USING RISK TO SET SERVICE PRIORITIES IN U.S. RURAL COUNTY

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Abstract

Small local government agencies struggle with the basic steps that implement sustainable infrastructure management practice. Using international risk assessment, and Australia's NAMS.PLUS risk plan templates, a small coastal county in the western U.S. was able to use available information to risk-rate services and guide service priorities as budget reductions forced a 40% cut in agency resources. By using world wide best practices this rural agency successfully used available information to assess critical infrastructure, adopt explicit strategies and engage stakeholders as a specific level of service was adopted for this rural community in the United States.

Key Words: Risk Analysis, Rural Levels of Service, Community Consultation

Introduction

The Tillamook County Public Works Department manages a 378 mile county road network with a 2008 replacement value of $304 million for the 25,845 citizens in Tillamook County, the west central coast of Oregon in the Pacific Northwest U.S. Tillamook County road services are supported by three sources of funding: federal forest timber receipts, the Oregon Motor Vehicle Fund, and state and federal grants (primarily used for bridge replacement and storm repairs). In spring 2007, the U.S. Congress eliminated, then restored for one year, Tillamook County's federal forest receipt funding. This represents approximately 40% of the Public Works Department's revenues.

In January 2008, new leadership moved quickly to develop road asset information to communicate current and future road service choices faced by this rural county. Failure of a local revenue initiative in May 2008 required identifying service priorities so that the reduction in road services could be implemented by July 2008. Using available information and risk assessment, the community was able to target available resources to manage community risks, and protect high priority road assets.

Service Planning Issues

Known as "the land of seas, cheese and ocean breeze", Tillamook County's dairy farms and tourism place a heavy demand on aging county roads. Tillamook's population increases 50% in the summers due to tourism and recreation homes. Since 2000, Tillamook County's population has grown 6%. As with the rest of Oregon, the population is aging; growth has been due to in-migration and the appeal of second-home ownership along this beautiful, mid-Oregon coastal community. Housing values are increasing but still below the state average. A significant increase in residential building permits reflects the attraction of the county's position on the Pacific Ocean.

Tillamook County is the largest source of harvestable timber in the state. Sixty-four percent (64%) of land in Tillamook County is owned by the public. Tillamook County experiences a high volume of truck traffic primarily due to logging and dairy farms.

Tillamook County is 75 miles west of Portland, Oregon, the major metropolitan area in this state on the west coast of the U.S. Five rivers empty into Tillamook Bay. A wet coastal climate with an average 90 inches of rainfall annually, Tillamook County has been hit by an increase in severe

hurricane force wind and rain events. Six significant storms have occurred since 1996, two of these include federally declared emergencies. In December 2007 and again in November 2008, a county bridge and 12 foot culvert were washed away or severely damaged.

Salmonberry Bridge, Railroad and Telecommunications to Pacific Asia, December 2007

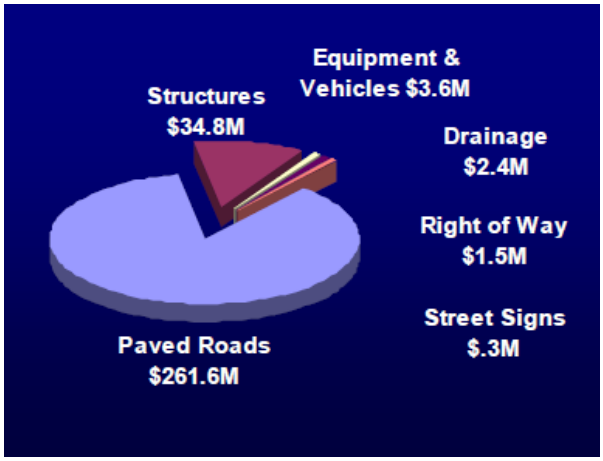
The interdependence of Tillamook County's transportation networks was highlighted as the County-owned Salmonberry Bridge was washed away during the December 2007 storm. This storm severely damaged sections of the only railroad to Oregon's urbanized Willamette Valley owned by the Port of Tillamook Bay. This railroad carried finished lumber products to the valley, and brought in feed for Tillamook County's dairy farmers, the county's largest employer. Telecommunication lines to Pacific Asia running alongside this rail line were exposed in the hurricane's aftermath. Loss of the railroad will impact County roads. An estimated 10 log trucks must now use County roads to carry the equivalent of one railroad car of finished lumber.

Over the last 10 years, the County road budget has remained nearly the same, $4 million per year. Over the last 20 years, road programs have been reduced or eliminated. The County road ditching program was eliminated in recent years as Public Works staff was reduced from 41 in 1998 to 30 in 2007. Drainage management (ditches, culverts) occurred on a reactive basis in response to service calls or flooding with no accurate inventory or condition assessment of culverts and ditches.

Asset Planning

In 2007, new County Public Works leadership understood the road network was in a state of disrepair. A decision was made to adopt a new agency strategy based on community partnership and managing today's needs with consideration of long term impacts. An assessment of the organization's roles and responsibilities, policies, business processes, data and technical tools, knowledge and decision making processes was assessed. Inventory, condition, various investment scenarios, given use of a Pavement Management System, existing bridge sufficiency ratings, assumed useful life and age of road assets were documented in a *Road Asset Management Plan*. Confidence levels in information were included.

Tillamook County's 2008 road replacement value is US$304 million. Eighty-six percent (86%) of the replacement value is in its paved roads.



Road Network Replacement Value - US$304M

Rated the worst condition in the state's 36 counties, Tillamook County's paved road surfaces in 2008 have a Pavement Condition Index of 45, or Fair. This is down from 48 PCI in 2006. $36 million is needed over 10 years to bring roads to a good condition where preventive maintenance could then sustain this level of service. Federally mandated bridge inspections indicate 66% of county bridges are in good condition. A state bridge

repair program is being used to renew or replace the 6 bridges in poor condition.

Community Perception of Road Maintenance vs. Willingness to Pay

The Tillamook County Futures Council surveyed citizens and businesses in 1998 and again in 2007 to understand the perception of the adequacy of road maintenance. Just over half (51%) of respondents in 1998 thought the "condition and quality of roads and highways" needed improvement. By 2007, almost 80% of respondents did not agree that "current condition and level of maintenance of the County roads was adequate". Neither survey identified the cost to bring county roads to a particular level of service. However, county leaders believed that these survey results, the impending elimination of federal forest receipts to timber-dependent counties, and a concerted public information campaign on the status and condition of county roads and services created a momentum for adopting a local revenue measure. A local vote to implement dedicated local funding for county roads was presented to voters in May 2008. Faced with a US$1 per US$1,000 assessed property value dedicated to local road maintenance, 65% voted no. Immediate action was then required to implement a 40% reduction in road revenues by July 1, 2008.

Using Risk to Set Priorities

A one-day workshop in June 2008 convened the three County Board Commissioners; the Road Advisory Committee; County directors for Human Resources, Community Development, Coastal Resource Planning and Treasurer; Public Works Director, foremen and administrative management staff.

Prior to the workshop, agency management reviewed asset condition information and discussed the ways assets could fail, and what would happen if they did fail. This resulted in separating some asset classes and services to reflect similar deterioration rates or management practices.

Eighteen county road services (e.g., paved roads, gravel roads, bridges) were defined.

The causes for each type of asset's failure were brainstormed, including the failure's impact on the community, the environment and the economy.

Tables were developed so that a 1 to 5 ranking could be assigned to the likelihood of an event's occurrence. The likelihood ranged from rare to almost certain; probability from 10% to 90%; the frequency from once per 10 years to 9 out of every 10 years; a description of the threat; and rating (1-5).

Likelihood	Probability	Frequency	Description	Rating
Almost Certain	90%	9 out of every 10 years	The threat can be expected to occur Or A very poor state of knowledge has been established on the threat.	5
Likely	70%	7 out of every 10 years	The threat will quite commonly occur Or A poor state of knowledge has been established on the threat.	4
Moderate	50%	Every 5 out of every 10 years	The threat may occur occasionally Or A moderate state of knowledge has been established on the threat.	3
Unlikely	20-30%	Once per 2-3 out of 10 years	The threat could infrequently occur Or A good state of knowledge has been established on the threat.	2
Rare	10%	Once per 10 years +	The threat may occur in exceptional circumstances Or A very good state of knowledge has been established on the threat.	1

Categories of risk were modified so that the consequences of the threat reflected Tillamook County's experience. These factors included: economic (damages to community, losses, additional expenditures), legal compliance, community impact, human health and safety, reputation, environment, and human resources. Factors were rated 1, or insignificant to 5, or catastrophic.

Factor	Score				
	Insignificant	Minor	Moderate	Major	Catastrophic
	1	2	3	4	5
Economic (damages to community, losses, additional expenditures)	Less than $5,000	$5,000-$50,000	$50,000 -$100,000	$100,000 - $500,000	Greater than $500,000 (or 25% of budget).
Legal compliance	County fully complies and is on course with regulators to anticipate mandates	County agrees to compliance schedule, and avoids lawsuits and fines.	County warned of compliance issues and adopts corrective action	County sued or fined for missing mandates. Expects to comply in 1 year.	County sued or fined for missing mandates. No viable plan to comply.
Community impact	Community complaints	Unplanned disruption to multiple households, firms or community services/structures	Simultaneous unplanned disruption to multiple households, firms, or community services/structures	Unplanned disruption to large number of households	Unplanned disruption to essential service (e.g., lifeline route)
Human health and safety	No injuries	Minor injuries	Serious injures	Single fatality or multiple serious injuries	Multiple fatalities
Reputation	No adverse media (all week)	Local media criticize county for 1 week	Regional media criticizes County for 2 days	National media criticizes County for 2 days	National media criticizes County for 1 week
Environment	Short-term damage	Limited but medium-term negative effect	Major but recoverable ecological damage	Heavy ecological damage, costly restoration	Permanent, widespread ecological damage
Human Resources	Permanent staff turnover 0% to 10% per year	Permanent staff turnover 10% to 15% per year	Permanent staff turnover 15% to 20% per year	Permanent staff turnover 20% to 30% per year	Permanent staff turnover exceeds 30% per year

Likelihood and consequence scores were multiplied to define relative risk. The risk rating was used to determine risk treatments.

Risk Rating		Action Required
E	Extreme Risk	Immediate action required to reduce risk
H	High Risk	Management attention required to manage risk
M	Medium Risk	Management responsibilities specified and risk controls reviewed
L	Low Risk	Manage by routine procedures

Risk treatments can range from ‘Extreme’ risks requiring immediate corrective action (reallocate resources to mow intersection roadsides for sight distance), ‘High’ risks (such as posting weight limits on bridges with low sufficiency ratings), or ‘Low’ risks (continue annual building safety inspections).

A summary of road asset inventory, condition, replacement value and renewal need was presented to the workshop participants. Likelihood and consequence tables were also handouts and explained, along with the risk assessment process.

The causes of an asset or service failure and its impact were discussed and modified during the workshop. This collaboration improved the understanding of the risk analysis process, what was being rated and ranked, and why.

Risks were either a threat (asset failure) or opportunity (transferring Local Access Road responsibility back to private land owners by rescinding a Board Order—an opportunity to transfer non-mandated services and communicate with the community about County road responsibilities).

During the workshop, presentation of the road information from the *Asset Plan* led to interactive assignment of the likelihood and consequence rating, then ranking of road service risks. A Risk Contingency Response Plan was brainstormed at a high level. This consultant-led exercise was interactive; an Excel spreadsheet was projected on a screen so that participants could see risk ratings and follow decisions.

Extreme risks include:

- Arterial and collector paved roads
- Mowing and spraying roadsides
- Fleet equipment
- Staffing levels and succession planning

High risks include:

- Gravel roads
- Local Access Roads
- Bridges
- Levees
- Culverts/Ditches & Shoulders
- Signs-Regulatory
- Pavement Markings
- Quarries

Medium risks include:

- Guardrails
- Signs-Non-regulatory (street name)

- Engineering services

Low risks include:

- Public Works buildings

Tillamook County Risk Rating				
Asset or Service Program	Asset or Service Subprogram	Likelihood	Consequence	Risk Rating
Roads	Arterial & collector paved roads	5	5	Extreme
Veg.Mgmt	Spraying & mowing roadsides	4	5	Extreme
Equipment	Fleet & Equipment	4	5	Extreme
Admin. Services	Staffing leves & succession	5	5	Extreme
Roads	Gravel roads-county maintained	3	3	High
Roads	Local Access Roads	4	3	High
Structures	Bridges	2	5	High
Structures	Levees	3	5	High
Drainage	Culverts, ditches & shoulders	5	3	High
Traffic Safety	Signs-Regulatory (stop signs)	4	4	High
Traffic Safety	Pavement markings	3	4	High
Materials Mgmt.	Quarries	4	3	High
Structures	Guardrails	3	2	Medium
Traffic Safety	Signs-Other	4	2	Medium
Engineering	Engineering services	2	4	Medium
Facilities	Public Works buildings	3	1	Low

A three-year improvement plan implementing decisions from the workshop now includes reallocating existing resources to address extreme risks.

- In one case, not knowing about culverts and ditches in this wet environment was deemed unacceptable. Partnering with state and federal officials is underway to find other funding to collect this critical information and provide a road drainage management program.

- A chipseal activity was initiated to ensure paved road surfaces achieved their useful life. An adjoining county road department was hired that had the expertise and equipment to perform this activity.

- An estimated 50% of Public Works staff will retire within 3 years; cross-training is underway and a priority.

- Overtime response to downed signs was limited to regulatory signs (stop and yield signs) only.

- An equipment replacement fund has been established to address the fact that 73% of the existing County fleet exceeds established useful lives. Without adequate equipment, no road response—proactive or reactive—is possible.

- Community notification of significant changes in services became an important part of follow up actions.

A more complete set of actions, the responsibility and resources to manage risk priorities were developed following the workshop. This more detailed risk register, workshop process and results were assembled using the NAMS.PLUS risk plan template in the *Road Risk Management Plan.* Risk priorities were also integrated with the *Road Asset Plan* 3-year improvement plan.

Monitoring and reporting frequencies are reflected in the *Risk Plan;* new risks will be identified annually, the risk plan should be rewritten every three years, and action plan tasks incorporated in annual County employee performance reviews. *Risk Plan* reporting cycles reflect the road asset management planning and financial management and budgeting cycles. The plan identifies reporting frequency as well as who is responsible, who approves, who is conferred with, and who informed. Alignment of these reporting relationships begins to manage the expectations of employees, the community and road service partners, as well as holds the department, the Road Advisory Committee, and the County Board accountable for their commitments.

The County Board is to consider adoption of an explicit asset management policy that sets guidelines for implementing consistent sustainable infrastructure management processes throughout Tillamook County Public Works. IPWEA's NAMS.PLUS template is the basis of the draft policy under consideration.

On October 3, 2008, the U.S. Congress again extended federal funding for timber-dependent rural Oregon counties; these revenues will be reduced each year and eliminated by 2012.

Lessons Learned

The key to proceeding on this fast track was the presence of a public works director who understood the benefit of asset management, and within the context of setting county road service priorities, made cooperation of key county department leadership and employees a priority.

Even with this federal funding extension, the risk workshop prepared this rural U.S. County to:

1) face the immediate road network risks,

2) begin to improve local understanding of road needs,

3) identify the likelihood of a risk event or asset failure, and the consequence if it were to occur, and

4) define a common view of service priorities for decision makers, including elected officials, road advisors, the county management and road agency managers and field staff.

Longer term solutions become more probable through this understanding and involvement.

Notably, citizens who led the May 2008 “no” revenue campaign attending the workshop commented they had no idea the choices that the Board and Public Works faced were so severe and real. Following the workshop these same citizens formed a group leading an initiative that will ask voters to fund a higher level of road service. Polling is underway to better understand what type of revenue would be acceptable and what type and level of road services are desired. Voting on a higher level of county road services is waiting outcomes of the 2009 U.S. Congress and Oregon State Legislature. Both are addressing transportation policy and funding.

Regardless of future ballot initiatives, there is a commitment within Tillamook County to improve the way county road services are managed, and strategically target available funds. A handout based on an annual *Road Performance Report* information will help educate Tillamook County about county road network performance, use and service challenges. A summary of the *Road Asset Plan* and activity cost and work accounting, this report will be made available at public meetings and community events. The handout seeks to improve on-going communication and road department accountability.

Conclusion

A simplified approach to asset management implementation was sufficient for this rural road management agency to set service priorities. Organizational, business practice and data management and field tools were evaluated. Road asset inventories, condition, replacement value, and future paved road needs were then assembled in an *Asset Management Plan.* This provided the foundation for using a risk analysis process in which key stakeholders could review summary information prepared by Public Works to reach consensus on road service priorities in a one-day workshop. This iterative process used information that was available and the risk analysis process to set priorities and reallocate resources to manage road service risks.

Providing the desired level of road services given informed choices and a commitment to long term stewardship of the roadways has brought Tillamook County leadership into internationally recognized best appropriate asset management practice. Oregon’s other county and city agencies, as well as other state and U.S. national asset management leaders are interested in the actions taking place in Tillamook County.

There is recognition in Australia, Canada and the U.S. that local government has increasing responsibility for managing and funding community services, and that the capacity to be a knowledgeable owner requires more education and training in sustainable infrastructure management.

Tillamook County is providing the leadership to implement needed changes to the organization, information and decision making in public works management. International templates, techniques and guidance have been used to leverage these pockets of excellence.

Weather events, economic shifts and expiring funding can focus a community's decision making in the short term. Presenting asset planning information and mapping this to future service demands using risk analysis techniques may present opportunities to improve collaborative decision making. Together these increase the confidence in the choices being presented and improve a sense of ownership by the community in the decisions being made. Ongoing communication about these services choices, adoption of policy, and embedding organizational roles and responsibilities for asset management are the necessary ingredients for sustaining these changes long term.

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