

BACKGROUND AND PROJECT GOALS

At this midpoint of the EWITS project, the Steering and Advisory Committees continue to support the four broad objectives of the Eastern Washington Intermodal Transportation Study:

- Facilitate existing regional and statewide transportation planning efforts.
- Forecast future freight and passenger transportation service needs for Eastern Washington.
- Identify gaps in Eastern Washington's current transportation infrastructure.
- Pinpoint transportation system improvement options critical to

economic competitiveness and mobility within Eastern Washington.

This six-year study is currently moving into Phase II, the second half of the study. The study is funded jointly by the federal government and the Washington State Department of Transportation. Dr. **Kenneth Casavant** of Washington State University serves as the director of the study, guided by a Steering Committee and an Advisory Committee from the region. The Advisory Committee has representation from a broad range of transportation interest groups (see page 8).

EWITS Steering Committee

Jerry Lenzi, Chair
WSDOT, Eastern Region

Richard Larson
WSDOT, South Central Region

Don Senn
WSDOT, North Central Region

Charles Howard
WSDOT, Planning Manager

Jay Weber
Douglas County Commissioner

Linda Tompkins
Washington State Transportation Commission

EWITS SYMPOSIUM IN MOSES LAKE WAS WELL ATTENDED

Almost 100 people attended the "Intermodal Transportation Priorities for Eastern Washington" one-day symposium held October 6, 1994, in Moses Lake, Washington. Attendees came from interest groups in Eastern Washington including: port authorities, counties, small businesses, departments of transportation, tribes, trucking and barge firms, and cities in Eastern Washington. Attendees listened to keynote remarks by **Pat Patterson**, newly appointed member to the Washington State Transportation Commission, as he talked about the financing needs to support the infrastructure in Eastern Washington and throughout the state.

The program of the EWITS symposium assisted in identifying problems existing in Eastern Washington and then de-



Pat Patterson gave keynote remarks at the EWITS Symposium held in Moses Lake.

veloped options for Eastern Washington freight truck transportation. In the afternoon, the specific transportation needs of agriculture in Eastern Washington were discussed followed by an examination of the relationship between transportation needs and local economic development. Special attention was given to local perspectives on intermodal needs by a panel consisting of **Charles Howard**, **Eric Berger**, **Jerry Bryant**, and **Jim Kuntz**, representatives of the state, counties, cities and ports.

An underlying theme of the symposium was the opportunity for the attendees to identify concerns and needs in their area for data and policy information, needs that would then be incorporated into the Phase II portion of the EWITS study.



Washington State Department of Transportation



Washington State
University

Note from the Project Director

With both regret and pleasure, I would like to congratulate **Bill Gillis** and announce that he has left EWITS as project manager and has been appointed by Governor Lowry as Commissioner on the Washington State Utilities and Transportation Commission. Bill served as project manager, and his firm (The Gillis Group) as principal subcontractor to several of the major projects currently completed under EWITS. He and his firm did an outstanding job and they will be missed. However, the Washington State Utilities and Transportation Commission, and the people of the state, have gained significantly with this appointment. Good luck, Commissioner Gillis.

Ken Casavant



EWITS INFORMATION IS REACHING CONSUMERS!

The data development and publications arising from the multiphased EWITS study have been requested and distributed to many consumers. Local planning authorities and counties have requested information, regional and national papers have been presented and a paper, "Collecting State or Region-Wide Transportation Origin and Destination Truck Data," by Casavant and Lenzi, will be presented at a symposium in Australia this summer. Over 60 requests for information and copies of publications have been received as this information is developed. Over 300 publications have been sent out to planning and action agencies.

The highest degree of interest has been expressed in the methodology used in the origin and destination truck freight study as well as in the Geographical Information Systems-Transportation procedure being developed as part of the EWITS study.

In the recent months, specific attention has been given to the effect of road bypasses on local communities and the relationship of transportation to economic development. The findings of these subprojects have been incorporated into regional and local planning efforts.

NEW EWITS PUBLICATIONS ARE NOW AVAILABLE

Four new reports, reflecting the ongoing research and subprojects of the EWITS have now been released by Washington State University. They joined the initial two reports, "Linking Transportation System Improvements to New Business Development in Eastern Washington" and "Lessons From Eastern Washington: State Route Main Streets, Bypass Routes, and Economic Development in Small Towns" in providing planning and development information for users of the EWITS research effort.

The four new publications, discussed in several other stories in this newsletter, deal principally with freight movement in Eastern Washington. Report #3, "Washington State Freight Truck Origin and Destination Study," is a detailed summary that emphasizes the methods, procedures and data dictionary for the massive database developed in this statewide study. The data and this report have been made available to the WSDOT Eastern Region and the Olympia Service Center Planning office and will be, therefore, available to all users in the public arena.

Truck traffic on U.S. 395 north of Spokane received specific attention in Report #4, "Major Generators of Traffic on U.S. 395 North of Spokane: Including Freight Trucks and Passenger Vehicles Crossing the International Border."

Reports #5 and #6 deal with transportation characteristics of the wheat industry and some of the road reconstruction that is needed to support that industry. Haul roads in Eastern Washington, of critical importance to the wheat and barley industry, are examined in "Transportation Characteristics of Wheat and Barley Shipments on Haul Roads To and From Elevators in Eastern Washington." Specific attention was paid to the road use and deterioration that occurs in Eastern Washington, deterioration that requires rehabilitation of infrastructure to support the wheat and barley industry. This was examined in Report #6, "A Quantitative Estimate of Eastern Washington Annual Haul Road Needs for Wheat and Barley Movements."

Both of these reports were partially funded by the Washington Wheat Commission.

The UPDATE newsletter is published to disseminate information from the Eastern Washington Intermodal Transportation Study.

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MODELING GRAIN FLOWS VIA GEOGRAPHICAL INFORMATION SYSTEMS (GIS) MOVES FORWARD

Several critical issues face the transportation system in Washington state, among them possible drawdowns on the Snake River system to aid in salmon recovery as well as further abandonment of railines. Agriculture, and particularly the grain industry, could be adversely affected by the implementation of such policies. Questions quickly arise as to the magnitude of costs, both to the grain industry and to maintaining the transportation system, of such changes. Project managers of EWITS, therefore, desire to develop a policy analysis tool which will allow them to investigate the impact of a wide array of potential policy options for the state.

Several questions arose while developing the methodology and model for the needed policy tool. Just how does one deal with the tremendous amount of data necessary when modeling the movement of grain from thousands of grain production sites, to hundreds of intermediate stops at grain elevators and river ports, and on to the final destinations at ocean ports or Columbia Basin feedlots? How can one easily obtain the minimum distance route from the remote farm to the nearest elevator, and do this for several thousand such sites? How can one then present resulting changes in traffic flows so that they are easily understood?

Presentation of grain flows in a large table by highway or county road section offer little insight to the policymaker, but a visual display depicting those changes utilizing various colors proffers much more information in a more interpretative fashion. Geographical Information Systems (GIS) technology provides an efficient means of dealing with each of the concerns noted above. In essence, a GIS is a set of specialized computer software which allows one to work with geographically referenced data (such as grain production or elevator sites) coupled with a highly efficient database program to deal with the possible attributes (such as elevator capacity or grain handling rates) for the geographically referenced data.

As advanced as GIS is, however, this technology was not able to fully model the many nuances of the grain transportation system of Eastern Washington. Issues such as multiple shipment modes (single, three-car, or 25-car rail; or truck-barge) as well as the transshipment of

grain from one elevator to a "sister" elevator within the same firm could not be fully modeled in any of the commercially available GIS packages. A combination of GIS and the classical optimization technique of a least cost transportation linear programming (or LP) model was therefore developed. Such a model minimizes the cost of transporting one or more commodities from numerous sites to numerous destinations. Limitations on the transportation system, such as maximum amount of grain shipped by a particular mode, maximum capacities at elevators, or the option of transshipping grain to another elevator, are easily reflected in such a model. The resulting mathematical depiction of the transportation system is then solved using a computerized algorithm to provide the set of routes and shipment modes which minimizes the total cost of moving the grain to market.

In this setup, the GIS is being used to generate input data concerning distances and costs for the thousands of potential routes to market, and the LP model would then solve for a base set of traffic flows. One may then change the structure of the transportation system (i.e., disallow barge traffic for several months or remove a railine from use), run the LP model, and analyze the change in traffic flows. Estimates of changes in required road, rail and river maintenance can then be calculated, but the changes in cost or flows are exported back into the GIS and portrayed graphically to aid in policymakers as they decide on which policy options to pursue.

Much of the work of developing the model has already been done in this EWITS study. A detailed survey concerning the timing of grain flows to and from elevators as well as handling and shipping rates was given to elevator operators in Eastern Washington. Results of that survey are critical in determining the nature of the grain handling transportation system and key coefficients for the LP model. Digitized coordinates for all the interstate, U.S., and state highways have been obtained from the Washington

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Three new topics set direction

NEW DIRECTION FOR PHASE II OF THE EWITS ACTIVITY

Based on recommendations from the Advisory and Steering Committees, as well as expressions of interest from agencies in Eastern Washington, specific attention will be paid in the forthcoming year to three new topics: intercity transit, forest products transportation, and development of an Eastern Washington transportation input-output model.

The study of intercity passenger travel issues will emphasize a review of current patterns of services and identification of unmet needs in

the area. Such analysis will allow an assessment and provide direction for meaningful investment programs in improving passenger mobility and economic vitality in Eastern Washington. A scoping study for this project is underway and the study will be initiated in the next several months.



MODELING GRAIN FLOWS

Continued

State Department of Transportation. These have been supplemented with similar coordinates from the DOT and U.S. Census TIGER files for the hundreds of relevant county highways. The latter roads provide key routes of transportation to the hundreds of elevators in Eastern Washington. Detailed records concerning the location by township for planted wheat and barley acres have been obtained from the U.S. Agricultural Stabilization and Conservation Service. Such data is used to better understand exactly where grain is originating and what roads

and/or elevators may be impacted by that production. Preliminary testing of the LP model formulation has been done, and the 20-county level model will be completed by the spring of this year.

The Washington State Wheat Commission helped partially fund this effort.



The forest products industry is distributed broadly within Eastern Washington. This study will look at the problems and usage of the forest products industry of the infrastructure of transportation in the region. Attention will be paid to alternative modes, intermodal facilities, problems caused by seasonal road closures, and other issues identified by members of the industry. Recommendations as to investment or policy changes will be an outcome of this analysis.

The new effort to develop an input-output model for Eastern Washington transportation will serve to document the importance of transportation to Eastern Washington economy by looking at regional employment in transportation sectors, the value of output by detailed transportation sectors, and the extent of regional linkages and ties with market and sales to other regional industries and to export. Further, it will be designed to provide an impact assessment tool that will look at the role of highway construction in the region, the impact of changes in highway construction budgets, and other transportation sector multipliers. This will be the first regional transportation input-output model developed for the state or region.

New Advisory Committee members are welcomed

The Advisory Committee to EWITS has performed a valuable guiding function over the first two years of its activities. New additions to the Advisory Committee reflect the interest and advice that is sought for the second phase of the effort. New Advisory Committee members include **Bob Hannus**, Marketing Manager, Port of Seattle; **Paula Hammond**, Highways and Local Roadways Service Center, WSDOT; **Dennis Hamblet**, Freight Rail Program, WSDOT; **Scott Ransmeier**, Tidewater Barge Lines; and **Al Harger**, Freight Mobility and Economic Partners Service Center, WSDOT.

The Advisory Committee has recently been polled to see if they desire to continue working in this capacity and if they have any suggestions for additions to the Advisory Committee. Further changes will be made as subprojects in new areas are developed.

First statewide study in the nation

WASHINGTON'S ORIGIN AND DESTINATION FREIGHT SURVEY HAS BEEN COMPLETED!

A region-wide freight truck origin and destination study was first proposed in Washington as an element of the EWITS. Supplemental funding provided by WSDOT enabled the EWITS freight truck origin and destination study to be expanded to include the entire state.

The Washington study is the first in the United States to collect statewide freight truck origin and destination data through direct personal interviews of truck drivers. The statewide study involved over 300 persons conducting personal interviews at 28 separate locations. A total of 28,000 truck drivers were interviewed, providing Washington with an extensive database on statewide freight and goods movements.

Permanent weigh stations and ports of entry were utilized as the primary data collection sites for the Washington truck survey. The specific weigh stations utilized as data collection sites were identified through analysis of WSDOT's traffic count and vehicle classification data. Data collection sites were established on all state highways with a significant volume of daily truck traffic. On Washington's major interstate corridors, multiple data collection sites were identified. Recognizing the importance of expanding international trade, plans were also established for roadside interviews at major United States/Canadian border crossings.

To obtain a complete profile of truck movements it was necessary to interview trucks traveling both directions on a given highway segment. On the divided highways, this required identifying two separate interview sites, one on each side of the highway. In total, interview sites were established at 21 Washington State Patrol weigh stations, three Canadian border locations, and the Oregon Port of Entry in Umatilla.

This study, massive in size and complex in structure, has to be considered a complete success. Ninety-six percent of the truck drivers participated in the study. The study was done over four seasons so that seasonality of movement could be tightly monitored. Fourteen different service clubs, mainly Lions, served as the labor force for this massive effort, resulting in slightly

over 300 people who participated as surveyors.

Much was learned, and has been requested from other states, about the methodology of such an effort. It is evident that:

1. Community service clubs can be a viable labor force for conducting personal interviews of truck drivers. However, strong management systems are required.
2. Involvement of uniformed enforcement officers is a critical factor in obtaining cooperation and participation from truck drivers requested to complete interviews.
3. Site setup and the use of systematic sampling techniques are important factors to maintain traffic flows and promote cooperation at the interview sites.
4. Establish an ongoing procedures for evaluation and modification of procedures is important to quality data collection.

Selected findings of the technical data are being produced and will be part of the forthcoming publications of EWITS.

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EASTERN WASHINGTON ROAD CONDITIONS CAUSE NEED FOR ROAD FUNDING



The grain movement data developed for the GIS provided the opportunity for an examination of the need for road construction to support such grain movement. The importance of the grain industry to the state's economy is well-documented; this study identifies the amount of support required to maintain that contribution to the state's economy. Road needs were identified in four specific areas: (1) grain moving from elevator to river ports on truck; (2) grain moving directly from farm to river ports on truck; (3) grain moving from one elevator to another elevator on truck; and (4) grain moving directly from farm to elevator. Although the analysis may be somewhat conservative, it

does provide an estimate of the needs, on an annual basis, of the Eastern Washington haul road system.

Road deterioration, and required reconstruction, approach almost \$28 million annually in the area. Of that, about \$5 million is on county roads, and \$23 million on state and federal highways. The methodology allowed detailed identification of the needs that occur within each county, and the usage that occurs as a result of grain grown for each county. The deterioration figures are presented on a county by county basis and in total; such data will be presented to each of the counties in Eastern Washington.

WOOD PRODUCTS ARE MAJOR SOURCE OF TRAFFIC ON 395 NORTH OF SPOKANE

Because of the important policy interests in North American trade, specific attention was paid to Canadian border crossings north of Spokane. Wood and chemical products are the primary Canadian commodities shipped to U.S. destinations over this northern route. Of the southbound traffic, 100% of the trucks



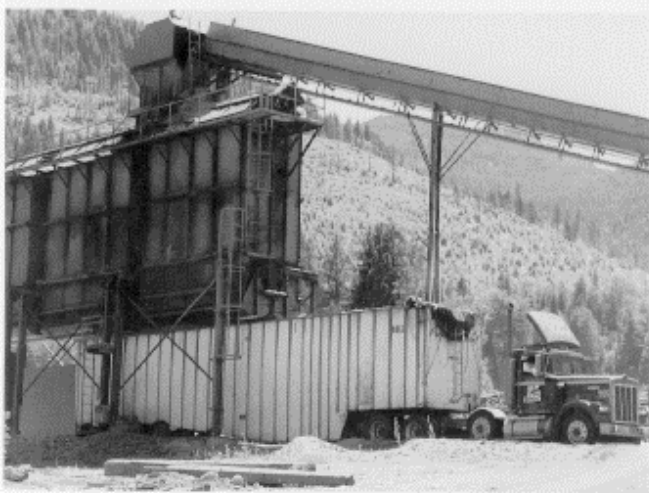
at Laurier were wood products related.

At Frontier, the southbound traffic was also heavily wood products related, but fertilizer and chemicals had 35% of the movement.

Approximately one-half of the total wood products tonnage transported on U.S. 395 north of Spokane originates in Canada. Eighty percent of the Canadian cargo traffic originated in Grand Forks and Castlegar.

Wood chips represent more than three-quarters of the wood products cargo tonnage originating from Canada. Most of these wood chips are destined for the Washington Water Power Electrical Cogeneration Plant near Kettle Falls. While these trips only include about 80 miles of Washington roads (U.S. 395 from Grand Forks and SR 25 from Castlegar), chip truck transportation is both steady and intensive. The median reported cargo weight for chip trucks crossing the U.S. border was 34 tons.

Mills located in Kettle Falls, Colville, and Arden represent the major wood products cargo origins from northeastern Washington. On average, about 800 tons of dimension lumber and 500 tons of wood chips are shipped from Stevens County mills each day. These products are shipped year-round with a somewhat smaller transportation flow during the late fall.



GRAIN MOVEMENTS IN EASTERN WASHINGTON VARY SIGNIFICANTLY BY TIMING, MODE, AND SOURCE

An extensive database on the movements of grain products in Eastern Washington is now available. The modal combination of truck and barge is responsible for shipping over 61% of the wheat and almost 55% of the barley by volume that is shipped from Eastern Washington elevators. Bulk rail or 25- and 26-car shipments, the main competitor to truck-barge, is responsible for the shipment of 34% of the wheat.

Trucks play a more predominant part in the shipment of barley from elevators than in the shipment of wheat. In addition to the barley which moves via truck-barge, truck to final market is responsible for about 17% of barley shipments and truck to other houses for 15%.

Wheat and barley are shipped from elevators the year-round. The percentage of wheat shipped is spread somewhat evenly throughout the year, a high of 23.3% in November and December and a low of 6.5% in May and June.

Elevator operators report that over 89% of the farmers within a 10-mile radius of their elevators ship all or some of their grain to that elevator. Elevator operators also report that of

their clients who use their elevator, over 88% are within 10 miles of their elevator. Both of these statistics confirm that most likely grain does not move very far at harvest time to an elevator. It is the transshipment of grain that occurs throughout the rest of the year.

The primary destination for wheat and barley shipped from elevators in Eastern Washington is Columbia River ocean elevators. Almost 80% of all wheat and 61% of all barley is shipped to ocean elevators in Portland or Kalama. In addition to the large amount shipped to ocean elevators, barley is shipped to breweries in Vancouver, Washington, 10.2%, and to feedlots, 16.9%.



All roads in all directions

ENTIRE ROAD SYSTEM IS USED BY THE FRUIT, VEGETABLES, AND HAY INDUSTRIES IN EASTERN WASHINGTON

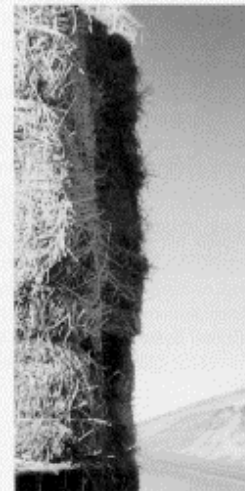
The efficient transportation of fruit, vegetable, and hay requires many different modes and roads. Eastern Washington fruit, vegetable, and hay sales contribute approximately \$1.5 billion to the regional economy each year.

The efficient transportation of fruit is particularly important for producers concentrated in Yakima, Chelan, and Okanogan Counties. Farms located in Grant and Franklin Counties are the state's leading producers of potatoes, hay, and vegetables. Among non-grain agricultural commodities, apples, potatoes, and hay generate the greatest volume of cargo on Eastern Washington highways. These commodities are shipped year-round and need infrastructure year-round.

U.S. 97 and I-82 are the primary routes uti-

lized by the Yakima and Wenatchee Valley fruit producers to reach national and international markets. A significant volume of fresh fruit is also transported year-round on I-90 to Puget Sound ports and regional distribution centers. The heaviest volumes of year-round fresh potato shipments tend to be local movements between cold storage facilities and processors located throughout the Columbia Basin and Umatilla County, Oregon. Significant volumes of fresh potatoes are also transported to distribution centers in the Puget Sound and Spokane areas.

The majority of Eastern Washington-produced hay is shipped to Western Washington dairy farms and ocean ports utilizing I-90. There are also significant movements into Canada and Oregon.



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