogan County Public Works and Planning - Roads	☑	☑		☑	☑ Primitive	☑ FFC + LFC	☑ + width	☑ Pave year	☑ ADT	PRIMITIVE roads designation metric. Bus routes, speed limits, mail routes, SPECIALSYS attributes also available.
USFS - National Forest System Roads (feature layer)	☑		☑	☑	☑ + seasonal + passage	☑	☑	☑		SYSTEM Layer: Identifies whether a road is a National Forest System Road (NFSR) or is part of another system. A system is a network of travel ways serving a common need or purpose, managed by an entity with the authority to finance, build, operate and maintain the routes.
USFS - Motor Vehicle Use Map: Roads (feature layer)	☑		☑	☑	☑ + seasonal	☑	☑	☑		Operational Maintenance Level defines the level to which the road is currently being maintained. The maintenance level currently assigned to the road considering current needs, road condition, budget constraints and environmental concerns.
WSDOT Mat Labs - Pavement Management System	☑			☑			☑	☑		Coverage is minimal but attributes are good.
WSDOT - Local Agency Public Roads	☑			☑						Attributes are minimal but coverage is good.
WSDOT – Washington All Public Roads	☑			☑			☑	☑		
County Road Administration Board – County Roads				☑						CRAB uses this data collected from counties for system reports.
Colville National Tribal Transportation Facilities Inventory	☑	☑		☑		☑	☑	☑		Contains terrain, roadbed, surface, width, shoulder, drainage, maintenance attributes.
Forest Practices Orphaned and Abandoned Roadways				☑	☑					Minimal data coverage, but links in with DNR inventories.

While the Department of Natural Resources Roads Feature Service will function as the baseline for the development of the Highly Rural Roads Network, other inventories provide supplemental coverage areas and attributes that will be referenced to further inform network development and evaluation criteria. Those columns marked in green offer additional evaluation metrics above and in addition to those found in the DNR Active Roads Feature Service inventory.

Road Name: Segments represented with a locally recognized naming convention.
Segment Ownership: The entity in ownership control of the given roadway segment.
Maintenance Responsibility: The party or agency tasked with segment maintenance.
Segment Identifier: A numerical identifier unique to each segment.
Availability Status: Information regarding a segment's seasonal and public use availability.
Segment Class/Level: A hierarchical listing of segments based on capacity and serviceability.
Physical Characteristics: Segment characteristics including condition, surface type, width, roadbed, terrain etc.
Maintenance Level: Attributes regarding a segments condition, scheduled maintenance, and general state of repair.
Use Volumes: The frequency with which a segment is used by vehicles and other modes of transportation.

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In addition to roadway datasets, other available geodata was identified or collected that can support future evaluation activities. This includes land use data as well as environmental and other spatial analysis data. Lidar[3] in particular will provide valuable insights when assessing the condition and vulnerabilities of different routes. Background investigations revealed a number of intersecting opportunities associated with lidar and is discussed later in this report.

2.A.2 LMA RESEARCH AND ENGAGEMENT

Concurrent with data collection and assessment were efforts to understand the context within which each of the various land management agencies (LMA) conduct their transportation planning and programming activities, and to identify overlapping interests that this effort should recognize and leverage.

There are four primary categories of LMAs operating in the Okanogan Region: local, state, federal, and tribal. Within three of those LMAs there are multiple players.

- o Local LMAs include Okanogan County and each of the city and town municipalities.
- o State LMAs include the Department of Natural Resources, Department of Fish and Wildlife, and State Parks. The Washington State Department of Transportation (WSDOT) is an active partner with state LMAs.
- o Federal LMAs include the US Forest Service which is part of the US Department of Agriculture, as well as US Fish and Wildlife, National Parks, the Bureau of Land Management, the Bureau of Indian Affairs, all of which are part of the US Department of the Interior. The FHWA is an active partner with federal LMAs.

The Confederated Tribes of the Colville Reservation is the tribal LMA.

Land management agencies were the focus in Phase 1 because these are the organizations responsible for building and maintaining the roadways that access rural lands. These roadways support a wide variety of system users – utilities, orchardists and farmers, private property owners and outdoor enthusiasts, public safety and emergency responders, mining and logging operations, and more. While there is a strong interest in engaging these different system users in Phase 2, it is necessary to start from a solid understanding of the facilities, protocols, and decision-making considerations of the agencies that build and maintain the roadways on which those user activities depend.

The original plan was to convene two stakeholder meetings with representatives from the different LMAs. The first was to be in late-May to introduce the study effort, find commonalities and differences in the ways that each LMA approaches its roadway responsibilities, and jointly identify shared interests in this study effort. The second was to be in mid-late June to discuss a proposed implementation approach. An early finding in this background research was that scheduling meetings in this time period – effectively the beginning of peak summer season activities for every agency – was not realistic.

Investigations were reorganized to focus instead on the foundational plans and strategies guiding each agencies' decision-making processes, building on the extensive foundations informing not just transportation decisions across the region but also public safety, economic resilience, and recreational opportunities each LMA pursues within its limited but prioritized resources.

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[3] Lidar (also referred to as Lidar or LiDAR) stands for Light Detection and Ranging. It is a fairly recent remote sensing method of data collection that uses light in the form of a pulsed laser to measure variable distances to earth from a plane-mounted camera. This technology results in extremely fine-grained 3D images used to make high-resolution maps that support a wide range of uses. Readers unfamiliar with lidar will find a fascinating overview on the WA Dept. of Natural Resources website in "The Bare Earth Story Map" which can be found here: https://www.dnr.wa.gov/lidar#the-bare-earth-story-map

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Plans and implementation strategies from every LMA were scanned to identify those with the greatest relevance to the project need described in the OCOG *2040 Regional Transportation Plan.* Few plans were found specific to rural roads themselves, though a comprehensive compendium of rural roadway maintenance classification schemes and protocols associated with several LMAs was assembled. This enables development of a terminology framework and data dictionary specific to this Okanogan rural roads network that corresponds back to the original datasets from each LMA while bridging the differences in terminology between the agencies. Just as importantly, numerous insightful plans were identified and reviewed that put transportation and the need for this rural road network into the broader context of regional and agency objectives. This includes reports generated through community and countywide emergency management planning activities, strategies, and protocols, and LMA resource management activities.

In addition to providing overviews of their programs, several LMA representatives and others spent considerable time sharing practical insights about interagency coordination and how to navigate the various decision-making and communications channels of each agency. People discussed the funding and resource challenges their agencies face and explored possible overlapping areas of interest that might open doors to potential partnerships. Valuable insights shaped early thinking about the potential value of this coordinated road planning effort and how to get the most out of it through the implementation strategy in Phase 2.

While efforts to reach some key stakeholders were unsuccessful, several outreach efforts were successful and yielded much useful information. Following are the people who contributed to the background understanding:

Josh Thomson, County Engineer – Okanogan County

Roxanne Bash, Transportation Planning Lead – Western Federal Lands Highway Division

Neal Christiansen, FLAP Program Manager – Western Federal Lands Highway Division

Randy Hart, Executive Director – County Road Administration Board

Dave Colbert, Roads Manager – Okanogan-Wenatchee National Forest

Abby Gleason, Lidar Manager – WA State Department of Natural Resources

Additional input from staff with the Okanogan PUD, the US Forest Service and DNR, as well as 2017 discussions with Maurice Goodall at the Okanogan County Department of Emergency Management helped in establishing a baseline understanding of key issues and opportunities.

On-going efforts will continue to pursue contacts within the Confederated Tribes of the Colville Reservation, the Branch of Roads with the Bureau of Indian Affairs, lands management for the Department of Natural Resources, Washington State Parks, Washington Department of Fish and Wildlife, and the Okanogan County Department of Emergency Management for additional input on this approach.

RURAL ROADWAYS AND PUBLIC SAFETY

Public safety is a driving factor behind the *Backroads Study.* That is why products of on-going emergency preparedness and coordination activities were so useful. The following were particularly insightful:

o *Okanogan County Community Wildfire Protection Plan and Appendix (2013)*

o *Okanogan County Multi-Hazard Mitigation Plan (2014)*

o *Okanogan County Comprehensive Emergency Management Plan, particularly ESF 1&3 (2017)*

Building on earlier emergency management plans and processes, these plans clearly demonstrate an enduring multiagency commitment to preparedness and system resiliency. They also provided insights that informed the Phase 2 implementation approach recommended in this *Backroads Study* report.

Copies of these plans and more can be found on the Okanogan County Emergency Management website at: http://www.okanogandem.org/file-share

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2.A.3 OCOG WORK SESSION

Representatives from the Okanogan Council of Governments (OCOG) convened for a special work session with the consultant team on May 13, 2019 to share their insights for this study effort and engaged in a focused discussion of the needs and opportunities this effort can address.

That work session affirmed that public safety is the biggest factor driving the need for this work but that there is also significant value for economic vitality and access to recreational opportunity. There was agreement that keeping public safety considerations in mind will effectively support those other needs.

Other insights included:

- Public safety considerations extend well beyond that of wildland fires to include flooding such as Oroville and others experienced in spring 2018, and the potential evacuation needs of Pateros and Brewster if either the Chief Joseph or Grand Coulee dams fail.
- While it is important to identify logical primary routes through highly rural areas, that assessment should include an evaluation of vulnerabilities like the risk of landslides that can block culverts and wash out roads, a prevalent risk in the wake of significant wildland fires.
- The primary objective of this effort is to get agreement among land management agencies on what constitutes the primary rural network and appropriate design and maintenance standards, as well as ways to improve coordination amongst the different agencies in its management. The process should be open to the fact that new ideas might emerge that build on this work.
- Terminology matters and the term "primitive roads" has a very distinct meaning for counties that is established in state statute. Primitive roads are a subset of Okanogan County's highly rural roadways. It was agreed that the name of this should be changed from a "primitive roads study" so as to avoid confusion.
- Highly rural roadways include a number of public use roadways that may come into consideration as part of a network. These are legacy roadways open to the public and dedicated for public use but they are not necessarily owned by the County or maintained as such.
- FEMA-funded community-based emergency preparedness efforts are underway and expanding across the region. It will be valuable to engage with these community groups during stakeholder outreach in Phase 2.
- Versatile mapping products are needed that are easily scalable to specific areas and easy to print.
- Don't overlook utilities as a key stakeholder interest. Their corridors and facilities cross the boundaries of land management agencies and they rely on these roadways for access.
- The implementation strategy needs to address long-term database maintenance needs. Devise a crosswalk that enables seamless data updates without requiring extra effort on the part of agencies.

Policy makers shared valuable insights that come from deep local knowledge and experience with the issues that a highly rural road network must contend. A recap of the work session is included in the appendix and can also be found on the OCOG website at https://www.ocog.org/agendas-recap .

2.B FINDINGS AND KEY CONSIDERATIONS

There is minimal coordination between agencies in planning for or maintaining rural roads. The premise behind the original 2040 Regional Transportation Plan "Primitive Roads Study" recommendation was borne out in the interviews conducted during the Phase 1 investigation. Every land management agency has its own mission and responsibilities. The approach each takes towards the designation of, maintenance, and improvements to its own rural roads is necessarily informed by those missions and responsibilities. For some large landowners like the Department of Natural Resources, that mission itself has changed over the last couple of decades as the agency has shifted much of its focus from resource

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extraction to tourism and outdoor recreation opportunities. Differences in rationale for rural roadway designations are also reflected quite naturally in the terminologies and standards employed by each agency.

Resources are scarce for rural roadway needs. Every land management agency consulted for this background investigation spoke to the challenges of maintaining rural roadways with scarce and overcommitted funding resources. For state and federal LMAs, transportation funding is part of a consolidated general agency or site budget. Transportation represents increasingly smaller shares of those budgets as more of their agencies' resources are directed to fire management and suppression. Agencies are decommissioning some roads due to lack of funding to maintain them. Some traditional state revenue sources associated with logging on DNR lands have dwindled as resource extraction has been reduced. The recent transition from logging to recreation significantly reduced revenues that logging used to generate for road building and maintenance purposes on DNR lands while at the same time generating demand for additional facility improvements. State and federal gravel roads provide essential access to residential properties but those agencies don't receive any of the road levy funds those properties generate for the County. Federal land management agencies have experienced sharp reductions in overall staffing levels, further straining capacity to maintain roadways or enforce access rules. National Forest staff today are managing the combined Okanogan-Wenatchee National Forest with a small fraction of the staff that managed the Okanogan Forest alone in the 1990s.

Fire management and suppression is a priority for every land management agency. Rural roadways are fundamental to carrying out that priority. Interest in rural roadways is evident in the fire divisions of every land management agency.
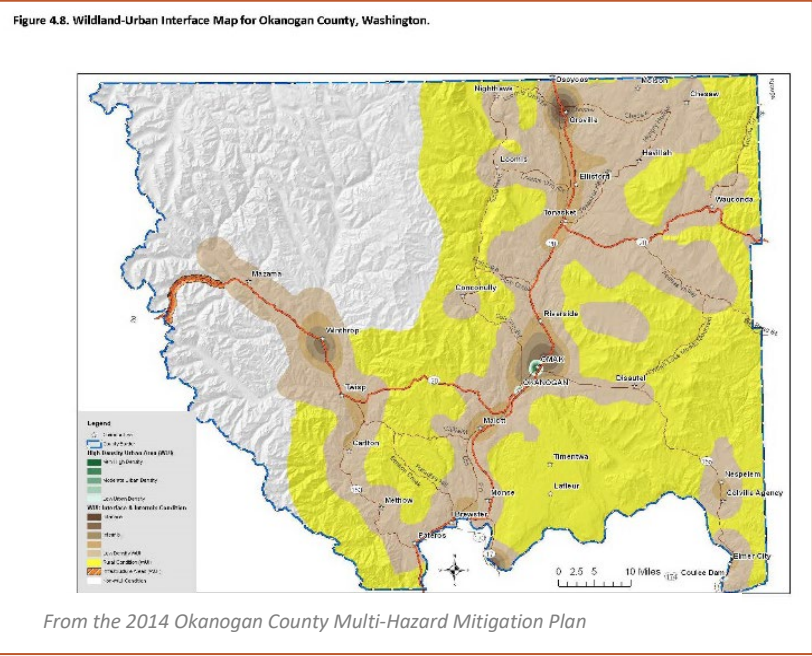
Severe wildland fires create long-term risks for highly rural roads. Several people consulted for this background work spoke to the long-term risks that severe wildfires present to rural roadways. Elimination of vegetation combined with physical changes to the soil create landslide hazards on steep slopes. Debris from landslides can block culverts while associated flooding and erosion can completely wash away well-established roads, such as what has happened to SR 20 over Loup Loup Pass twice between 2017 and 2019. Resources to rebuild or repair gravel, dirt, or primitive roads are much scarcer than those to repair state highways and other non-rural streets and roads, though. Not all rural roads damaged by landslides or flooding are being repaired today. The prevalence of decommissioning damaged roadways is likely to increase, not decrease, in the future.

Residential pressures are growing in highly rural parts of the region. Increasing residential development in highly rural parts of Okanogan County are creating expectations for improved multi-season access for passenger vehicles on fragile rural roadways that were not built or maintained for the uses they are currently serving. In other areas rural residential growth is accompanied by petitions for government to vacate and privatize public roadways, some of which are important links in a bigger network. Road managers talked of the roadway degradation that occurs as traffic increases on gravel roads faster than maintenance levels can increase. They talked of the damage from surface erosion caused by improper driveway cuts into their facilities. Every agency consulted spoke of regularly finding their public-use roads illegally closed off with boulders, gates, or logs as some rural residents try to limit access to "their" road. Residential development in the wildland-urban interface[4] increases demand for fire suppression in these wildfire-prone areas and emergency response vehicle

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[4] The Wildland Urban Interface (WUI) is the area where structures and other human development meet or intermingle with undeveloped wildlands that have vegetative fuels prone to wildfire. An "interface condition" exists where structures abut wildlands and there is a clear line of demarcation between the structures and the wildlands, such as a road or a fence. Interface densities are typically three structures or more per acre. An "intermix condition" exists where structures are scattered throughout a wildland area and there is no clear line of demarcation between wildland fuels and the structures. Intermix densities can be three or more structures per acre all the way to one structure per forty acres. Okanogan County identified two additional conditions. The "Rural Condition" exists where scattered small clusters of structures exist and are exposed to wildland fuels; there may be many miles between these clusters. Additionally, "High Density Urban Areas" describe areas similar to city and growth boundaries but with very high densities exceeding 7 units per acre with exposure to wildfires. An extensive discussion of the WUI in the Okanogan Region can be found in the 2013 Okanogan County Community Wildfire Protection Plan and in the 2014 Okanogan County Multi-Hazard Mitigation Plan.

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access to remote locations on facilities not built or maintained for this purpose. Resources don't exist to upgrade these facilities to support emergency vehicle response in highly rural areas.

This map from Okanogan County's 2014 *Multi-Hazard Mitigation Plan* shows the extent of the wildland-urban interface across the county. Okanogan County correlated development density with wildfire risk and topography. Areas colored yellow expand upon the federal definition of wildland-urban interface conditions to identify conditions related to clusters of highly rural development. The further areas are from the main roadway system the more reliant they are on highly rural

roads that may or may not be accessible by emergency responders and where private property owners must assume greater responsibility for protecting their homes and businesses. Okanogan County actively works to promote personal responsibility for those choosing to locate their homes in these highly rural areas where access and emergency services are limited. Despite these efforts, concerns remain that many residents are not prepared and expect government services to be available in an emergency. There are thousands of undeveloped residential parcels all throughout highly rural areas of the Okanogan Region that were platted decades ago without regard for access or services necessary to support residential development in these areas.

Figure 4.8. Wildland-Urban Interface Map for Okanogan County, Washington.

From the 2014 Okanogan County Multi-Hazard Mitigation Plan

The *Multi-Hazard Mitigation Plan* notes that limited access within remote areas and a lack of maintenance on existing routes increases fire suppression response time and has a direct effect on fire spread leading to increased fire size and destructive potential (page 48). Increases in dispersed residential development in the intermixed and rural areas of the wildland-urban interface also make it more difficult for the fire divisions of state and federal agencies to conduct prescribed burns as a fire management option on nearby forest lands.

Agriculture relies on rural roads for seasonal access. Vast tracts of orchards and other crops are found throughout much of the region's highly rural lands. Access to and from these lands is via backroads, some of which were built for this purpose and others that were not. Heavy equipment takes a heavy toll on gravel and dirt roads, making travel rougher and more damaging for farm equipment and for everyone else using these public roadways. More frequent maintenance is required to keep these roads passable. The region's largest orchardist, Gebbers, participates with Okanogan County in helping to repair its roadway impacts, but this is the exception and not the rule. It is uncertain what similar maintenance cost-sharing arrangements exist with state or federal land management agencies for use of their roads by agricultural, mining, or private timber interests.

Access to highly rural essential public facilities is an on-going concern for utilities. Utility corridors that support energy transmission across the region are considered essential public facilities as are telecommunications towers that support all communications across the region. The PUD and communications providers have leases with state and federal LMAs allowing their facilities to be located on those lands. Less certain is whether these leases include cost-sharing provisions for access road maintenance. Utility providers depend on rural roadways built and maintained by state and federal LMAs in order to access their facilities. Telecommunications providers locate their transmission towers on the tallest peaks and rely

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on state and federal roadways to access those towers for maintenance and repair. The Okanogan PUD depends on US Forest Service roadways primarily to access its 104 miles of power transmission lines which are located on federal lands. In background discussions, PUD staff expressed frustration at finding some of these critical access roads closed off by gates or other illegal road closures such as those discussed earlier.

Community-based emergency planning and preparation efforts are underway. Neighborhood-scale planning efforts funded through FEMA grants is on-going, engaging local residents and businesses in developing coordination and evacuation plans tailored to their specific area. These localized planning efforts create opportunities for effective and efficient community coordination. Early community work can provide useful inputs to the *Backroads Study* effort while completion of this study can provide value to future community planning work.

Designated roadless areas are prevalent in highly rural areas. Large tracts of designated roadless areas where road construction or reconstruction are not allowed create some challenges to increasing route continuity and redundancy in highly rural areas. The dark reddish brown areas in the following map show the designated Roadless Areas where no further roadway construction or improvements will be made, per federal statute. These areas should be considered with the understanding that improving or hardening critical facilities are not viable options for minimizing route vulnerabilities.


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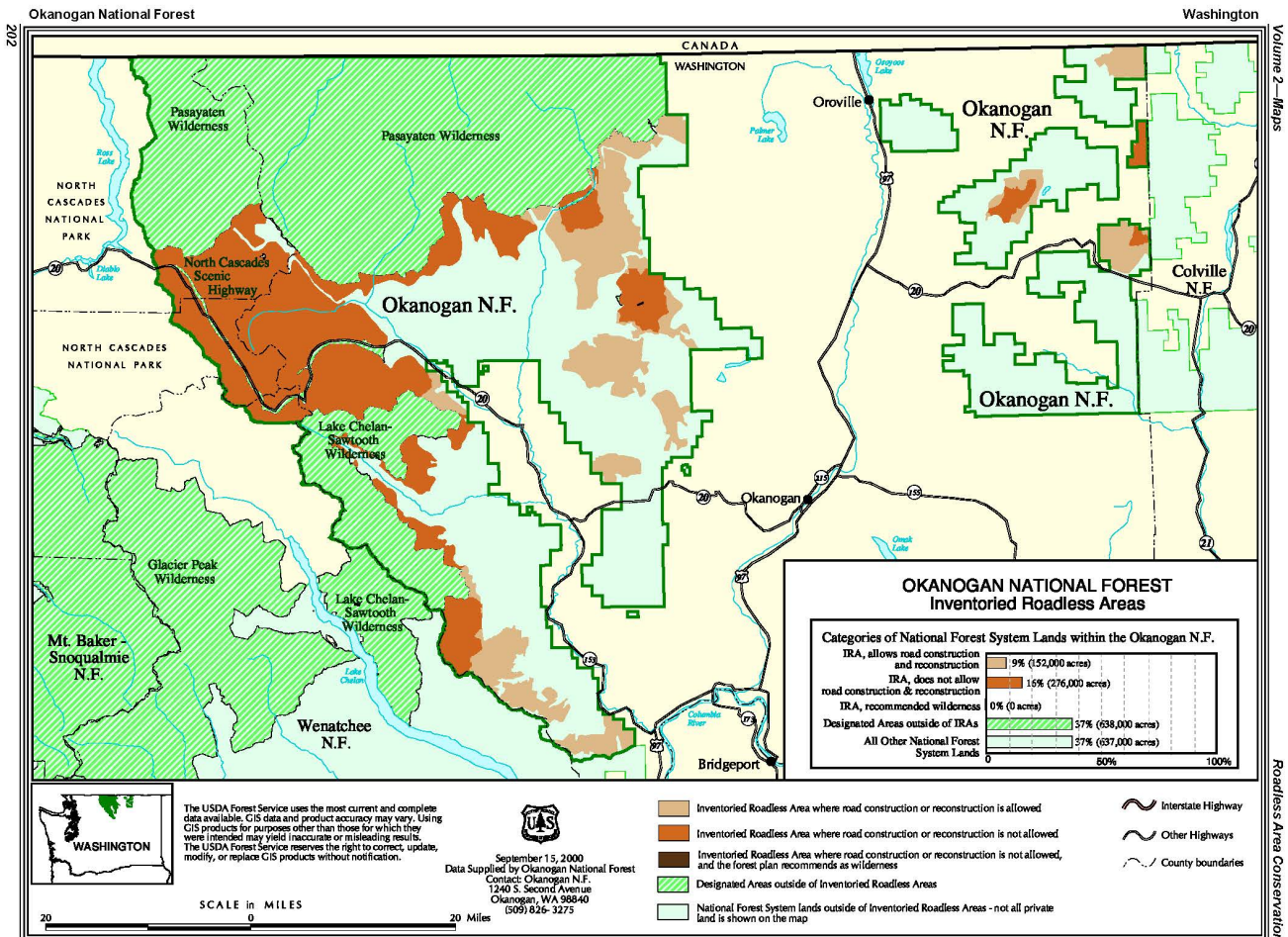
Roadway geodata exists and is regularly shared among different agencies. Data collection and evaluation revealed numerous roadway datasets that, when combined, seem to present a fairly complete line map of all but the most minor of rural roadways. Several composite datasets were located though differences in the original roadway attributes or characteristics in these composite sets have not been previously reconciled. Key roadway characteristics will be vetted with stakeholders in the Phase 2 evaluation of potential facilities. Some data gaps are likely to emerge that will need to be addressed, however, preliminary assessment suggests that most of the likely key characteristics will be available for the priority routes though differences in terminology between agencies will require some agreement on common language to use in this study effort.

High quality lidar data is sought for multiple applications in most LMAs. Lidar data provides users with an unparalleled view of earth and surface features that inform a wide array of decision-making processes.

- As staffing and budget resources dwindle, LMA road managers rely more and more on lidar data to anticipate, evaluate and prioritize route vulnerabilities and treatments.
- Forest managers and fire divisions use lidar to assess vegetative mass and forest health.
- Fisheries managers use it to assess stream quality and erosion impacts.
- Land use managers use it to evaluate development capacity and assess the risk on human settlement of such things as floods and landslides.

Many agencies would like a complete lidar coverage of the Okanogan Region. Less than half of it has been mapped. The Methow-Twisp watershed has been mapped and the data is in final stages of quality control; it is expected that this data will be available shortly. The map below shows the current lidar collection priorities for DNR as of June 2019. White areas have been mapped. The dark turquoise areas, including parts of the Okanogan shown in the pink box, are scheduled to be

Map of DNR lidar priorities presented at the June 19, 2019 Lidar Advisory Committee meeting.
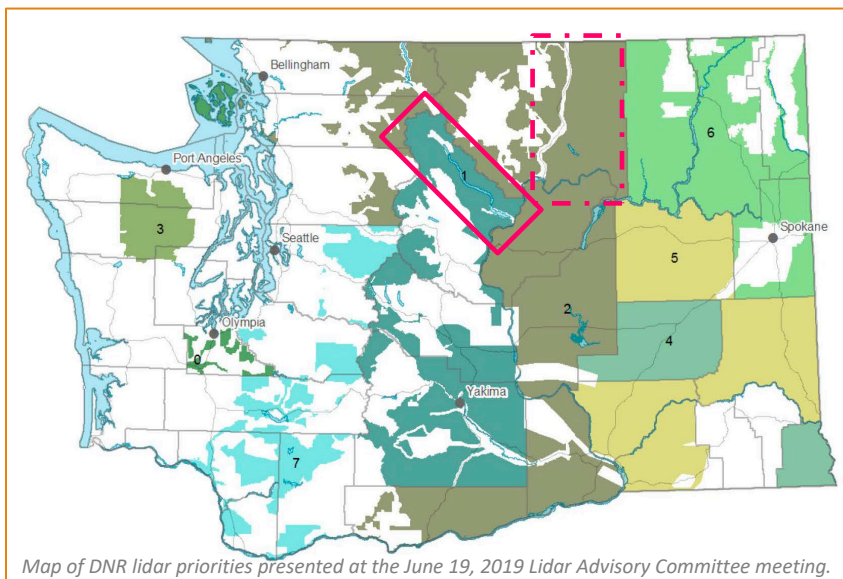
flown and mapped later this year in the very narrow weather window when leaves are off the trees in the lowlands but snow has not yet covered the mountain tops. Most of the rest of the Okanogan falls within DNR's Priority 2 lidar mapping area.

A critical gap in mapping includes a north-south swath from Pateros to Oroville and extending several miles on either side of Highway 97, shown in the dashed pink box. This is an area that includes most of the region's population centers, agricultural lands, and other economic generators. Fire divisions within state and federal agencies are keenly interested in this data but they are cash-strapped and

need grants and partnerships to expedite this data collection effort. State and federal grants are available to collect and process lidar data, with priority going to those areas that can demonstrate multiagency partnerships that include local jurisdictions and which can provide small amounts of seed money. A call for proposed 2020 mapping projects will be issued in August 2019 by the US Geological Survey. Additional funding opportunities will occur in November when the next call for Federal Lands Access Program (FLAP) grants is issued.

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Funding opportunities reward collaboration and partnerships. Every land management agency faces significant funding shortfalls to plan for, maintain, repair, or construct rural roadways. Grant programs are available to support this work, from planning and data collection to engineering and constructing capital improvements. Some of these programs are transportation grants while others are for planning and coordination that supports public safety and emergency response. The nexus between transportation planning for rural infrastructure and emergency response is a strong opportunity to leverage these mutual interests for grants. What is common to all of these grant programs is that priority is placed on those initiatives that can demonstrate multiagency collaboration and coordination, such as what this OCOG initiative seeks to do. This background study recommends pursuit of a FLAP grant in 2019 to advance this coordination work. To be successful, that proposal will require participation and support by federal and state partners.

3. PHASE 2 IMPLEMENTATION - RECOMMENDED APPROACH

This section outlines the proposed implementation strategy for the *Okanogan County Backroads Study*. It reflects the insights and baseline understanding established in Phase 1. This recommended approach is presented to the various LMAs for consideration and input. The final implementation approach will be refined with any additional input received by study stakeholders.

3.A PROCESS OVERVIEW

The overall intent of Phase 2 efforts is to promote strategic and programmatic alignment between local, state, federal, and tribal agencies in the designation and management of a highly rural roadway network while recognizing the separate missions, roles, and responsibilities of each agency. This process seeks to foster on-going communication and collaboration among agencies that advances mutual needs and objectives without adding undue burdens to already strapped agency personnel and resources. Where possible this effort will secure additional resources to accomplish this work. It will also identify potential applications for this network initiative.

3.B IMPLEMENTATION FRAMEWORK

Reaching agreement amongst several different agencies as to what constitutes a priority network for the highly rural roads in Okanogan County will take collaboration, mapping, and data analysis in an iterative process involving land management agencies and broader stakeholder interests. In Phase 2 the implementation framework expands stakeholder engagement beyond that of land management agencies to include other interests such as public safety officials, outdoor enthusiasts, residential and business interests, and the general public.

The proposed process strives to balance desktop analysis with active engagement in order to take advantage of on-the-ground expertise of land management agencies and system users while respecting resource limitations, distance, and competing priorities for time. Phase 2 is structured to promote collaboration and back-and-forth engagement without being dependent on face-to-face meetings though where appropriate, effort will be made to convene participants for in-person engagement. It is also structured so that task areas with independent utility can proceed as resources are available.

In the first task area a preliminary route network will be developed for more detailed evaluation and refinement. In the second task area the preliminary network will be evaluated for vulnerabilities and weaknesses and possibly refined further. This will include the cost to upgrade facilities to accommodate highly rural residential or economic development with better quality roadways.

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Realistically, that is as far as this effort can go without formal buy-in from the various agencies as to the need for interagency coordination and the proposed implementation process. A goal of this effort, though, is to develop champions in each agency for on-going coordination and collaboration in pursuit of a more resilient rural transportation system in the Okanogan Region. Task Areas 1 and 2 are meant to develop those champions, possibly forging new interdisciplinary, multiagency partnerships with shared interests in a coordinated rural network. If the *Okanogan County Backroads Study* is successful in this regard then a third task area will pursue follow-up actions as appropriate.

Following is a summary discussion of each of the three Task Areas in the proposed Phase 2 implementation plan.

TASK AREA 1: DEVELOP PRELIMINARY ROUTE NETWORK FOR EVALUATION

Work in Task Area 1 is broken out by mapping activities and inter-related stakeholder engagement activities. It entails an iterative process of desktop analysis and stakeholder review and refinement.

TA 1.1   MAP KEY PLACES AND RURAL ROUTES

This work will result in preliminary alignments of a highly rural road network for review and refinement. The approach is inspired by the work Okanogan County did in mapping its wildland-urban interface and the process the US Forest Service uses to identify and prioritize roadways for maintenance and upgrades. It puts an emphasis on locating where in rural Okanogan County people are likely to be concentrated and the location of essential public facilities and then identifying logical routes based on those places. Mapping activities described below rely on desktop analysis

TA 1.1.A - IDENTIFY KEY PLACES

Following is a preliminary list of key places in Okanogan County to consider when mapping priority routes. Input on this list is welcome.

a. **Municipalities, Census Designated Places, and other rural unincorporated places** where there are concentrations of human settlement. This includes:

- Brewster
- Conconully
- Coulee Dam
- Elmer City
- Nespelem
- Okanogan
- Omak
- Oroville
- Pateros
- Riverside
- Tonasket
- Twisp
- Winthrop

- Aeneas
- Azwell
- Carlton
- Chesaw
- Colville Agency
- Disautel
- Ellisford
- Havillah
- Lafleur
- Loomis
- Malott
- Mazama
- Methow
- Molson
- Monse
- Nighthawk
- Rocky Butte
- Synarep
- Timentwa
- Wauconda

Connections between cities and towns and the more rural areas featured in this study are potentially important links for ingress/egress as are significant connections with highways and more major roads.

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b. Essential Rural Public Facilities including:
- Public use airports
- Smoke jumper base
- Electric transmission utility corridors
- Telecommunications towers
- Railroads

c. Economically Significant Rural Development including:
- Active orchards in the WUI located in intermix or rural areas
- Active mines
- Active commercial timber stands

d. Entrances to designated recreation sites (local, state, federal, tribal)

This represents a preliminary "places and facilities" coverage where there are concentrations of residential, economic, or recreational activities in Okanogan County. It is expected that this list will be refined during this process with local knowledge to better reflect key rural places.

TA 1.1.B - MAP KEY ACCESS ROUTES

These activities will develop a preliminary route map for stakeholder review and refinement. The aim of this exercise is to identify the essential corridors and intersections that connect the places identified above. Route selection – and the subsequent evaluation process described in Task Area 2 and strategic actions described in Task Area 3 – will emphasize priority characteristics that are known to increase system resiliency and support wildland public safety efforts:

- Proximate access to concentrations of activity
- Route connectivity
- Route continuity
- Route redundancy

Another priority consideration is that funding for roadway maintenance, repair, or construction is constrained for every agency. This identification and prioritization process must recognize cost-effectiveness and mutual benefit as criteria when designating and evaluating routes to avoid creating an unrealistic wish list of routes that cannot be supported.

There should be no expectation that an urban-style grid will be identified for the region's highly rural roadways, but those basic principles of priority routes serving through traffic and critical connections will inform the drafting of potential alignments. Draft route alignments will also adhere to the premise that larger facilities are built and maintained to move the most vehicles.

- In all cases route identification will focus on those roadways designated and maintained for use via passenger vehicles by the respective agency owner. Roads designated as off-road vehicle only facilities are not suitable as primary rural roads for this purpose. The first priority routes to include will be the highest designated facilities identified in the roadway datasets of each agency. For example:
  - Okanogan County facilities – initial focus will be on designated Federal Aid System (FAS) collectors followed by designated primitive roads, followed by rural local access roads not on the FAS only where necessary to ensure route completeness or connectivity.

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- US Forest Service facilities – initial focus will be on those roads designated as Maintenance Level 5 or Maintenance Level 4, followed by roads designated as Maintenance Level 3 only where necessary to ensure route completeness or connectivity. Maintenance Level 2 or 1 facilities will not be included. USFS assigns higher maintenance levels to those roads that serve more traffic and/or connect to destinations that serve more people.
- Tribal road facilities – where possible, road types 1 and 2 will be favored, followed by road types 3 and 4. Road type 5 will be used where necessary to ensure route completeness or connectivity.

Attributes within each roadway layer will be chosen to preclude consideration of off-road, abandoned, or unimproved roads in this initial preliminary route mapping. A data dictionary will be developed concurrently that reconciles differences in roadway terminology amongst the different agencies and creates a crosswalk to the attributes in each data layer used for this mapping.

- Whenever there is a choice between a route that is seasonal versus one that is suitable for year round use, the year-round facility will be the priority route. Note will be made of seasonal alternate route potential where appropriate, but the mapping focus will be on the priority or primary routes.

- Mapping will clearly delineate the location of designated roadless areas where future roadway improvements are not allowed. It is too soon to know whether any existing routes in roadless areas will be identified as a part of a preliminary network but it should be clear when identifying routes if any are located within these federally-restricted areas.

This preliminary network developed through desktop analysis for stakeholder review and refinement will be created in an accessible, easy to navigate online portal for reviewing and sharing comments on the draft map and associated attributes of the selected facilities and places.

TA 1.1.C - ADJUST THE ROUTE MAP AS NEEDED

The resulting map and documentation will undergo review and refinement in the stakeholder process. The following describes stakeholder engagement for Task Area 1.

TA 1.2   REVIEW AND REFINE THE PRELIMINARY ROUTE MAP THROUGH ENGAGEMENT

Stakeholder engagement includes broader participation than in the original background investigation. It strives to create opportunities for meaningful engagement while being respectful of time and availability of participants.

TA 1.2.A - LAND MANAGEMENT AGENCY REVIEW AND REFINEMENT

When a draft map of places and preliminary routes is complete it will be shared with representatives of the various rural land management agencies for initial review. This includes Okanogan County Public Works, Planning, and Emergency Management as well as the Colville Tribes, the Bureau of Indian Affairs, the US Forest Service, the Department of Natural Resources, State Parks, National Park Service, the Bureau of Land Management, and the State Fish and Wildlife Department. State and federal agency reviews should include Fire Division representatives, if possible. Refinements to the draft map will be made, with the resulting map serving the broader stakeholder engagement effort.

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TA 1.2.B - PUBLIC REVIEW AND COMMENT ON PRELIMINARY ROUTE MAP

This effort will engage system users in reviewing and providing input on the preliminary route map. One track will target specific stakeholder groups while the other will attempt to engage people not only in reviewing the draft route map but also in participating in crowd-sourced data collection activities.

TA 1.2.B(1) - Targeted Stakeholder Outreach

Input from several specific stakeholder groups will be sought on the adequacy of the preliminary highly rural road network.

- Area fire districts
- State and federal LMA fire divisions (if not part of prior agency reviews)
- Municipalities
- Community-based emergency planning groups
- Agricultural interests
- Utilities and telecommunications providers

These system users will evaluate the route network for how well it identifies the most critical routes and connections in order to ensure no key places or routes were overlooked and no outdated or abandoned routes included. As noted earlier, financial constraint is integral to this process.

TA 1.2.B(2) - General Public Outreach

The approach for general public outreach of the preliminary route map recognizes the strong public interest in recreation opportunities and rural residential lifestyles. It also recognizes the widespread difficulty in generating broad awareness and participation outside of known interest groups. For that reason this approach proposes two different avenues of outreach.

The first is oriented around traditional review and comment opportunities, utilizing the media and community-based organizations to help get word out about the study and the opportunity to review and comment on early route concepts. The same or similar online portals available for the agency review process will be available for members of the public to review and comment at their leisure. This presumes availability of internet access which may be limited in some areas. While effort will be made to assist those without internet access in engaging, the sheer size of the region makes it impractical to present this information in a paper document for public review and comment.

A second, parallel approach would invite residents to participate in data collection activities on rural roads. Phase 1 investigations revealed a concerted partnership effort between the mobility company Waze and the US Forest Service, National Parks Service, Bureau of Land Management, and Bureau of Indian Affairs. Waze is working to enlist interested drivers in helping collect data on highly rural roads for the interactive Motor Vehicle Use Maps created for federal lands. This is a different kind of engagement opportunity that will appeal to a certain group of outdoor enthusiasts and can generate meaningful data for this and subsequent uses. In addition to this Waze/federal lands partnership, background research identified other crowd-sourced data collection efforts from StreetLight and others targeted to rural roads. These opportunities should be revisited when scoping this work to gage how far along companies are in developing their crowd-sourced data collection programs as the pace of advancement is rapid due to technological advances. As of June 2019, Waze is the most advanced effort and has established agreements in place with federal lands agencies on data collection protocols and reporting requirements.

Input derived from the targeted stakeholder and general public outreach efforts will be used to make final revisions to the preliminary route network. This concludes Task Area 1 activities and cues up the route evaluation in Task Area 2.

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TASK AREA 2: EVALUATE DRAFT PRIORITY ROUTE CONDITIONS

Activities in Task Area 2 are heavily reliant on agency expertise and robust data for analysis. This is also where input from any crowd-sourced data collection will be particularly useful. The intent of this task is to evaluate the priority routes proposed in this highly rural roadway network to assess the baseline condition of routes, evaluate known vulnerabilities that jeopardize the routes, and identify and prioritize mitigating measures to alleviate potential risks. If any routes are particularly vulnerable or known to be candidates for abandonment, stakeholders may reconsider those routes. Particular consideration will be given to routes in designated Roadless Areas where roadway improvements are prohibited under federal statute. Lidar and local knowledge are both essential to this process.

As with Task Area 1 activities, this work entails desktop analysis as well as stakeholder review and input in an iterative process.

TA 2.1 ASSESS ROUTE CHARACTERISTICS

This basic desktop analysis will compile characteristics of each route, noting where data gaps exist. In addition to the route classifications used in Task Area 1 to develop the preliminary network, key attributes to use in assessing proposed routes include:

- Surface material
- Number of lanes
- Roadway width
- Design speed
- Traffic volumes
- Presence of shoulder
- Presence of culverts
- Presence of bridges
- Presence of guardrails
- Intersecting roadways
- Existing roadway conditions
- Crash history, if known

Input on this preliminary list of roadway characteristics is welcome.

TA 2.2 ASSESS ROUTE VULNERABILITIES

In addition to basic route characteristics, terrain and other contextual factors need to be considered for the proposed routes. Local knowledge and lidar data will facilitate this evaluation and narrow the remaining questions that require field investigation.

Key vulnerabilities to evaluate include:

- Importance for freight traffic
- Steep terrain
- History of landslides, erosion, or slope instability
- History of prior burns
- History of prior floods
- Proximity to Vegetation Condition Class III (high risk of catastrophic ecosystem impacts due to fire)

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- Proximity to wildland-urban interface areas, especially rural and interspersed areas
- Proximity to likely future development areas

This assessment will carefully review the characteristics and vulnerabilities of proposed routes to ascertain the robustness of the proposed network, critical improvements needed to address likely system failures, and other improvements that improve safety, route navigation, user comfort, etc. Proposed routes with vulnerabilities or risks that cannot be mitigated will be flagged for further consideration and possibly eliminated. A final route assessment will include key mitigation measures that can increase the resiliency of this network in meeting the highly rural mobility needs of the Okanogan region.

TA 2.3   QUANTIFY POTENTIAL COSTS TO UPGRADE ROADS SERVING DISPERSED RESIDENTIAL DEVELOPMENT

Given the growth of highly rural residential development and the mounting interest of rural residents in roadway upgrades to their highly rural properties, what would it cost Okanogan County to bring its rural roadway network up to standards more closely aligned with public expectations of residential local access roads?

To estimate these costs, high level engineering estimates can be developed for a representative sample of facilities. Infraworks 360 is a powerful engineering software tool that enables relatively fast evaluation of terrain, soil types, stormwater runoff, and other factors on roadway construction costs. Minimum rural residential standards will be developed in collaboration with Okanogan County staff. These standards will be used to develop ballpark planning level estimates of per mile costs that can be applied as appropriate to selected routes in order to estimate the County's financial obligation if it were to adopt a policy of upgrading its highly rural roadways to accommodate growth in rural residential uses.

TA 2.4   DEVELOP CUSTOMIZED MAPPING TOOLS

Resulting products of Task Area 1 and 2 will be available for customized mapping. Users will be able to zoom in to particular areas of the region and print or share maps that show the highly rural road network and the attributes or characteristics of its roadway segments. Mapping tools will show the relation of this network to other rural roadway facilities, proximity to key rural places and other geographies, and other features identified during network development.

TASK AREA 3: IDENTIFY AND PURSUE FOLLOW-UP ACTIVITIES

This section is necessarily less detailed than activities described in Task Areas 1 and 2 since it is dependent on the participation and interests of various land management agencies and disciplines. Based on background research and discussions, there are a variety of potential activities that may generate interest in follow-up pursuits.

- **Coordinated Maintenance Plans.** Once an agreed upon primary rural network is defined, each land management agency can incorporate these designations into its own maintenance strategy. A base level of coordination opens up opportunities for interagency agreements and possible consolidation of activities to complete needed work more cost-effectively.
- **Grant Funding for Capital Improvements.** Critical infrastructure needs identified during route assessment can provide compelling grant funding opportunities, particularly if they can demonstrate multiagency collaboration and benefit such as proposed in this *Backroads Study.*
- **Support WUI Management Efforts.** Okanogan County's Department of Emergency Management maintains a database of high risk areas for catastrophic wildfires. Designation of a primary rural network makes it possible to direct limited resources for roadside vegetation maintenance to the most important routes that support wildland fire abatement through emergency access and creating defensible fire breaks.

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- **Input to community-based emergency planning efforts.** Resulting maps of the primary rural network can provide valuable input to rural communities engaged in coordinated emergency planning efforts.
- **Enhance public education efforts.** A number of aspects of this work can be incorporated into existing public education efforts regarding rural mobility in the Okanogan Region. This includes input for the community-based emergency planning efforts described above, as well as data that underscores the County message of self-sufficiency for those choosing highly rural residential lifestyles. Analysis can be used to help educate people about the hazards of illegal closures of public access roads.
- **Update Okanogan County Road Atlas.** The composite database of roadway geodata layers can be used to update Okanogan County's Road Atlas and make it available in both a print and electronic format.
- **Integrate rural road planning with emergency management activities.** Numerous transportation-related strategies identified in the Okanogan County 2013 Community Wildfire Protection Plan and 2014 Multi-Hazard Mitigation Plan have been sidelined for lack of resources. It is likely that overlapping interests exist between owners and managers of the region's highly rural network and those engaged in public safety. These mutual interests create opportunities for strategic and programmatic alignment between local, state, federal, and tribal agencies that advance shared objectives in a cost-effective, efficient manner. An example of this is the potential opportunity for collaboration between agencies in the collection of priority lidar data that benefits a wide range of analysis and user needs, or the targeting of roadside treatments on primary routes in the highest-risk wildland fire areas.
- **Incorporate designated network and priorities into long-range transportation plans.** While the formats vary between agencies, each land management agency maintains its own version of a long-range transportation plan for its rural roadway system. Recognition of this agreed-upon highly rural road network in those plans would provide long-term policy support. If this is truly the first multiagency rural roads planning effort as suggested through the background investigation, such recognition in various plans can create unique opportunities for future funding and reinforce the imperative for on-going coordination and collaboration.
- **Evaluate cost-sharing arrangements to maintain critical roadways.** The process of identifying and evaluating priority roadways and their use characteristics may reveal the need for additional maintenance resources for critical segments. Cost-sharing agreements may offer win-win opportunities for users who require reliable, maintained access to their facilities and the cash-strapped agencies whose roadways support that access.
- **Maintain regular interagency coordination.** The value of this analysis and the resulting network may generate interest in on-going coordination between agencies and disciplines. Such coordination can include data sharing and update, developing near-term and long-term maintenance strategies, pursuit of grant funding for data collection or capital improvements, etc.

This is a preliminary list of ten possible follow-up activities inspired by findings of the Phase 1 background research. What should be included on a final list of follow-up activities will be determined during completion of Task Area 1 and 2 activities.

4. NEXT STEPS

Phase 2 implementation activities are funding dependent. No revenues are currently earmarked to advance this work, but it is anticipated that a small amount of funds will be available from the Okanogan Council of Governments for some activities. This study assumes that grants or other outside funding sources will be needed to augment any funds from the OCOG to complete this work. To that end, this study recommends the following priority activities as near-term pursuits.

a. **Continue engagement efforts with land management agencies.** Circulate this report and implementation strategy to representatives within each of the land management agencies and solicit input on the proposed process.

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Continue to identify allies with shared interests and work to develop a working coalition of agency representatives that will be involved in Phase 2 implementation efforts.

b. **Secure grant funding for Phase 2 activities.** Building on the continued engagement with land management agencies, work to create a multiagency partnership and funding proposal for the Federal Lands Access Program (FLAP) grant opportunity in late 2019. Determine partnership interest in pursuing a USGS proposal for high quality lidar data collection; a call for proposals will be issued in August 2019 for this opportunity. Evaluate interest and potential pursuits for a Federal Lands Transportation Program (FLTP) grant. Where possible leverage the multiagency, multidisciplinary aspects of this work to secure grants from diverse sources.

5.   CONCLUSION

The Okanogan Council of Governments is embarked on an ambitious, timely initiative to improve the resiliency of the region's rural roadway system, regardless of system ownership or jurisdiction. This initiative presents unique challenges and equally unique opportunities with far-ranging benefits for the region, its agency partners, and its communities.

The background investigation completed in Phase 1 of the *Okanogan County Backroads Study* provided useful insights that shaped the recommended Phase 2 implementation approach described in this report. Funding will be sought to complete those implementation activities. Meanwhile, input on the proposed approach is sought from the various land management agencies responsible for building and maintaining the region's rural roadways. Comments and suggestions are welcome and should be directed to: Thera Black | thera@3ptransport.com | 360.878.0353

Updated information on project activities will be available on the OCOG website at www.ocog.org . Look for *Backroads Study* in the Library.

Okanogan County Backroads Study – Phase 1

Okanogan County Project Management – Josh Thomson, County Engineer

SCJ Alliance Project Team

  Charity Duffy: Project Manager

  Hans Shepherd: GIS mapping and data analysis, website development

  Thera Black: Interagency coordination, funding research, regional planning

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APPENDIX

Primitive Roads Study – 2040 Regional Transportation Plan for the Okanogan Region Project Description

May 13, 2019 Okanogan Council of Governments Work Session Recap

Database Documentation

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2040 REGIONAL TRANSPORTATION PLAN FOR THE OKANOGAN REGION

Transportation for the Okanogan Region

RESILIENT. RESOURCEFUL. RESPONSIBLE.

Okanogan
COUNCIL OF GOVERNMENTS

PRIMITIVE ROADS STUDY

This work will enable a broad understanding of the primitive roads network that serves the Okanogan region, its characteristics, and key issues and opportunities associated with this uniquely rural element of the regional transportation system.

Of the 1,376 miles of roads Okanogan County owns, 726 of those miles – 53 percent – are gravel roads. Of these, 571 miles are designated as Primitive Roads. Thousands of additional miles of Primitive Roads are owned by the Colville Tribes, the Washington State Department of Natural Resources, as well as the Bureau of Land Management, and the National Forest Service.

This **Primitive Roads Study** will establish the only comprehensive profile of the region's primitive roads regardless of ownership, identifying in a searchable GIS database key characteristics and enabling coordinated mapping among agencies. Building on this baseline network the study will identify and evaluate measures to improve coordination and collaboration between agencies in managing this rural asset.

Primitive Roads are unpaved and they don't adhere to standard street designs with which most people are familiar. They are not maintained on any kind of regular basis and at some times of the year they may be impassable. They are a uniquely rural category of roads and as such, are often dismissed in some circles as unimportant. Yet they play a vital role in the rural transportation system in terms of access to public lands, transport for resource-based industries, and emergency access and route redundancy.

In the introduction to the County Road Administration Board's 2016 Gravel Roads Study, it's noted:

There is possibly nothing more representatively iconic of rural Washington State or, perhaps of rural America than is the simple line of an unstriped, unpaved road hugging the land contours as it stretches through large, open spaces and reaches towards a distant horizon...this kind of road is not just emblematic of the history of surface transportation in our state, but is very much a functioning part of the system as it exists today, and will remain an important part of it for many future years.

Primitive roads serve a number of different purposes with wide-ranging expectations and constraints, and are governed by the policies of vastly different and independent agencies. This study will lay the foundation for a common understanding of this important component of the regional transportation system and potential strategies to improve management and coordination between agencies. It will assist in prioritizing some of these roads for preservation and maintenance as they serve vital roles in safety.

May 13, 2019

Attending:

Soo Ing-Moody, OCOG Chair and Twisp Mayor

Josh Thomson, Okanogan County Engineer

George Mazur, WSDOT NC Region Senior Transportation Planner

Tim Rieb, Brewster City Council Member

Carlene Anders, OCOG Vice-Chair and Pateros Mayor

SCJ Alliance Staff: Charity Duffy, Hans Shepherd, Thera Black

Notes:

After introductions, SCJ staff provided an overview of the meeting agenda and then offered background on the need for the project, its relation to the 2040 Regional Transportation Plan, and the overall approach.

- Why is a primitive roads strategy needed? Most lane miles in the Okanogan Region are unimproved gravel roads managed by multiple land management agencies with multiple management plans. The 2014 and 2015 wildfires pointed to the need for a coordinated plan in the event of an emergency though there are likely to be other benefits of coordination, too. This is not being done in response to a requirement but instead, as an identified regional priority need.

- Based on early investigations this appears to be the first regionally coordinated primitive roads strategy in Washington state or even the western US. SCJ has reached out to land management agencies. SCJ has heard that state and federal agencies recognize the need and support development of a coordinated plan. Interagency coordination and collaboration are needed. There has been good affirmation to date from agencies contacted about this process

- Terminology varies from agency to agency, as do standards and management protocols. Already the team is reconsidering the use of "primitive roads" to describe the highly rural gravel roadway network since that term has very specific meaning in state statute for counties and does not include all of Okanogan County's gravel roadways. Effort will be made to come up with agreed upon terminologies and standards for this planning purpose that are consistent across agencies and resulting eventually in an agreed primary network that is seamless across boundaries.

- Phase 1 work is a scoping phase to establish a clear picture of "what we know, what we don't know, what we need to know" to develop this strategy. Through this phase the team is collecting and assembling roadway and other data from each of the land management agencies and evaluating it for

consistency and sufficiency for this planning process. What data gaps need to be addressed for this process? The team is also conducting informational interviews with key stakeholders and all land management agencies. This helps to get word out about the study effort and also allows the team to get information, gain a better understanding of overlapping interests, and identify opportunities for shared resources. Key stakeholders will also be tapped to help evaluate the composite data set since they know it the best.

- Phase 2 Implementation work will be shaped by the scope of work developed in Phase 1 and will get underway after July 1 as funding is available. That is why effort is being made to engage key stakeholders in participating in the scoping phase to ensure the approach makes sense to those who will implement it on the ground. The goal is to build champions within the agencies who see value in this work and will participate in implementation and on-going coordination efforts. Stakeholder engagement in Phase 2 will be expanded to other interest groups (i.e. first responders, hunters, etc.).

- Phase 2 work will include some efforts to secure additional funding for this work beyond OCOG's baseline funding.

- While the initial focus is on a highly rural gravel road network that better supports emergency management and response needs, there are likely to be other benefits to this work. A core assumption is that if this strategy is robust enough for emergency management response it will likely support other needs as well.

- Staff underscored the value of questions, insights, and issues generated during this meeting, explaining that input from OCOG members now will help inform the investigation and scoping process for the implementation work.

The rest of the work session was an open discussion among participants.

OCOG Discussion and Observations:

1. What evacuation routes exist if the dams break or are compromised? Chief Jo and Grand Coulee are upstream from Pateros and Brewster. The cities have been told by the Army Corp of Engineers that if Grand Coulee fails these two communities have a maximum of 22 minutes to evacuate all residents to high ground. This will require the coordinated use of rural, primitive roads outside each city, and should be considered during this process.

2. Scope of work should include identification and evaluation of blockages, gates, culverts, etc. that can impede the use of some rural facilities. Lidar data can be a powerful tool for evaluating many conditions in remote locations. In its research SCJ has heard that state and federal agencies are interested in collecting lidar for the rest of the Okanogan Region; this work may create some impetus for that data collection effort. Additionally, a Long-Term Recovery Group may be able to help conduct critical field checking later on. Carlene is a contact for that group.

3. Existing disaster planning efforts funded by FEMA are underway and may provide useful input to the process as well as a conduit later for getting information back out. "Map Your Neighborhood" is a three-year program engaging landowners in identifying critical access routes and developing coordination strategies tailored to individual areas. Work is underway in the Methow and is just getting underway in Pateros and Brewster this year; efforts will get started in Oroville and Conconully later. Work is organized by municipality or, in rural areas, by school district geographies. Carlene is a good point of contact for the Pateros/Brewster effort. Soo is a good contact for the Methow Valley Public Safety Committee, which is leading the Methow effort. The Methow Valley Public Safety Committee can be a valuable resource for other data, too. It consists of fire districts, Sheriff's office, local police departments, air rescue, search and response, others, providing a one-stop resource for information. They meet once a month.

4. The end game strategy is to get agreement among the various land management agencies on what constitutes the primary gravel road / primitive routes of value for emergency response and come up with a coordinated strategy for designating and maintaining these routes regardless of jurisdiction. Other objectives may be identified as scoping and implementation work progresses.

5. Versatile mapping products are needed. Maps should be easily scalable and printable, customized to specific areas. Maps must be easy to understand and easy to share.

6. Be cognizant in the approach that it takes more than a roadway network to support emergency evacuation. Dust and smoke will make it nearly impossible to see more than a few feet ahead. People panic easily and can create gridlock on evacuation routes or run off the road and require rescuing. Pilot cars may be the only feasible solution in some cases. In an ideal world there would be dedicated routes for emergency vehicles, but this probably won't be practical. Recognize that the network is but part of the solution and that innovative technology or methods may be needed to fully support emergency response needs. This effort won't be able to address those other factors, but it should be open to the fact that a coordinated response plan will be part of the solution.

7. Okanogan County Department of Emergency Management has a well-established communication and notification/alert program in place. Maurice (Mo) Goodall, Director, is the best person to talk with in Phase 1 about how to approach broader community-based engagement in Phase 2 in terms of outreach and effective messaging. He will also have useful insights on scoping from the perspective of emergency management and response.

8. Okanogan County's rural network includes public use roadways that should be considered as appropriate. These roads are open to the public and dedicated to public use, but they are not necessarily owned by the County or maintained as such.

9. This process among the various land management agencies may stimulate interest in some kind of coordination of maintenance activities. At a minimum it should result in agreement on standards and maintenance activities for the primary network. It could also identify ways of coordinating across agencies in order to complete work more efficiently. Be open to new ideas.

10. Utility providers maintain their own access roads and corridor easements throughout some of these areas. They have a vital interest in protecting their facilities during a disaster and may be willing to come to the table as partners in this effort. Reach out to them to gage their interest and try to obtain data for roads, pipelines, and corridor easements. Look for possible partnership funding opportunities with utilities, which will be a very different set of opportunities from those of the land management agencies. The Methow Valley Emergency Plan identifies communication facilities that must be protected via designated access roads. There may be something comparable for the land management agencies that won't show up in the traditional "transportation planning" framework.

11. Cold storage in the apple warehouses in Brewster is powered by anhydrous ammonia, a volatile gas. Not only must these facilities be managed in the event of a disaster to avoid explosive fireballs, they must also be avoided in evacuation strategy.

12. A strategy for the long-term maintenance of the composite database should be considered at the outset of this process. Each agency maintains a database with characteristics specific to their mission and requirements and uses the terminology of their organization; those individual databases are maintained on schedules defined by each agency. This primitive roads effort is going to identify select characteristics from all of those datasets with value to this project and combine them into a composite dataset using agreed-upon terms that may be specific to this project. As those individual datasets are updated over time by each agency, corresponding updates to the composite database should be seamless. A data "crosswalk" between the individual agency datasets and the composite dataset can ensure the composite dataset always reflects the most current individual data while reconciling differences in terminology without requiring duplicate efforts by the partners.

13. A Federal Lands Access Program (FLAP) call for projects will be released in July. Per conversations with staff in the Federal Lands program, this implementation effort would be a prime candidate for a FLAP grant. Thera will provide an outline of the ask along with other application details to Soo for consideration and approval by the OCOG Board in June, enabling application in a timely manner.

The work session concluded with a presentation of the new Okanogan Council of Governments website, www.OCOG.org . This website will provide a convenient way of storing and sharing information and large data files via cloud-based storage and will be a vehicle for communication and outreach with the general public during Phase 2 implementation efforts. In addition, it provides an on-going portal for OCOG information concerning meetings, plans, and processes. The site is configured to allow public access just to basic OCOG information while the composite database being built requires a password to access. Edits and comments on the basic site are appreciated as it goes through final development.

SCJ Team Contacts:

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Okanogan County Backroads Study - Database Documentation

The following is a list of reviewed databases and available inventories accompanied by basic dataset notes and primary database management contacts. These inventories will be used to further develop and provide desktop analysis supporting the *Okanogan County Backroads Study*. For more information on the compiled databases please contact Hans Shepherd at SCJ Alliance by email at Hans.Shepherd@scjalliance.com or by phone at 360.352.1465.

Provider/Source	Okanogan County Public Works - Roads		
Website	ftp://47.25.168.198/DISPATCH/		
Last update	2019-06-03		
Intended use	Used by Okanogan County Department of Public Works whose primary concern is roads under Public Works jurisdiction		
Methodology	-		
Update cycle	On an as needed quarterly basis.		
Contact person	Cecil Turner	509-422-7124	cturner@co.okanogan.wa.us
Attributes	Not publicly published.		
Date accessed	5/29/2019		
Notes	Use public works data over planning public facing options, strict definition for "primitive roads" → will need to also consider gravel designated roads. Less coverage than Planning department data.		

Provider/Source	Okanogan County Planning Department - Roads		
Website	ftp://47.25.168.198/DISPATCH/		
Last update	2019-06-03		
Intended use	Okanogan dispatch roads layer		
Methodology	-		
Update cycle	On an as needed quarterly basis.		
Contact person	Gene Wyllson	509.422.7123	ghwyllson@co.okanogan.wa.us
Attributes	Not publicly published.		
Date accessed	5/29/2019		
Notes	Greater coverage than public works layer		

Provider/Source	County Road Administration Board (CRAB)		
Website	http://www.crab.wa.gov/		
Last update	-		
Intended use	This dataset represents county roads open to the public in Washington State as listed in the County Road Administration Board (CRAB) Road Log compiled as a GIS Linear Referencing System (LRS) using County Road Numbers and county milepost values. This dataset is used for general-purpose mapping and as a linear referencing system.		
Methodology	Same data as used by County, See OC Public Works		
Update cycle	Same data as used by County, See OC Public Works		
Contact person	Josh Thomson (OC)	509.422.7300	jthomson@co.okanogan.wa.us
Contact person	Mike Clark (CRAB)	360.350.6084	mike.clark@crab.wa.gov
Data sets	Dual use Gravel road reports Paved road reports Per mile cost reports Primitive roads reports Private roads reports Right of ways Surface type reports		
Date accessed	County gives approval to CRAB for access to data and reports generated by CRAB using county road data		
Notes	CRAB dataset is the roadway dataset developed by Okanogan County Public Works		

Provider/Source	**Department of Natural Resources – LiDAR (DNR)**
Website	http://lidarportal.dnr.wa.gov/
Last update	https://www.dnr.wa.gov/publications/ger_wa_lidar_plan_2019.pdf?qfq6uf
Intended use	-
Methodology	-
Update cycle	Variable
Contact person	Abby Gleason	360.902.1560	abigail.gleason@dnr.wa.gov
Attributes	-
Date accessed	5/29/2019
Notes	DNR divisions (Forest Practices and Wildfire) → stated interest in project, FP Division maintains road dataset

Provider/Source	**Federal Lands Transportation Program (FLTP) and Federal Lands Access Program (FLAP) Projects**
Website	https://flh.fhwa.dot.gov/programs/fltp/	https://flh.fhwa.dot.gov/programs/flap/
Last update	
Intended use	These two federal funding programs are intended to improve a variety of transportation facilities that provide access to, are adjacent to, or are located within Federal lands. This geodata layer identifies those projects in Washington that have been funded through either of these programs.
Methodology	-
Update cycle	-
Contact person	Roxanne Bash	360.619.7558	Roxanne.Bash@dot.gov
Attributes	-
Date accessed	5/29/2019
Notes	https://usfs.maps.arcgis.com/apps/View/index.html?appid=71b34dd792164136a81afc981fd22288

Provider/Source	**DNR Active Roads Feature Service**
Website	https://geo.wa.gov/datasets/wadnr::dnr-active-roads-feature-service
Last update	3/20/2018
Intended use	This layer is used to help in road infrastructure planning and maintenance, Forest Practices and Road Maintenance and Abandonment Planning (RMAP) compliance reporting, forest management, timber sales planning
Methodology	Updating and editing efforts are primarily focused on roads in DNR managed state lands, adjunct roads or in areas that are covered by a published map that is undergoing an update. The ROAD layer includes basic attributes that are linked to the intersection-based road segments. The original road lines were entered primarily by digitizing from paper maps, scanning by machine, or derived stereoscopically from black and white photo imagery. They are currently updated and corrected as needed, in most cases using on-line, geo-referenced orthophotography, stereo color imagery, GPS or field survey.
Update cycle	
Contact person	Kevin Kozak/ Jeffery Holden	360-902-1170	kevinkozak@dnr.wa.gov / jeffrey.holden@dnr.wa.gov
Attributes	https://fortress.wa.gov/dnr/adminsa/gisdata/metadata/road.html
Date accessed	5/29/2019
Notes	This layer shows only Active Roads on DNR Lands in black. This does not include abandoned, orphaned, decommissioned, or closed roads on DNR lands. Roads not on DNR Lands are of unknown status are shown in grey. Roads not on DNR lands and of unknown status may not be drivable.

Provider/Source	**DNR – Forest Practices Orphaned and Abandoned Roads**
Website	http://data-wadnr.opendata.arcgis.com/datasets/forest-practices-orphaned-and-abandoned-roads
Last update	3/20/2018
Intended use	Officially abandoned and orphaned roads existing within the state of Washington. All active roads are now updated and maintained in the DNR's Proprietary Roads (ROPA.ROADS) data layer.
Methodology	
Update cycle	Variable
Contact person	
Attributes	
Date accessed	5/29/2019
Notes	Classification of a transportation route is based on the primary mode of transportation on the route.

Provider/Source	**WSDOT - Local Agency Public Road (LAPR)**
Website	https://www.wsdot.wa.gov/mapsdata/geodatacatalog/Maps/noscale/DOT_TDO/LAPR/LAPR_IDX.htm
Last update	03-31-2018
Intended use	This dataset contains Local Agency Public Roads such as county roads and city streets. Additionally there are some private roads that have been included for networking purposes. Refer to the Federal Functional Class (FFC) field and metadata description for these code values. Local Access roads are still under development. This data set is used: 1) For HPMS annual submittal to FHWA; 2) As a Linear Referencing System (LRS): 3) For general-purpose mapping.
Methodology	Route, route mileage values, and attributes were created using multiple resources including: 1) CAD drawings, 2) Functional Class tabular data, 3) HPMS tabular data, 4) Orthoimagery for route alignment, and 5) County Road Administration Board (CRAB) tabular data.
Update cycle	Local Access roads are still under development and QA/QC. Additional public roads maintained by other state and federal agencies will be added in the future.
Contact person	Thomas A. Blake　　　　360-570-2363　　　　blaket@wsdot.wa.gov
Attributes	http://www.wsdot.wa.gov/mapsdata/geodatacatalog/Maps/noscale/DOT_TDO/LAPR/LAPR_Routes.htm#4
Date accessed	5/29/2019
Notes	LAPR has more extensive roadway attributes than the Washington All Public Roads dataset.

Provider/Source	**WSDOT - Washington All Public Roads (WAPR)**
Website	http://www.wsdot.wa.gov/mapsdata/geodatacatalog/Maps/noscale/DOT_TDO/WAPR.htm
Last update	09-23-2015
Intended use	This dataset contains all of the public roads in Washington State in the form of Linear Referencing Routes that were submitted to FHWA for HPMS reporting in June 2015. This dataset was created for HPMS reporting requirements.
Methodology	Geometry representing public roads in WA were compiled from various sources. A unique ID was added for each route and an LRS was created.
Update cycle	Annually
Contact person	Thomas A. Blake / 360-570-2363 / blaket@wsdot.wa.gov　　　Jordyn Mitchell / mitchejo@wsdot.wa.gov
Attributes	http://www.wsdot.wa.gov/mapsdata/geodatacatalog/Maps/noscale/DOT_TDO/WAPR.htm#5
Date accessed	5/29/2019
Notes	WAPR has more extensive network coverage than the Local Agency Public Roads dataset.

Provider/Source	**US Forest Service - National Forest System Roads (Feature Layer)**
Website	https://enterprisecontent-usfs.opendata.arcgis.com/datasets/national-forest-system-roads-feature-layer
Last update	01-02-2019
Intended use	This feature class represents existing National Forest System (NFSR) roads necessary for the protection, administration, and utilization of the National Forest.
Methodology	Existing Forest Service roads with attributes representing their characteristics. Each feature represents a segment of road where the attributes are the same. These attributes are generated from the II_ROAD_CORE_ATM table. This table contains nationally required descriptive attribute data that is stored within an Oracle database. Creation of this feature class from the source data is automated using a combination of FME Workbenches, Python scripts, and ArcObject tools. The AllRoads feature class is copied into AllRoads_SDO feature class in SDO geometry.
Update cycle	daily
Contact person	USFS Chief Information Office, Enterprise Data Warehouse: data@fs.fed.us
Attributes	https://data.fs.usda.gov/geodata/edw/edw_resources/meta/S_USA.Road_MVUM.xml
Date accessed	5/29/2019
Notes	Only roads under the jurisdiction of the Forest Service are included. Includes trails as an inherent part of the dataset and can look like roadways without additional attributes for clarification.

Provider/Source	**US Forest Service - Motor Vehicle Use Map: Roads (Feature Layer)**
Website	https://enterprisecontent-usfs.opendata.arcgis.com/datasets/motor-vehicle-use-map-roads-feature-layer
Last update	05/28/2019
Intended use	The feature class indicates the specific types of motorized vehicles allowed on the designated routes (passenger vehicles versus high clearance vehicles versus no motor vehicles) and seasonal use limitations. The Forest Service's Natural Resource Manager (NRM) Infrastructure (Infra) is the agency standard for managing and reporting information about inventory of constructed features and land units.

Methodology	Compiled from the GIS Data Dictionary data and NRM Infra tabular data that the administrative units have prepared for the creation of their MVUMs. Only roads with a SYMBOL attribute value of 1, 2, 3, 4, 11, and 12 are Forest Service System roads and contain data concerning their availability for Off Highway Vehicle (OHV) use.
Update cycle	This data is published and refreshed on a unit by unit basis as needed.
Contact person	USFS Chief Information Office, Enterprise Data Warehouse	data@fs.fed.us
Attributes	https://apps.fs.usda.gov/arcx/rest/services/EDW/EDW_MVUM_01/MapServer/1
Date accessed	5/29/2019
Notes	-

Provider/Source	**WSDOT Materials Laboratory - Pavement Management Data (WSPMS)**
Website	http://www.wsdot.wa.gov/mapsdata/geodatacatalog/Maps/noscale/DOT_WSPMS/WSPMS_IDX.htm
Last update	07-13-2016
Intended use	GIS layers symbolizing various data in the WSPMS database This feature class has a text field with values Very Poor, Poor, Fair, Good and Very Good indicating the lowest category of PSC or RCN, Rutting and IRI. GIS layers symbolizing various data in the WSPMS database The surface type of the preservation unit, generally ACP (Asphalt Concrete Pavement), BST (Bituminous Surface Treatment) or PCCP (Portland Cement Concrete Pavement).
Methodology	Custom C# code to extract the data from WSPMS into Microsoft Excel workbook. Create shapes using ArcMap Display Route Events with the 24K Inc LRS
Update cycle	Annually
Contact person	Pavements Branch, WSDOT State Materials Laboratory / WebWSPMS@wsdot.wa.gov / 360 709-5473
Attributes	http://www.wsdot.wa.gov/mapsdata/geodatacatalog/Maps/noscale/DOT_WSPMS/WSPMS_SurfaceType.htm#5
Date accessed	5/29/2019
Notes	For spatial analysis and mapping at WSDOT. Intended for WSDOT use only.

Provider/Source	**Colville Tribes 2019 updated - National Tribal Transportation Facilities Inventory**
Website	https://services3.arcgis.com/0i8WvfNdfTbWrPkh/arcgis/rest/services/Colville_Prioritized_Project_Routes/FeatureServer
Last update	04-29-2019
Intended use	Colville Tribes 2019 updated NTTFI
Methodology	
Update cycle	
Contact person	Vivian Spidle	Jason Celeste
Attributes	
Date accessed	5/29/2019
Notes	

Reviewed datasets: (Bolded are included in table above)

1. **NFS Motor Vehicle Use Map Roads (2019.05.28)**
2. **National Forest System Roads (2019.01.02)**
3. National Forest System Trails (2018.12.03)
4. **County Road Administration Board (2018.03.31)**
5. DNR Proprietary Roads Statewide (2018.03.20)
6. **Forest Practices Orphaned Abandoned (2018.03.20)**
7. **DNR Active Roads Feature Service (2018.03.20)**
8. **Okanogan County Roads – Public Works (2019.06.03))**
9. **Colville NTTFI Routes (2018)**
10. **WSDOT P (2016.07.13)**
11. **WSDOT Materials Lab Pavement Management Data (2016.07.13)**
12. **WSDOT Washington All Public Roads (2015.09.23)**
13. **WSDOT Local Agency Public Roads (2018.3.31)**
14. **Okanogan County Roads – Planning Department (2019.06.03)**
15. **FHWA Federal Lands Program Project Map (2019.05.29)**
16. Okanogan County Trails (2011.05.27)
17. USDA Forest Service Topo Transport Cartographic Feature File (CFF)