

NORTH/WEST PASSAGE



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North/West Passage TPF-5(376)

Final Report (Work Plan 13 – Work Plan 17)

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16. Abstract Since North/West Passage was established as a Transportation Pooled Fund (https://www.pooledfund.org/) in 2003, the members (Idaho Transportation Department, Minnesota DOT, Montana DOT, North Dakota DOT, South Dakota DOT, Washington State DOT, and Wyoming DOT) have completed research projects to support the unique aspects prevalent in these northern states along the I-90 and I-94 corridors. The member states are predominantly rural and face similar transportation issues related to maintenance and operations, traveler information, integrating emerging transportation technologies, and commercial vehicle operations. This final report describes the activities of North/West Passage technical activities performed between 2018 to 2023, which includes projects completed in Work Plan 13 through Work Plan 17. Collectively, the North/West Passage members identified, prioritized, and oversaw the research activities of 29 individual projects that all contributed to the objectives of the program.			
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The cover image is provided courtesy of Pixabay by jatocreate.

Administrative State

The lead state for North/West Passage is the Minnesota Department of Transportation (DOT). The lead state is responsible for controlling project financing (obligating funds, tracking expenses, paying invoices, and returning unused funds to participating entities) from inception through final closeout for TPF-5(376).

North/West Passage Members

The North/West Passage members for TPF-5(376) consisted of the following agencies.

- Idaho Transportation Department
- Minnesota DOT
- Montana DOT
- North Dakota DOT
- South Dakota DOT
- Washington State DOT
- Wyoming DOT

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1. INTRODUCTION

Interstates 90 and 94 between Washington and Minnesota function as major corridors for commercial and recreational travel. Extreme winter weather conditions, prevalent in the northern states within this corridor, pose significant operational and travel-related challenges. Idaho, Minnesota, Montana, North Dakota, South Dakota, Washington, and Wyoming are predominantly rural and face similar transportation issues related to maintenance and operations, traveler information, integrating emerging transportation technologies, and commercial vehicle operations. Recognizing the value of coordinated, cross-border collaboration, the Minnesota Department of Transportation (DOT) initiated a meeting in 2002 with representatives from each of the states within the corridor. The group established itself as a Transportation Pooled Fund in 2003 as *North/West Passage* through the Federal Highway Administration (FHWA). FHWA serves as a monitoring body, providing strategic and technical input. The Minnesota DOT serves as the Program Administrator and a Steering Committee consists of one representative from each of the states that have financially contributed to the effort. The Steering Committee meets annually in person, monthly by webinar, or as necessary to provide overall program direction. There are also two established task forces (Operation Task Force and Freight Task Force) that Steering Committee members and others within their agency participate in. The task forces were created to develop ongoing, dedicated groups focused on operations and freight activities and projects.

This final report highlights projects completed by North/West Passage in Work Plan 13 through Work Plan 17 performed between 2018 and 2023.

North/West Passage members contributed \$25,000 or more annually to the pooled fund and were reimbursed for program travel. A work plan is developed and approved annually by the Steering Committee.

This final report describes the activities of North/West Passage technical activities performed between 2018 to 2023, which includes projects completed in Work Plan 13 through Work Plan 17 under Transportation Pooled Fund (TPF)-5(376). Work Plan 1 and 2 were funded under TPF-5(093), Work Plan 3 through Work Plan 12 were funded under TPF-5(190), and Work Plan 13 through Work Plan 17 were funded under TPF-5(376). North/West Passage closed out TPF-5(376) in 2025 and established TPF-5(506) for Work Plans 18 through 22. See Table 1. Collectively during TPF-5(376), the North/West Passage members identified, prioritized, and oversaw the research activities of 29 individual projects that all contributed to the vision of the program.

Table 1: TPF Numbers and Corresponding Work Plans and Timeframe

TPF Number	Work Plans	Timeframe
TPF-5(093)	Work Plan 1 – Work Plan 2	2003-2007
TPF-5(190)	Work Plan 3 – Work Plan 12	2007-2018
TPF-5(376)	Work Plan 13 – Work Plan 17	2018-2023
TPF5-(506)	Work Plan 18 – Work Plan 22	2023-2028

To view each work plan and project results, visit the [program website](#). To view the previous work plan summary report, visit [TPF-5\(190\) Work Plan 3 – 12 Report](#).

The sections of this report include:

- [2. Members and Benefits to Members](#) – Provides a list of members and highlights key benefits members have received from participation in North/West Passage.
- [3. Strategic Plan](#) – Describes the components of the North/West Passage ITS Integrated Corridor Strategic Plan produced in 2007 and the subsequent updates. It also describes the focus areas and the vision of North/West Passage.
- [4. Corridor Documents](#) – Provides a summary of key corridor documents produced by the members.
- [5. Work Plan Projects](#) – Provides a listing of the 29 projects completed during TPF-5(376) and key results, outcomes, and implementation from each project.
- [6. Task Forces](#) – Describes the efforts of the Operations Task Force and the Freight Task Force completed during TPF-5(376).
- [7. Outreach](#) – Provides a summary of outreach material developed for North/West Passage members to utilize when discussing program efforts. A listing of conferences where North/West Passage presented is also included.
- [8. Summary](#) – Includes an overall summary of the North/West Passage efforts completed during TPF-5(376).

2. MEMBERS AND BENEFITS TO MEMBERS

This section lists the North/West Passage members that participated in TPF-5(376) and highlights the overall benefits received by the members from participation.

2.1 Members

The participating agencies that contributed financial resources as well as technical input and program leadership to North/West Passage during Work Plan 13 through Work Plan 17 included the following.

- Idaho Transportation Department
- Minnesota DOT
- Montana DOT
- North Dakota DOT
- South Dakota DOT
- Washington State DOT
- Wyoming DOT

2.2 Benefits to Members

In addition to specific project benefits members have received that are further identified in [Section 5](#), the North/West Passage member states identified many overall benefits they gained from participating in the pooled fund. Some key benefits included:

- Important contacts in member states.
- Member discussion input on topic issues before moving forward with a project.
- Exchange of traveler information with neighboring states.
- Peer exchanges of intelligent transportation systems (ITS) and operation and maintenance experiences.
- Data sharing between state agencies and public safety.
- Closer working efforts with border states.
- A program website resource that shows decision-makers the benefits for continued financial contribution to the program.
- Opportunity for increased participation during monthly and annual meetings with quality, focused meeting agendas and topics.
- Webinars that allowed other staff to get involved in program and project efforts (e.g., workshops), expanding knowledge of other state efforts as well as extending networks internally.
- Consideration of project ideas and the technical resources and contacts to pursue them.

3. STRATEGIC PLAN

Efforts during North/West Passage Work Plan 2 produced a North/West Passage ITS Integrated Corridor Strategic Plan (2007). The plan outlined transportation issues within the corridor and established a vision with corresponding goals and objectives for the pooled fund. An ITS architecture and an inventory of ITS devices deployed along I-90 and I-94 were also included in the plan. The inventory was completed to help the states understand what had been deployed and to provide insight into the states' experiences with various technologies, technology preferences, and the potential for further deployment. The Strategic Plan also included a series of prospective projects based on the inventory and corridor goals. The focus areas, issues, vision, goals, and objectives from the plan are reviewed and updated periodically. Additional information on the Strategic Plan is available on the [ITS Integrated Corridor Strategic Plan](#) webpage.

3.1 Focus Areas

The focus areas of North/West Passage have been modified based on changes to the transportation environment and the focus of projects through the years. Currently the North/West Passage is focusing on six different areas: Traveler Information, Maintenance and Operations, Planning and Program Management, Freight, Staffing and Resources, and Integrating Emerging Transportation Technologies. See Figure 1. For each focus area there are corresponding issues, problems, or needs as well as goals and objectives which are identified and available at: [Updated Focus Areas, Issues, Vision, Goals and Objectives](#) (2022).

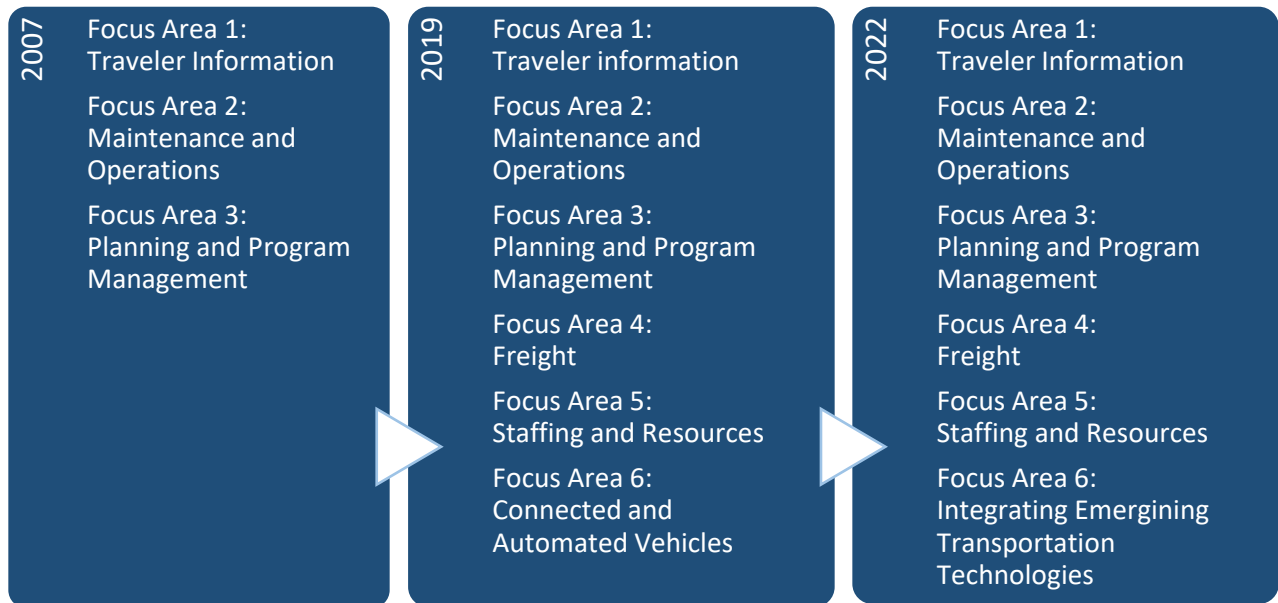


Figure 1: Timeline of Updates to the North/West Passage Focus Areas

3.2 Vision

During the development of the North/West Passage ITS Strategic Plan in 2007, the members developed a stated vision for the program. The vision is used as a reference to ensure that the projects selected annually align with the vision. The vision was updated in 2010 and then again in 2022. See Figure 2.

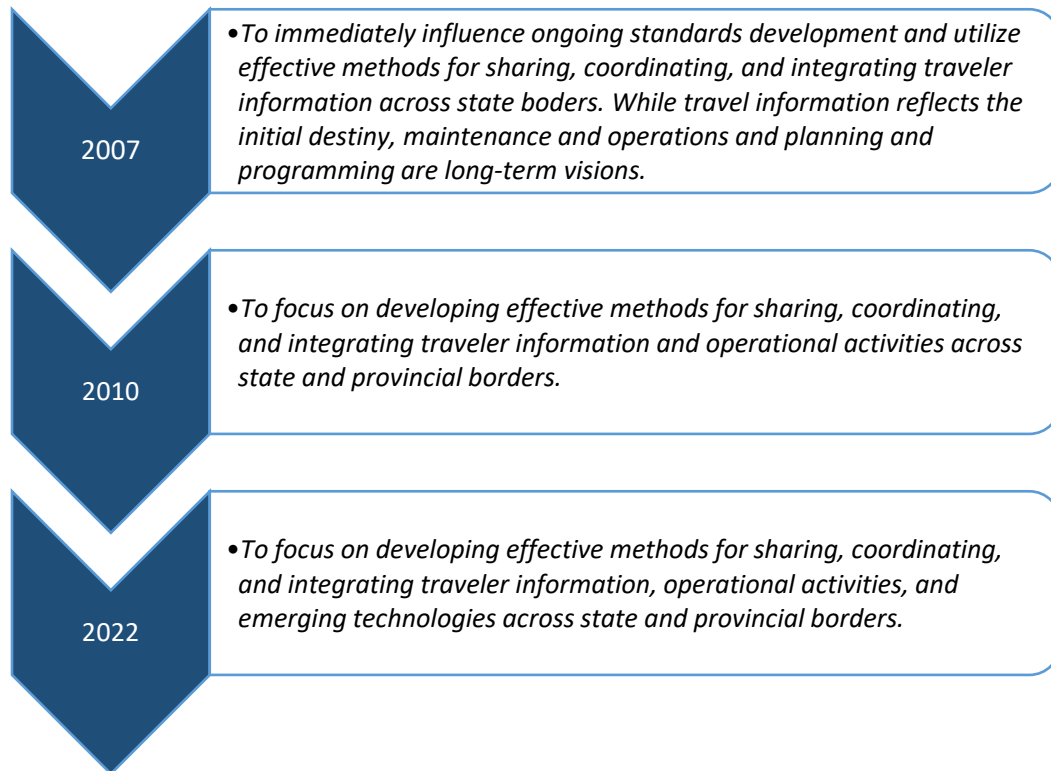


Figure 2: Timeline of Updates to the North/West Passage Vision

4. CORRIDOR DOCUMENTS

North/West Passage has developed an organization charter, Memorandum of Understanding (MOU) for Traveler Information Coordination, and Operational Guidelines for Coordinating Traveler Information with Other States Along I-90/I-94. These documents are resources used by the members.

4.1 Organization Charter and Operating Rules

An [Organization Charter and Operating Rules](#) document was developed as North/West Passage was initially established as a pooled fund in 2003. The charter provides overall guiding principles and program administration. The operating rules describe voting and contracting procedures as well as travel support.

4.2 MOU for Traveler Information Coordination

In 2011, the Operations Task Force created a MOU that was signed by the member states. The purpose of the MOU was to establish a framework for cooperation and coordination of traveler information among the state departments of transportation. The MOU was reviewed in 2018 by the members, and it was agreed that the content was still relevant.

4.3 Operational Guidelines for Coordinating Traveler Information

Operational guidelines were identified in 2011 to help Traffic Management Center (TMC)/Traffic Operations Center (TOC) operations staff coordinate with other states when a major event occurs. The guidelines, [Operational Guidelines for Coordinating Traveler Information with Other States Along I-90/I-94](#), were developed to be used in conjunction with other relevant operational guidelines governing transportation management in each state. The guidelines are periodically reviewed and updated by the Operations Task Force.

5. WORK PLAN PROJECTS

Annually the North/West Passage Steering Committee meets to discuss in detail a list of prospective projects for the upcoming year. The prospective projects are based on member suggestions and the [ITS Integrated Corridor Strategic Plan](#) and corresponding updates. These projects are scored at the annual meeting based on anticipated benefits to the corridor, likelihood of success, compatibility with vision and strategic plan, and timeliness of the project.

This section includes a listing of the projects completed from Work Plan 13 through Work Plan 17 and summarizes a few key overall efforts completed over multiple phases.

5.1 Work Plan 13 through Work Plan 17 Projects

North/West Passage completed 29 projects identified in Work Plan 13 through Work Plan 17 under TPF-5(376).

- [Work Plan 13](#)
- [Work Plan 14](#)
- [Work Plan 15](#)
- [Work Plan 16](#)
- [Work Plan 17](#)

Table 2 provides a listing of the projects and notes key results, outcomes, and implementation for each project.

Additional details for each project and work plan are available at: <https://nwpassage.info/projects/>.

Table 2: North/West Passage TPF-5(376) Projects with Corresponding Results, Outcomes, and Implementation

Project (Year Completed)	Results, Outcomes, and Implementation
Work Plan 13	
Project 13.1 (2020) Freight Task Force – Year 4	<ul style="list-style-type: none"> • Enhanced North/West Passage activities with the freight community and efforts. Year 4 focused on supporting active engagement of members and taking steps to advance a multi-state truck platooning demonstration. • Held an Automated Permitting Systems Webinar in September 2020.
Project 13.2 (2019) Operations Task Force – Year 6	<ul style="list-style-type: none"> • Updated the membership list and planned meeting topics for the year. • Conducted a Technician’s Forum webinar. • Held 5 webinars on various topics of interest. • Conducted a round robin winter and flood season recap webinar. • Identified operations-oriented project ideas for Work Plan 14 consideration. • Reviewed and edited the <i>Operational Guidelines for Coordinating Traveler Information with Other States along I-90/I-94</i>. In addition, members reviewed the MOU that was established in 2011 by the North/West Passage members to provide a framework for cooperation and coordination of traveler information among the states.

Project (Year Completed)	Results, Outcomes, and Implementation
Project 13.3 (2019) NWP Corridor Safety and Mobility Assessment	<ul style="list-style-type: none"> Reviewed the North/West Passage states that had increased their speed limits, but because it did not include data from all member states and only a couple years of data were available since the speed limit changes, results were limited.
Project 13.4 (2019) North/West Passage Traveler Information Work Zone Alerts: Feasibility Study	<ul style="list-style-type: none"> Tracked current national work zone data efforts, including pilot activities and funding opportunities and documented current practices in North/West Passage states. The final report summarized the information gathered and shared by North/West Passage members on project webinars.
Work Plan 14	
Project 14.1 (2020) Operations Task Force – Year 7	<ul style="list-style-type: none"> Updated the membership list and planned meeting topics for the year. Conducted a Technician’s Forum webinar. Held 6 webinars on various topics of interest. Conducted a round robin winter and flood season recap webinar. Identified operations-oriented project ideas for Work Plan 15 consideration.
Project 14.2 (2020) Situational Data Exchange (SDX) – Phase 1	<ul style="list-style-type: none"> Provided North/West Passage members with an understanding of the potential of use and expansion of Wyoming’s SDX while also understanding the ongoing cost implications for both operations of the exchange and connections to the SDX. Created the SDX Summary and the Situation Data Exchange State Gap Analysis and Scope of Work documents. These documents provided DOTs with an overview of the services offered by the SDX and how a DOT may go about creating and distributing connected vehicle (CV) messages along roadways, including how to use existing state data feeds and convert that data into traveler information messages (TIMs). In addition, a gap analysis was conducted to compare information in member data feeds and TIM data needs.
Project 14.3 (2020) North/West Passage Workforce Needs – Practices and Peer Exchange	<ul style="list-style-type: none"> Documented North/West Passage member states’ workforce practices gathered through phone interviews and information shared during a peer exchange webinar.
Project 14.4 (2020) DOT Traveler Information Website Crowdsourcing Practices	<ul style="list-style-type: none"> Examined the crowdsourcing practices of several agencies to understand the practices around managing crowdsourced data from third-party providers, citizen reporting, and social media on DOT traveler information websites.
Project 14.5 (2020) DOT Traveler Information Website Features and Usage	<ul style="list-style-type: none"> Examined the similarities, differences, and usage of state DOT traveler information website features. This report is based on a review of thirteen traveler information websites from the North/West Passage states, another corridor effort (I-80 Coalition which includes the states of California, Nevada, Utah, Wyoming, and Nebraska), and other North/West Passage neighboring states (Iowa and Wisconsin).

Project (Year Completed)	Results, Outcomes, and Implementation
Work Plan 15	
Project 15.1 (2021) Operations Task Force – Year 8	<ul style="list-style-type: none"> • Updated the membership list and planned meeting topics for the year. • Conducted a Technician’s Forum webinar. • Held 8 webinars on various topics of interest. • Conducted a round robin winter and flood season recap webinar. • Identified operations-oriented project ideas for Work Plan 16 consideration.
Project 15.2 (2021) Freight Task Force – Year 5	<ul style="list-style-type: none"> • North/West Passage has supported a Freight Task Force for four years where the intent of the task force is to enhance North/West Passage activities with the freight community and efforts. • Year 5 focused on improving the commercial vehicle travel experience across state lines by streamlining the e-screening process and identifying information sharing needs and issues.
Project 15.3 (2021) Situational Data Exchange – Phase 2	<ul style="list-style-type: none"> • This project provided a gap analysis of the different connected and autonomous vehicle (CAV) message sets and a high-level overview of the data set needed for a DOT to support the generation of all these CAV message types. • Through this project, North/West Passage provided a level of effort on integrating the SDX with a cloud hosted SCMS system that would allow the SDX to sign and manage CV messages within the SDX system. • A final report documented scenarios in which the SDX will work well for message distribution vs scenarios where message delivery is more time critical.
Project 15.4 (2021) Commercial Vehicle Traveler Information Assessment	<ul style="list-style-type: none"> • This project increased awareness and collaboration between state agencies in the North/West Passage to benefit trucking operations by identifying freight-relevant information needs and issues and proposing a framework for improved sharing information across borders. • Developed an assessment to review available information and sources, identify information needs and issues, and propose opportunities for information sharing across borders in the North/West Passage.
Project 15.5 (2021) Responses to the COVID-19 Pandemic	<ul style="list-style-type: none"> • This project documented what worked well and shared lessons learned during the COVID-19 pandemic from North/West Passage member states to apply during future events or in daily operations.
Project 15.6 (2022) E-Screening Coordination Assessment	<ul style="list-style-type: none"> • This E-Screening Assessment focused on Washington, Idaho, and Montana to document the current state of e-screening systems and identify needs, issues, and opportunities for e-screening. • Increased collaboration across North/West Passage states, improved electronic (e-screening) harmony, and minimized the number of stops and redundancies that trucking operators and state agencies encounter during multi-state truck movements.

Project (Year Completed)	Results, Outcomes, and Implementation
Project 15.7 (2021) State Weather Messaging Coordination	<ul style="list-style-type: none"> Conducted a North/West Passage state weather messaging webinar on February 18, 2021. Documented the extent to which weather messaging is used in the North/West Passage states and identified coordination approaches.
Project 15.8 (2021) Activity to Support the Work Zone Data Initiative – Phase 1	<ul style="list-style-type: none"> This project built on the results of Project 13.4 and advanced an activity to support advancing the WZDI within the North/West Passage member states. Washington State DOT submitted a response to the Work Zone Data Exchange (WZDx) grant demonstration that tied in benefits to North/West Passage and was successful in receiving the grant. Some of the funding used for North/West Passage’s match was from this project. Minnesota DOT was also successful in receiving a grant.
Work Plan 16	
Project 16.1 (2022) Operations Task Force – Year 9	<ul style="list-style-type: none"> Updated the membership list and planned meeting topics for the year. Conducted a Technician’s Forum webinar. Held 8 webinars on various topics of interest. Conducted a round robin winter and flood season recap webinar. Identified operations-oriented project ideas for Work Plan 17 consideration.
Project 16.2 (2023) Freight Task Force – Year 6	<ul style="list-style-type: none"> In June 2023, the Freight Task Force hosted a webinar to share a wrap up of Year 6 and preview of Year 7/Year 8. The Task Force topic during the April 2023 webinar was on Collecting and Using Performance Measure Data. In March 2023, the Task Force learned about Applying for (Multi-State) Grants. Sharing Lessons Learned: Transitioning to an Electric Future was the November 2022 webinar topic. In August 2022, the Task Force met and discussed the topic Sharing Lessons Learned: BIL/IJA Changes for Freight Planning and Operations.
Project 16.3 (2022) Winter Performance Measures	<ul style="list-style-type: none"> Established a North/West Passage Winter Performance Measures Project Team and conducted a series of webinars with the project team to: <ul style="list-style-type: none"> Share findings of NCHRP 14-34: Performance Measures in Snow and Ice Control Operations. Review Project 10.5: Winter Performance Management Practices. Discuss current performance measures, gaps and desired changes, and challenges with consistent corridor performance measures. Share current practices on the most common performance measures. Identify action items or next steps.

Project (Year Completed)	Results, Outcomes, and Implementation
Project 16.4 (2023) Truck Parking Information Management Assessment	<ul style="list-style-type: none"> Reviewed existing truck parking information sharing systems region-wide and helped make recommendations to support a systematic region-wide approach to truck parking information sharing and information management. Documented the current state of Truck Parking Information Managements Systems (TPIMS) in the North/West Passage by identifying truck parking information needs and considered the potential for North/West Passage state coordination to advance a multi-state TPIMS in the region.
Project 16.5 (2023) Oversize/Overweight Movement Assessment	<ul style="list-style-type: none"> Documented the current state of Oversize/Overweight (OS/OW) requirements, identified needs, and with a focus on Minnesota, North Dakota, South Dakota, and Wyoming, considered how to streamline operational issues faced by cross-state OS/OW movements.
Work Plan 17	
Project 17.1 (2023) Operations Task Force – Year 10	<ul style="list-style-type: none"> Updated the membership list and planned meeting topics for the year. Conducted a Technician’s Forum webinar. Held 6 webinars on various topics of interest. Conducted a round robin winter and flood season recap webinar. Identified operations-oriented project ideas for Work Plan 18 consideration.
Project 17.2 (2024) Freight Task Force – Year 7	<ul style="list-style-type: none"> In February 2024, the webinar presentation was from the Colorado Freight Mobility & Safety Branch. The December 2023 webinar discussed survey results of Truck Driver Perspectives on Winter Weather Operations. At the November 2023 webinar, introduced Truck Driver Perspectives on Winter Weather Operations.
Project 17.3 (2023) Benefits of Traveler Information Provided by DOTs	<ul style="list-style-type: none"> This project researched approaches towards quantifying or describing the benefits of traveler information provided by DOTs.
Project 17.4 (2023) Communicating Route Restrictions to Third Party Mapping/Navigation Providers	<ul style="list-style-type: none"> This project documented challenges experienced by North/West Passage members that occur when travelers follow routing advice and divert trips to unsafe routes. The project also engaged with third party mapping and navigation providers to explore potential solutions to avoid or minimize situations where navigation systems advise drivers to divert onto inappropriate routes during highway closures or delays.
Project 17.5 (2023) Situational Data Exchange – Phase 3	<ul style="list-style-type: none"> The goal for phase 3 was to help with building out features and functionality of the SDX that would benefit all DOTs including tasks associated with aggregating and housing WZDx messages from all states that were publishing WZDx feeds. In January of 2023, Trihydro demonstrated the full functionality of the SDX updates to North/West Passage that included developing a WZDx Website Watcher application and a WZDx Ingest application

Project (Year Completed)	Results, Outcomes, and Implementation
	and added functionality that allowed users to sign up for notification of any issues with WZDx feeds that they owned as well as a map for the SDX that allowed users to view the TIMs spatially with weather overlays that allow users to see how road conditions are being impacted by weather patterns.
Project 17.6 (2023) Activity to Support the Work Zone Data Initiative – Phase 2	<ul style="list-style-type: none"> • This effort identified gaps between North/West Passage member states work zone reporting and the data elements included in the United States Department of Transportation (USDOT) WZDx specification. • Overall, this effort concluded that North/West Passage agencies are well positioned to develop and publish WZDx feeds to cover the entire corridors.
Project 17.7 (2023) Current Practices in Expanding DOT Traveler Information Coverage	<ul style="list-style-type: none"> • This project researched and documented practices for expanding DOT traveler information beyond State DOT-maintained roads. • The intent of the project was to provide North/West Passage members with insights and example practices of DOTs that provide traveler information beyond state-maintained roads to consider for their states.

5.2 Key Project Results

North/West Passage completed a variety of projects under TPF-5(376) to support the focus areas, vision, and goals of the program. This section highlights a few key overall project results completed over multiple phases during TPF-5(376).

5.2.1 Situation Data Exchange (SDX) Activities

The North/West Passage members researched the SDX that has been used by the Wyoming DOT for several years during TPF-5(376). SDX is a centralized system that stores and disseminates data. It is available to any state or local transportation agency to transmit WZDx messages and TIMs to CVs and third-party consumers (note: for this document, third-party consumer refers to those companies, applications, or systems that consume data from public agency Application Programming Interface (APIs)).

- SDX Phase 1 completed in 2020 provided an overview of the services offered by the SDX, the services available from the creator and owner of the SDX (Trihydro), and how a DOT may go about creating and distributing CV messages along roadways. The project was meant for DOTs to obtain an understanding of what the SDX is and how it operates, as well as how a DOT can leverage the SDX to communicate with CVs on their roadways. In addition, a summary was developed to understand the effort to take existing state data feeds and convert that data into TIMs, as well as what gap exists between existing state data feeds and TIM data needs. Cost estimates for each state were also provided. A large portion of the estimated costs for implementing the SDX was the cost of converting event reports from existing data feeds into SAE J2735 TIMs. A product has been built by Trihydro to work with the SDX to pull event reports from traveler information data feeds, create TIM messages, and apply security credentials to the messages. The SDX can also take in existing TIM messages generated by the source of the event data. This would reduce the costs of integrating a data feed with the SDX.

- SDX Phase 2 completed in 2022 conducted a gap analysis of different CAV message sets and a high-level overview of the data needed in order for a DOT to support the generation of all these CAV message types. A level of effort on integrating the SDX with a cloud-hosted SCMS that would allow the SDX to sign and manage CV messages within the SDX system was also provided. In addition, scenarios in which the SDX worked well for message distribution vs scenarios where message delivery using 5.9 GHz direct communications is more time critical were documented.
- SDX Phase 3 completed in 2023 helped with building out features and functionality of the SDX that would benefit all DOTs, especially North/West Passage members that were either considering or already implementing WZDx. This included tasks associated with aggregating and housing WZDx messages from all states that were publishing WZDx feeds. Additional information on the WZDx can be found at: [USDOT Work Zone Data Exchange](#).

After three years of research projects to explore the SDX, members are still interested in continuing to understand the need for and/or benefits of using the SDX to share their event report data, especially given each member state currently operates some type of API to share data with third-party consumers. The efforts will continue in Work Plan 18 (not documented in this report).

5.2.2 Engaging Third-Party Providers

During times when a stretch of highway is closed or when travel delays are excessive, travelers using third-party mapping or navigation systems are sometimes advised to divert to routes that are not safe or appropriate for their travel. For example, during a winter storm the diversion routes may not be cleared of snow, the geometry of a local road may not support the size of the vehicle, or other unsafe conditions may exist. These situations have at times resulted in the need for emergency responders to attempt to rescue stranded motorists or for public agencies to manage related disruptions. This challenge could become more widespread as CAVs use road closure and delay information to automatically reroute vehicles or advise drivers.

Project 17.4 Communicating Route Restrictions to Third-Party Mapping/Navigation Providers documented challenges experienced by North/West Passage members that occur when travelers follow routing advice and divert trips to unsafe routes. The project also engaged with third party mapping and navigation providers to explore potential solutions to avoid or minimize situations where navigation systems advise drivers to divert onto inappropriate routes during highway closures or delays.

This initial outreach with third-party mapping and navigation providers has led to increased and continued coordination with these providers to discuss challenges and strategies to not divert traffic onto unsafe roadways.

5.2.3 Work Zone Data Exchange (WZDx) Activities

North/West Passage completed three WZDx related projects during TPF-5(376). The first effort, in order to understand work zone related activities, tracked national work zone data efforts (e.g., WZDx), including pilot activities and funding opportunities. A second effort was then completed to build from the results of the effort. Washington State DOT submitted a response to the [WZDX grant demonstration](#) that tied in benefits to North/West Passage and was successful in receiving the grant, where some funding from North/West Passage was used towards the match from this project. Minnesota DOT was also successful in receiving a WZDx grant. The last WZDx effort completed during TPF-5(376) focused on documenting

the gaps between North/West Passage member states work zone reporting and the data elements included in the WZDx specification. The WZDx offers a standard data exchange format for communicating work zone information with a variety of mandatory and optional fields. At that time, this effort concluded that North/West Passage agencies were well positioned overall to develop and publish WZDx feeds. Currently, Minnesota and Washington State provide a data feed to the [WZDx Feed Registry](#).

5.2.4 Workshops and Peer Exchanges

As stated previously, a benefit of participating in North/West Passage noted by all members is the quality and relevant topics of meetings, workshops, and peer exchanges. This information sharing happens during the Steering Committee, Operations Task Force, and Freight Task Force activities and through specific projects. The following key workshops and peer exchanges were conducted during TPF-5(376).

- [Project 14.3 – North/West Passage Workforce Needs – Practices and Peer Exchange](#)
- [Project 15.7 – State Weather Messaging Coordination](#)
- [Project 16.3 – Winter Performance Measures](#)

6. TASK FORCES

During efforts of TPF-5(376), North/West Passage continued the work of two task forces whose purpose was ongoing. These dedicated groups focused on North/West Passage operations and freight activities and projects.

6.1 Operations Task Force

In 2013, an Operations Task Force was established to:

- Maintain relationships among operations staff in member states.
- Enhance operations-oriented, maintenance operations, and transportation system management and operations (TSMO) related topics.
- Support implementation of project findings.
- Increase interaction during major events.

This section highlights key activities of the task force from 2018 through 2023. In addition, the task force discusses and submits projects ideas for consideration by the Steering Committee for annual work plan projects.

6.1.1 Webinar Topics

The Operations Task Force met periodically throughout the years to hear presentations and discuss a variety of topics. Table 3 provides a list of key webinar topics from 2018 – 2023.

Table 3: Operations Task Force Key Webinar Topics

Webinar Topics	Year	NWP Project
Physical and Cyber Security of Field Devices	2023	17.1
North Dakota DOT TMC Planning Grant Update	2023	17.1
Alerting Travelers of Snowplows or Maintenance Vehicles	2023	17.1
Measuring the Effectiveness of TMCs	2023	17.1
2022 Montana Flood	2022	17.1

MnDOT's Automatic Vehicle Location (AVL) Advancements in Winter Operations	2022	16.1
Worker Presence Activities	2022	16.1
Minnesota DOT WZDx Grant and the Washington State DOT WZDx Grant Updates	2022	16.1
North Dakota DOT Autonomous Attenuator and Autonomous Mower Projects	2022	16.1
Washington State DOT's Rural Incident Management Practices, Tools, and Technology	2022	16.1
Options for Closing Roads without Gates or Barricades	2022	16.1
Sunsetting Technologies	2020	15.1
Responses to the COVID-19 Pandemic	2021	16.1
Broadband Development and Small Deployment in the Right-of-Way	2021	15.1
NCHRP 08:120 – Initiating the Systems Engineering Process for Rural CV Corridors	2021	15.1
Minnesota DOT's Vehicle Fiber Optic Study	2021	15.1
North Dakota DOT's Autonomous Attenuator	2021	15.1
Federal Communications Commission (FCC) Rule Making and Reallocating the Spectrum	2021	15.1
Minnesota DOT WZDx Grant Update and Washing State DOT WZDx Grant Update	2021	15.1
Plow Hit Experiences	2020	14.1
Traveler Information Systems Experiences	2020	14.1
Wyoming DOT Connected Vehicle Pilot Project Update	2020	14.1
Montana DOT's TMC	2020	14.1
North Dakota DOT HAAS Alerts and Washington DOT NexGen Work Zone Database and iCone Pilot Project	2020	14.1
Traveler Information and Operational Practices	2019	13.2
Pathfinder Peer Exchange Webinar	2019	13.2
Wyoming DOT Connected Vehicle Pilot Project	2019	13.2
Variable Speed Limit (VSL) in Work Zones	2019	13.2
IRIS Open Source Software	2019	13.2

6.1.2 Technician's Forums

Starting in 2017, the Operations Task Force began hosting an annual technician's forum. The purpose of the forum is to provide technicians with the opportunity to talk with each other and learn about practices on different areas from other states. The forum is modeled after the [Western States Rural Transportation Technology Implementors Forum](#) that was established in 2006. Table 4 provides a list of technician's forum presentations completed as part of North/West Passage TPF-5(376).

Table 4: Operations Task Force Technician's Forum Webinar Topics

Technician's Forum Presentations	Year	NWP Project
Next Generation Work Zone Data Integration and Dissemination – WZDx Development from Planning to Operations	2022	16.1
Wyoming DOT Technician's Perspective of using IRIS	2022	16.1

Evaluation of Road Weather Messages on Dynamic Message Signs (DMS) using Roadside Pavement Sensors	2022	16.1
Utah DOT’s Statewide Wrong-Way Detection, Design, and Implementation	2021	15.1
South Dakota DOT VSL Deployments	2021	15.1
A Comprehensive Solution for Truck Parking Based on Artificial Intelligence	2021	15.1
Virtual Wyoming TMC	2020	14.1
Leveraging Unmanned Aerial System (UAS) Technology: From First Flight to Speed Data Collection (Massachusetts)	2020	14.1
Oklahoma DOT Snowplow Tracking	2020	14.1
Organic vs. Purchased Data for Travel Time Predictions (Caltrans)	2019	13.2
Utah DOT’s Region Four Rural Intersection Control Warning System (ICWS) Design and Implementation	2019	13.2
Foresight is 2020: Nevada DOT Building an ITS Network for the Next Decade and Beyond	2019	13.2

6.1.3 Winter and Flood Season Experiences

Annually the task force meets to share the previous year’s winter and flood season experiences. This is conducted in a round robin format and members highlight efforts, lessons learned, challenges, and what worked during major winter and flood events.

6.2 Freight Task Force

North/West Passage completed a number of freight related projects before establishing a Freight Task Force in 2014. The purpose of the Freight Task Force is to enhance North/West Passage activities with the freight community and efforts. See Table 5 for freight related projects completed during TPF-5(376).

Table 5: North/West Passage Freight Related Projects Completed during TPF-5(376)

Project	Results, Outcome, and Implementation
Project 17.2 (2024) Freight Task Force – Year 7	<ul style="list-style-type: none"> • In February 2024, the webinar presentation was from the Colorado Freight Mobility & Safety Branch. • The December 2023 webinar discussed survey results of Truck Driver Perspectives on Winter Weather Operations. • At the November 2023 webinar, Truck Driver Perspectives on Winter Weather Operations was introduced.
Project 16.5 (2023) Oversize/Overweight Movement Assessment	<ul style="list-style-type: none"> • Documented the current state of OS/OW requirements, identified needs, and with a focus on Minnesota, North Dakota, South Dakota, and Wyoming, considered how to streamline operational issues faced by cross-state OS/OW movements.
Project 16.4 (2023) Truck Parking Information Management Assessment	<ul style="list-style-type: none"> • Reviewed existing truck parking information sharing systems region-wide and helped make recommendations to support a systematic region-wide approach to truck parking information sharing and information management. • Documented the current state of TPIMS in the North/West Passage by identifying truck parking information needs and considered the potential for North/West Passage state coordination to advance a multi-state TPIMS in the region.

Project	Results, Outcome, and Implementation
Project 16.2 (2023) Freight Task Force – Year 6	<ul style="list-style-type: none"> • In June 2023, the Freight Task Force hosted a webinar to share a wrap up of Year 6 and a preview of Year 7/Year 8. • The Task Force topic during the April 2023 webinar was on Collecting and Using Performance Measure Data. • In March 2023, the Task Force learned about Applying for (Multi-State) Grants. • Sharing Lessons Learned: Transitioning to an Electric Future was the November 2022 webinar topic. • In August 2022, the Task Force met and discussed the topic Sharing Lessons Learned: BIL/IIJA Changes for Freight Planning and Operations.
Project 15.6 (2022) E-Screening Coordination Assessment	<ul style="list-style-type: none"> • This E-Screening Assessment focused on Washington, Idaho, and Montana to document the current state of e-screening systems and identify needs, issues, and opportunities for e-screening. • Increased collaboration across North/West Passage states, improved electronic (e-screening) harmony, and minimized the number of stops and redundancies that trucking operators and state agencies encounter during multi-state truck movements.
Project 15.4 (2021) Commercial Vehicle Traveler Information Assessment	<ul style="list-style-type: none"> • This project increased awareness and collaboration between state agencies in the North/West Passage to benefit trucking operations by identifying freight-relevant information needs and issues and proposing a framework for improved sharing of information across borders. • Developed an assessment to review available information and sources, identify information needs and issues, and propose opportunities for information sharing across borders in the North/West Passage.
Project 15.2 (2021) Freight Task Force – Year 5	<ul style="list-style-type: none"> • North/West Passage has supported a Freight Task Force for four years where the intent of the task force is to enhance North/West Passage activities with the freight community and efforts. • Year 5 focused on improving the commercial vehicle travel experience across state lines by streamlining the e-screening process and identifying information sharing needs and issues.
Project 13.1 (2020) Freight Task Force – Year 4	<ul style="list-style-type: none"> • Enhanced North/West Passage activities with the freight community and efforts. Year 4 focused on supporting active engagement of members and taking steps to advance a multi-state truck platooning demonstration. • Held an Automated Permitting Systems Webinar in September 2020.

7. OUTREACH

Outreach efforts both to internal North/West Passage members as well as external audiences is critical and important. The following tools that are used for communication.

- [North/West Passage Brochure](#) – Two-page overview of the history, vision, member benefits, and accomplishments of the corridor.
- [North/West Passage Progress Report](#) – At the end of each year, a progress report is updated to document the progress of the overall program, including results from each work plan.
- [Work Plans](#) – Approved work plans and corresponding projects are updated annually to provide a history of work completed by the program.
- [Program Website](#) – The North/West Passage website was created to provide easy access to North/West Passage information and to communicate and educate users about the pooled fund study.

In addition, as projects are completed each year, appropriate results are submitted to conferences and presented. See Table 6 for presentations completed during 2018-2023.

Table 6: North/West Passage Conference Presentations During TPF-5(376)

Presentation	Date	Location
National Operations Center of Excellence (NOCoe) Regional Collaboration Peer Exchange	Nov. 15, 2022	Webinar
AASHTO Committee on Transportation System Operations (CTSO) Annual Meeting	Sep. 6-9, 2022	Scottsdale, AZ
AASHTO Maintenance Committee	June 28, 2022	Webinar
North Central Section of the Institute of Transportation Engineers (NCITE)/National Rural ITS	May 24, 2022	Webinar
2018 National Rural ITS Conference – Plow Camera and Location Sharing Practices	Oct. 23, 2018	Fort McDowell, AZ
2018 National Rural ITS Conference – Major Event Management in the North/West Passage States	Oct. 22, 2018	Fort McDowell, AZ
2018 National Rural ITS Conference – The Future of 511 Phone in the North/West Passage States	Oct. 22, 2018	Fort McDowell, AZ

8. SUMMARY

North/West Passage from 2018 to 2023 accomplished 29 projects from Work Plan 13 through Work Plan 17. Figure 3 groups the projects into nine categories. For example, there were 5 projects completed related to traveler information.

Workshops and peer exchanges were a critical effort in sharing information among the member states. This happened through specific projects as well as during Steering Committee meetings, Operations Task Force meetings, and Freight Task Force meetings.

There were three projects completed that focused on different aspects of the SDX. Efforts will continue with by continuing to understand the need for and/or benefits of using the SDX to share event report data in Work Plan 18 (not documented in this report).

North/West Passage members also conducted initial outreach with third-party mapping and navigation providers in TPF-5(376) which has led to increased and continued coordination in work plans beyond the work plans documented in this report with these providers to discuss challenges and strategies to not divert traffic onto unsafe roadways.

In addition, North/West Passage completed three WZDx related projects. Currently, Minnesota and Washington State provide a data feed to the [WZDx Feed Registry](#).

Overall, North/West Passage members project results and accomplishments from TPF-5(376) include the following.

- Planned and conducted 29 webinars on a variety of topics of interest as part of the Operations Task Force.
- Annually conducted a Technician’s Forum that provided presentations on technical subject areas and provided members with the opportunity to talk with and learn about practices on different areas from other states.
- Completed a series of projects focused on SDX as members had continued interest in understanding the motivation and/or need for the use of a centralized data exchange.
- Examined the crowdsourcing practices of several agencies.
- Compared the similarities, differences, and usage of state DOT traveler information website features.
- Developed a commercial vehicle traveler information assessment to review available information and sources, identify information needs and issues, and propose opportunities for information sharing across borders in the North/West Passage.
- Documented what worked well and shared lessons learned during the COVID-19 pandemic.
- Conducted an assessment to document the current state of e-screening systems and identify needs, issues, and opportunities for e-screening.
- Reviewed existing truck parking information sharing systems region-wide and helped make recommendations to support a systematic region-wide approach to truck parking information sharing and information management.
- Documented the extent to which weather messaging is used in the North/West Passage states and identified coordination approaches.

- Discussed different aspects of winter performance measures.
- Researched approaches towards quantifying or describing the benefits of traveler information provided by DOTs.
- Engaged with third-party mapping and navigation providers to explore potential solutions to avoid or minimize situations where navigation systems advise drivers to divert onto inappropriate routes during highway closures or delays.
- Researched and documented practices for expanding DOT traveler information beyond State DOT-maintained roads.
- Tracked current national work zone data efforts.
- Identified gaps between North/West Passage member states work zone reporting and the data elements included in the WZDx specification.
- Presented project results at conferences.
- Developed North/West Passage outreach material.

North/West Passage member participation in the program has not declined since its inception. The key members from each state take an active role in participating in monthly meetings and inviting other staff from their agency as topics or projects are identified and discussed. This sustained and growing interest in the efforts of North/West Passage will continue to make the program successful.

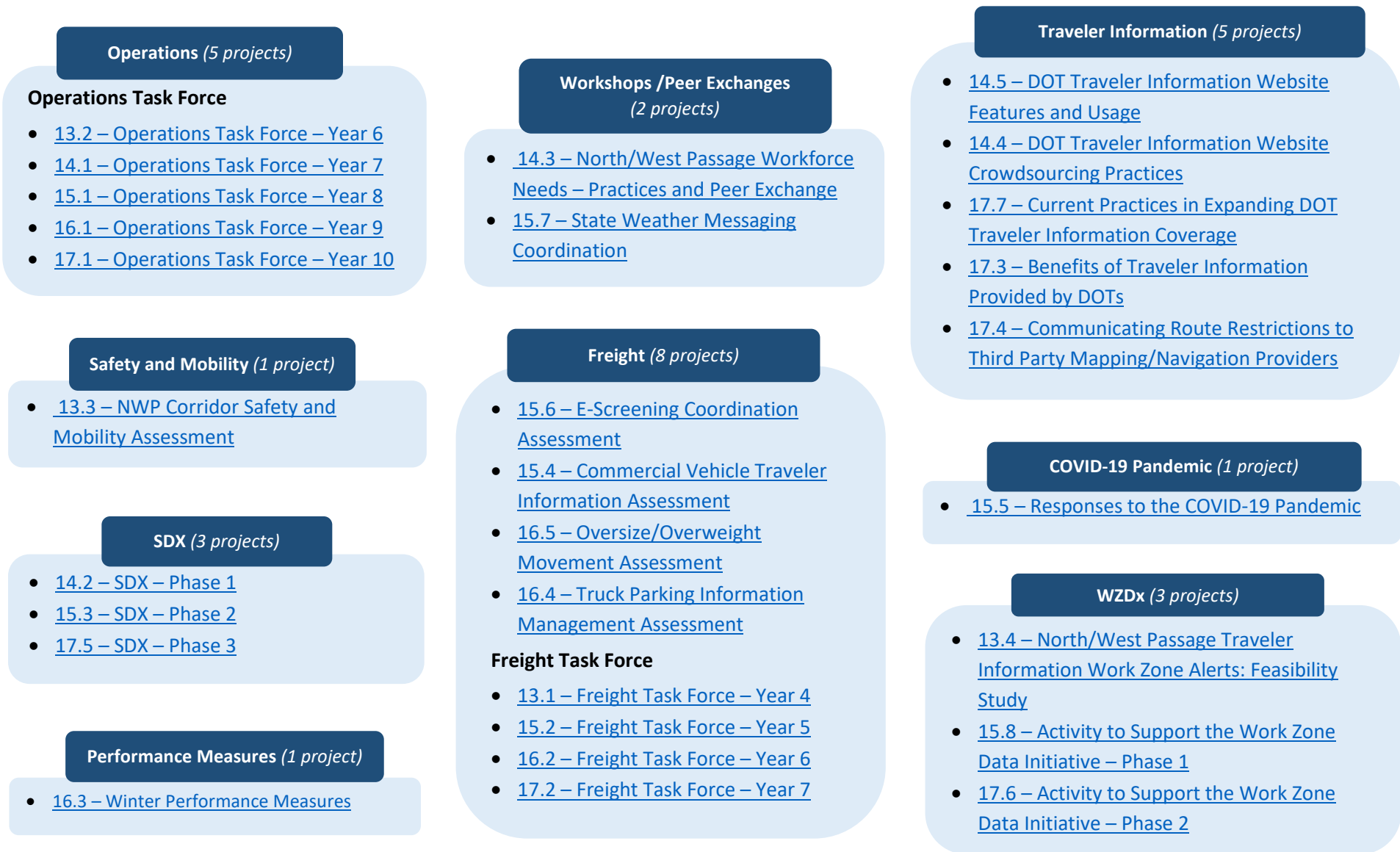


Figure 3: TPF-5(376) Projects by Category