Sustainable Road Drainage Asset Management Strategy and Financial Requirements

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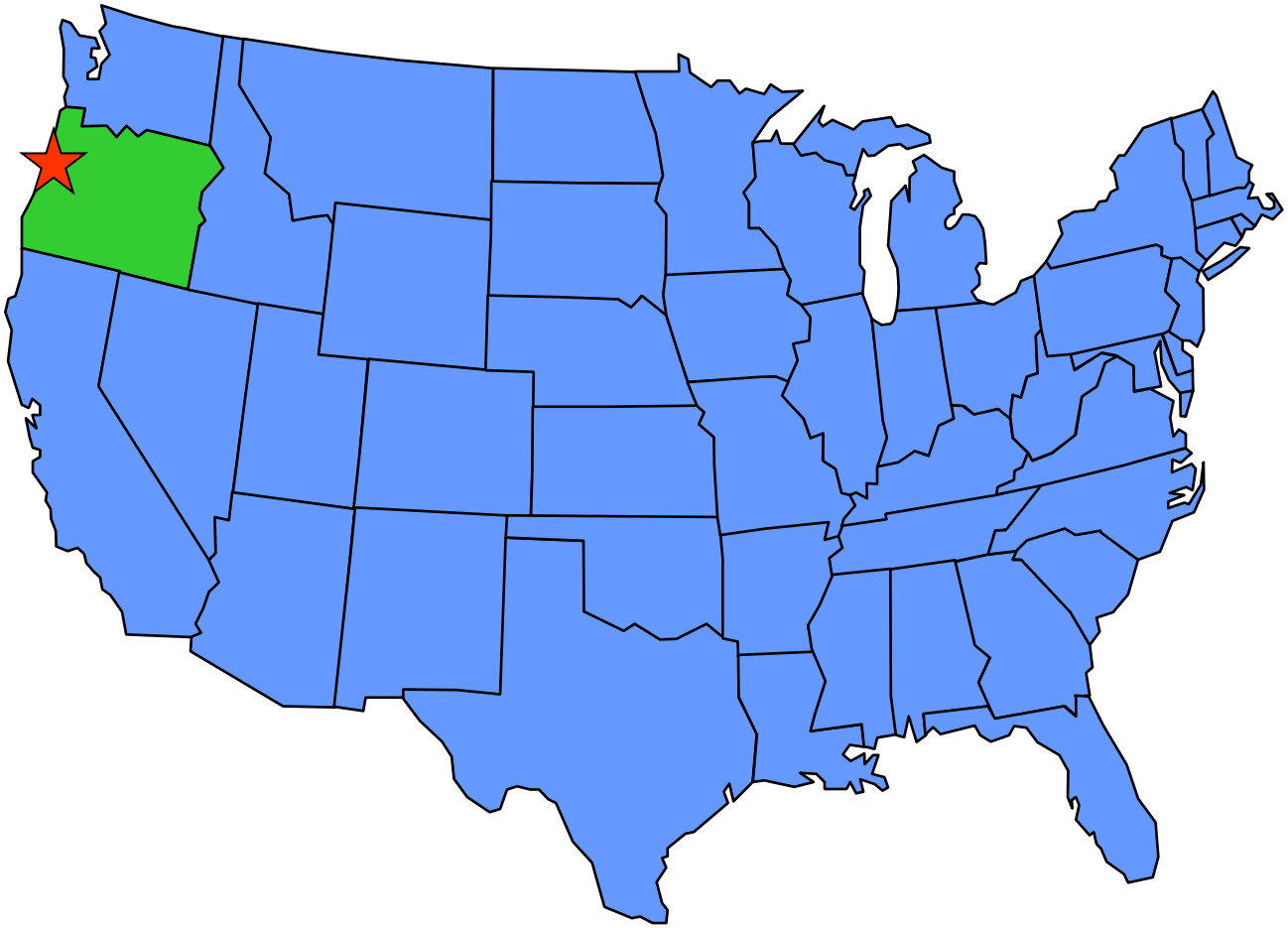
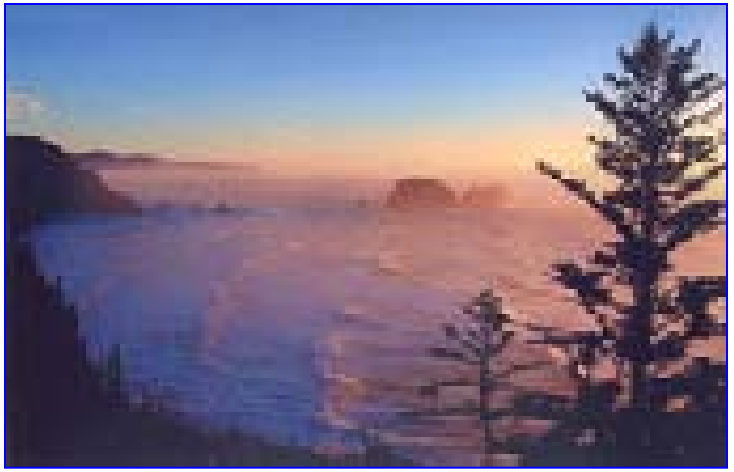
Tillamook County, Oregon



Dairy, logging & tourism dependent economy

"The land of cheese, trees & ocean breeze."

- Largest source of harvestable timber in state
- 64% publicly owned land
- 50% increase in summer population



Climate = Wet

- 90 inches average rainfall
- 5 rivers empty into Tillamook Bay

Recent severe weather events:

- November 2006 – 50 year flood
- December 2006 – 10 year wind event
- January 2007 – 20 year snow event
- December 2007 – hurricane-force winds & flood
- Winter 2008-09 – 3 floods
- Winter 2011 – Flood
- Winter 2012 - Flood

Weather prediction – More of the same

"Frequency and magnitude of coastal flooding events may continue to increase. "

Oregon Climate Change Research Institute Report, November 30, 2010

Drainage is the key to community safety


Neskowin Trace
Winter Storm 2011


Bixby Road
Winter Storm 2006

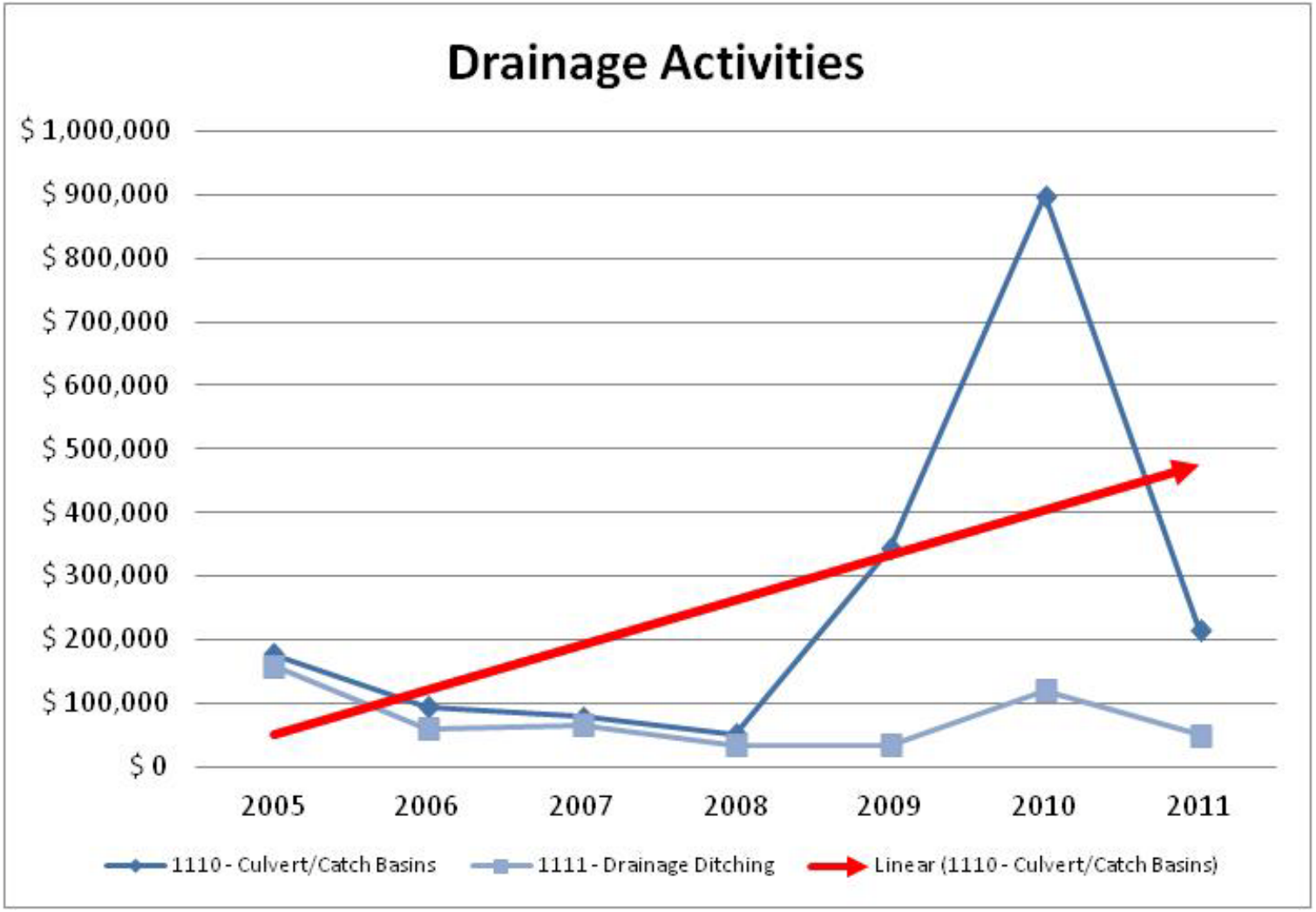
County road drainage purpose

- Goal
  - An accessible, safe and well maintained county road network clear of surface storm water and flooding.
- Strategic Objectives
  - provide and maintain adequate road drainage in order to prevent water damage to the roadway structure,
  - maximize the use of the county road network,
  - protect the rights of adjoining property, and
  - provide fish passage where mandated.

County Drainage Activities

- Purpose
  - maintaining vegetated ditches that serve as drainage and water quality facilities,
  - maintaining culverts in the condition necessary to handle their design capacity, and
  - where culverts carry streams, in maintaining them in a condition to provide fish passage.
- County Activities
  - Culvert and catch basin cleaning
  - Culvert replacement
  - Ditching
  - Erosion control using best management practices with regards to steep slopes, drainage ways and permitted activities.

Service Cost Trend



Do you know the history of your system?

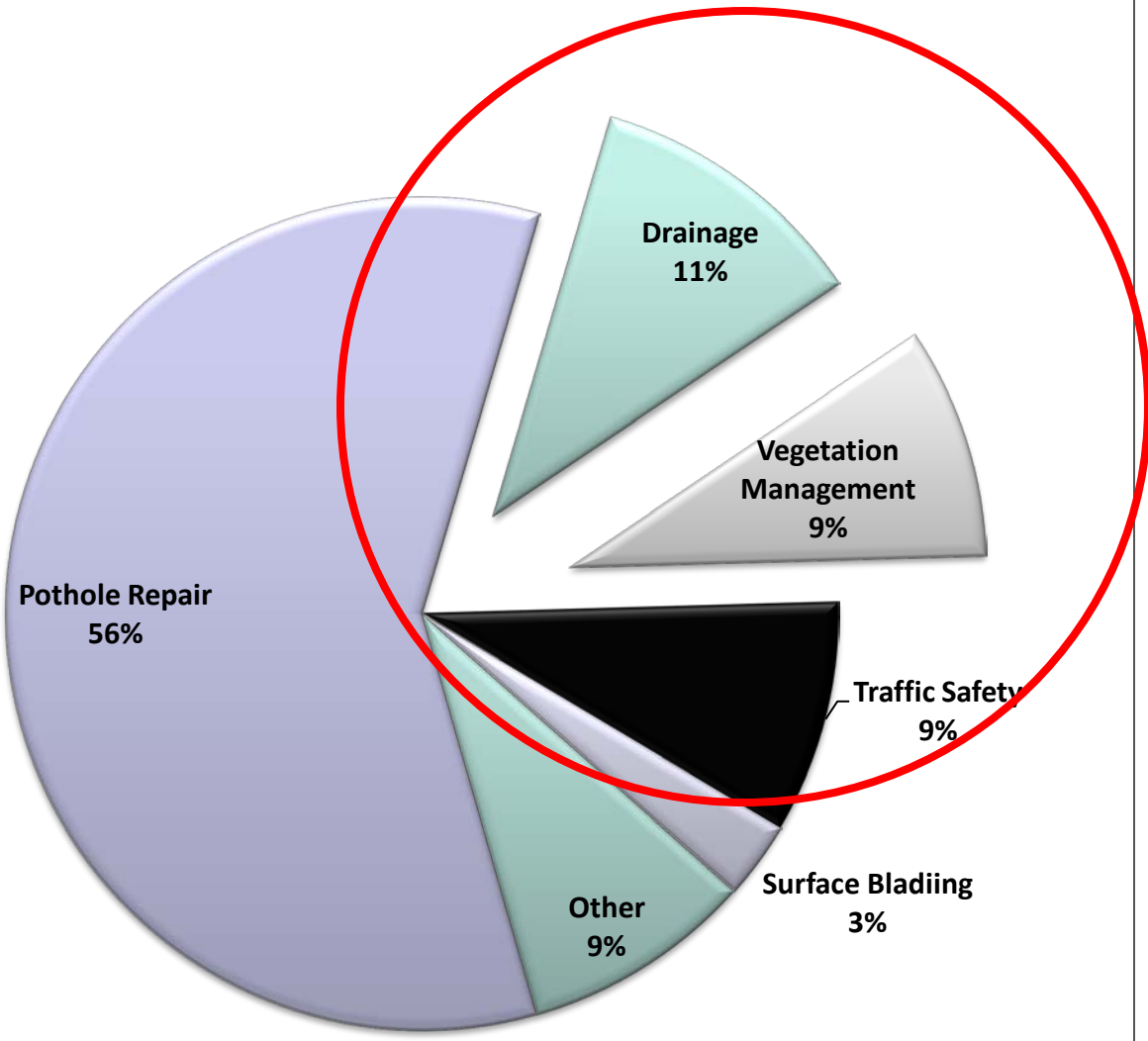
Fawcett Creek Road

Fawcett Creek 2008 Flood

Fawcett Creek Today

Monitor Customer Experience

- 20% of Service Requests are drainage related
- Risk incidents increasing
- Asset condition unknown
- Catastrophic Failures more frequent



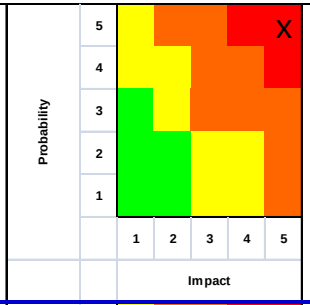
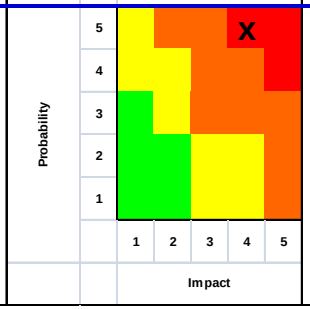
Which assets are most Critical?

Risk = Likelihood x Consequence of Risk

Likelihood	Consequence				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
5 Almost Certain	M	H	H	E	E
4 Likely	M	M	H	H	E
3 Moderate	L	M	H	H	H
2 Unlikely	L	L	M	M	H
1 Rare	L	L	M	M	H

Which County assets are Critical?

- Culverts – Extreme risk
- Ditches – Extreme risk
- Vegetation Management – Extreme risk

6	Drainage	Culverts	Outdated inventory & condition assessment Lack of mapped culverts Low lying roads inundated by plugged or deteriorated culverts Inappropriately sized outfalls beavers, undersized culverts, storm water , age	road washouts, flood property, road closures, traffic delays, property damage, emergency response issues, ecological impacts, negative impact on road integrity, public safety, may leave citizens isolated	Threat	5	5		Mitigate	partner to funds culvert replacements, inventory and map assets, inspect prestorm, rate condition Develop preventive maintenance program
7	Drainage	Ditches and Shoulders	Lack of maintenance, sediment from floods, debris from mowing, tree canopy, Eliminated program over 20 years ago, vegetation up to road	saturated road bed, flooded roads, soft and eroded shoulders, culverts plug, citizen complaints,	Threat	5	4		Accept & Mitigate	inventory and map assets, inspect, rate condition Develop preventive maintenance program

Drainage Risk Management Strategy: Mitigate Risk

- Partner to fund culvert replacements
- Inspect prestorm, rate condition
- Develop drainage asset management plan
  - Improve inventory and remaining life assumptions
    - Partner with TEP to conduct partial inventory, condition assessment & map assets
    - Improve replacement cost estimates using County costs
    - Develop low confidence future performance estimates
  - Identify any funding gap
    - Sustained performance over asset live (Desired)
    - Current Service Level
    - If further cuts to revenues
- Communicate drainage performance tradeoffs

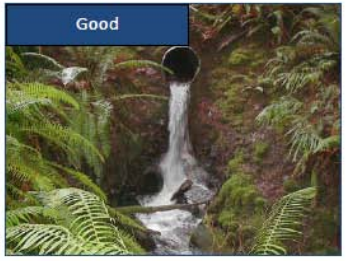
Targeting Drainage Service Failure

- No link between service plan & long range financial plan
- Lack of knowledge about culvert condition
- Inadequate engineering design
- Lack of County storm water management plan

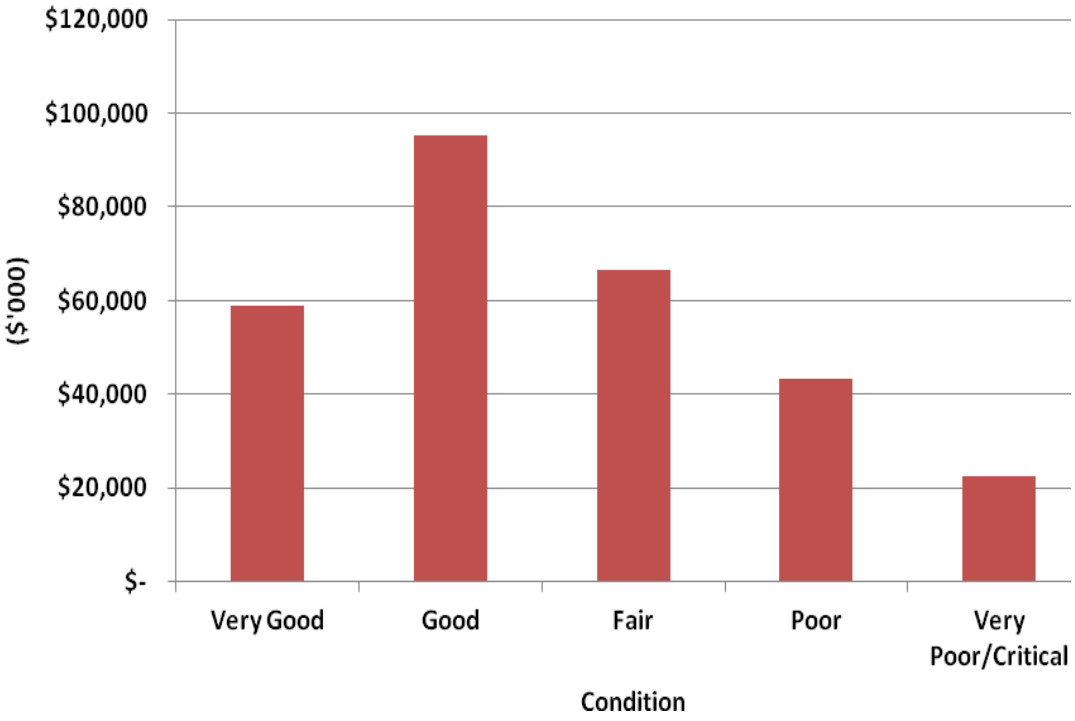
Service or Asset Risk	What can Happen	Likelihood	Consequence	Risk Rating (Extreme, High, Medium, Low)	Existing Controls	Is risk credible?	Risk Treatment Plan
Culvert debris; and debris caused by beavers	Culvert blocked and fails; road floods, collapses or is blocked; citizens isolated	4	5	Extreme	Inspect in fall prior to wet season & major weather events; clear "hot spots"	Yes	Remove debris/clean culverts proactively, fix road Upgrade culverts & fund through new revenue source
Drainage network -floods	Flooding on low lying roads	3	5	High	Rely on partner funding to replace culverts on fish bearing streams	Yes	Increase inspection & debris removal
-failure of aging culverts	Culvert collapse & flooding	4	5	High	Rely on service requests and inspections	Yes	Continue inspections, monitor conditions; communicate risk to BOCC
inappropriately sized or undersized culverts	Culvert collapse & flooding	4	5	Extreme	Conduct sample inspection on culverts	Yes	Target high risk culverts; Seek partner funding; Communicate risks
-reduced engineering staffing, lack of oversight and compliance with standard designs and reporting	Lack of legal compliance with requirements	4	2	Medium	Reviewing development plans; Monitoring federal and state changes; monitor compliance in the field	Yes	Seek additional engineering staff
Greater run off due to development	Flooding	1	2	Low	Less development & plan reviews due to economic downturn	No	Monitor development review with existing staff
Catastrophic culvert failures due to outdated inventory, condition assessment, location, replacement value	Increased overtime expenses due to emergency replacement and upgrades of culverts	5	5	Extreme	Conduct sample inspection on culverts	Yes	Inform BOCC of risk & seek partner funding (OWEB, USFS, TEP, NWACT, STIP)

Increase Condition Knowledge

- Rated 20% of inventory in 2012
  - 1(Critical)-5 (Very Good) Condition Scale
  - Inspected 20% of culverts in 2012
  - 100% inventory in IRIS with location & dimensions
  - Data Confidence: Low-Moderate



- 3,300culverts
- $281M current replacement value
- Low-Moderate confidence in information



Track Known Risks in Register

Road	Milepost	Current Condition	Material Type	Diameter (in)	Culverts Length (ft.)	Culverts Cover Depth (ft.)	System Type Desciption - Name	Carried Type Desciption - Name
FAIRVIEW RD	0.9	5	CS - Corrugated Steel	18	34	2	Cross Culvert - C	Ditch - D
FAIRVIEW RD	1.5	5	CS - Corrugated Steel	18	136		Approach Culvert -	Ditch - D
HUGHEY LN	0.5	5	CS - Corrugated Steel	18	20	2	Cross Culvert - C	Ditch - D
MIAMI-FOLEY RD	2.2	5	PC - Precast Concrete	18	35	4	Cross Culvert - C	Ditch - D
SOUTH PRAIRIE RD	0.2	5	PC - Precast Concrete	12	20		Approach Culvert -	Ditch - D
SOUTH PRAIRIE RD	1.2	5	O - Other	12	88		Frontage - F	Ditch - D
SOUTH PRAIRIE RD	2.4	5	CA - Corrugated Aluminum	12	28		Approach Culvert -	Ditch - D
TRASK RIVER RD	1.9	5	CS - Corrugated Steel	36	60	2	Cross Culvert - C	Ditch - D
TRASK RIVER RD	2.0	5	PC - Precast Concrete	36	35	3	Cross Culvert - C	Ditch - D
TRASK RIVER RD	2.2	5	PC - Precast Concrete	18	38	3	Cross Culvert - C	Ditch - D
TRASK RIVER RD	7.4	5	CS - Corrugated Steel	84	50	2	Cross Culvert - C	Named Body - B
BLAINE RD - UPPER NESTUCCA RD	1.4	5	CS - Corrugated Steel	36	100	6	Cross Culvert - C	Stream - S
MIAMI-FOLEY RD	5.6	5	PC - Precast Concrete	36	83	23	Cross Culvert - C	Stream - S
MIAMI-FOLEY RD	5.8	5	PC - Precast Concrete	24	80	11	Cross Culvert - C	Stream - S
MIAMI-FOLEY RD	12.5	5	PC - Precast Concrete	36	60	17	Cross Culvert - C	Stream - S
MIAMI-FOLEY RD	7.6	5	CS - Corrugated Steel	72	70	5	Cross Culvert - C	Stream - S
MIAMI-FOLEY RD	8.8	5	CS - Corrugated Steel	72	70	4	Cross Culvert - C	Stream - S
TRASK RIVER RD	1.6	5	PC - Precast Concrete	18	80	4	Cross Culvert - C	Stream - S
TRASK RIVER RD	3.2	5	CS - Corrugated Steel	12	60	3	Cross Culvert - C	Stream - S
TRASK RIVER RD	4.6	5	CS - Corrugated Steel	18	42	3	Cross Culvert - C	Stream - S
TRASK RIVER RD	12.2	5	CS - Corrugated Steel	48	60	6	Cross Culvert - C	Stream - S
TRASK RIVER RD	13.2	5	CS - Corrugated Steel	18	30	2	Cross Culvert - C	Stream - S

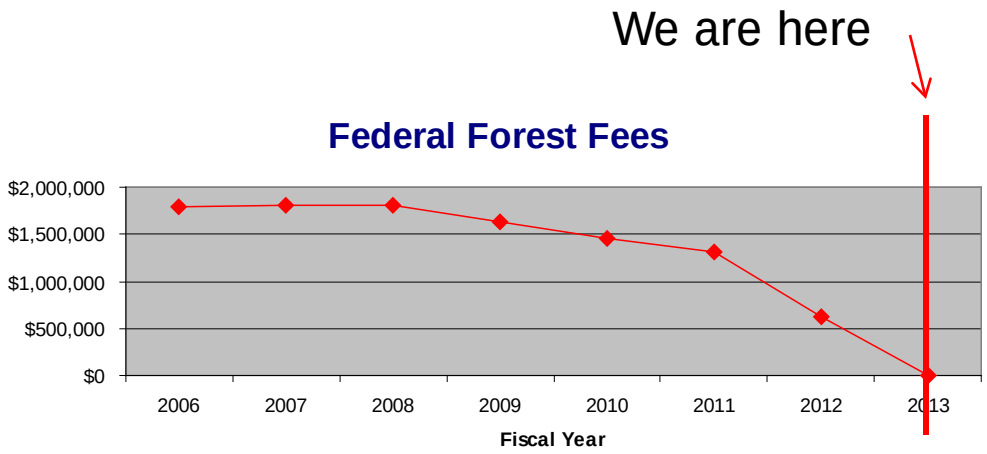
Action - Rank Critical Deficiencies based on Benefit-Cost

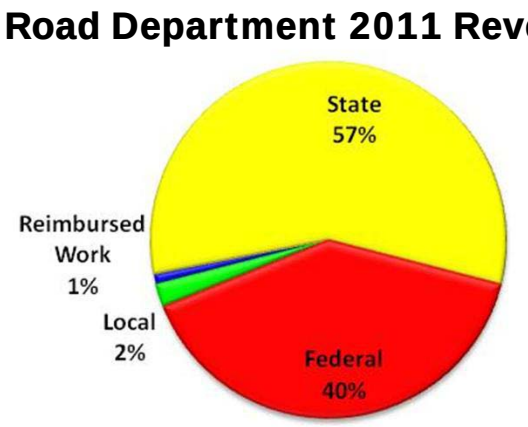
- Cost
- Remaining useful life/condition/performance
- Fish passage
- Alternate route out of community
- Lifeline route
- Emergency route
- Functional classification and use of route (arterial-collector, or local road)
- Detour length
- Consequence of failure on property
- Partner funding

				Value-Added Criteria												
				Access & Safety Criteria				Strategic Priorities								
	Culvert Replacement Projects	Asset Condition	Cost	Detour Length	Lifeline Asset	Alternate Route	Emergency Route	Fish Passage	Functional Classification	Consequence to Property	Partner Funding?	TOTAL BENEFIT SCORE	WEIGHTED BENEFITS	COST/ BENEFIT	PROJECT RANK
1	*Cape Lookout Road Culvert*	**5**	$100	1			1	1	2	1		6.04	12.84	7.79	1
2	*Bixby Road*	**5**	$150	5					1	3		9.03	16.98	8.84	2
3	*Miami River Road*	**5**	$300	5	1	1			2	5		14.01	22.66	13.24	3
4	*Hobsonville Point Road Culvert*	**5**	$150			1	1			3		5.03	11.53	13.01	3
5	*Sandlake Road - Reneke Creek*	**5**	$500	5				1	2	1		9.01	16.81	29.75	4
6	*Trask River Road*	**5**	$500	5		1			2			8.01	15.41	32.45	5
7	*North Fork Road*	**5**	$500	1				1	2	3		7.01	14.31	34.95	5
8	*Sandlake Road - Jewel Creek*	**5**	$700	5				1	2			8.01	15.56	45.00	6

Resourcing Crisis becomes…

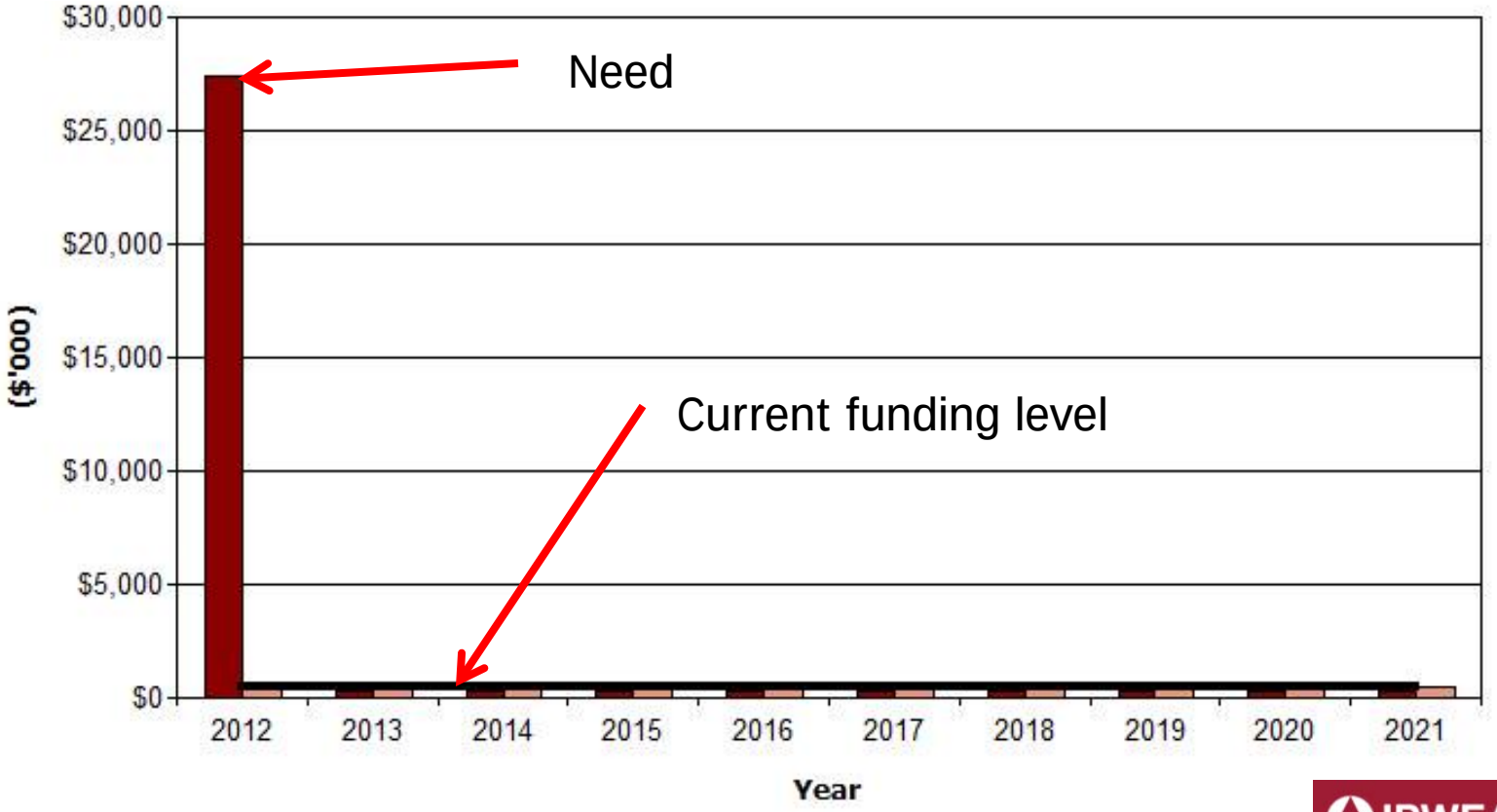
- Elimination of Federal funds July 1, 2012
- Slight increase in State gas tax
- No Local property tax support





Discussion on Service Level Resourcing Options

Culvert Funding Shortfall over 10 Years is $25 million



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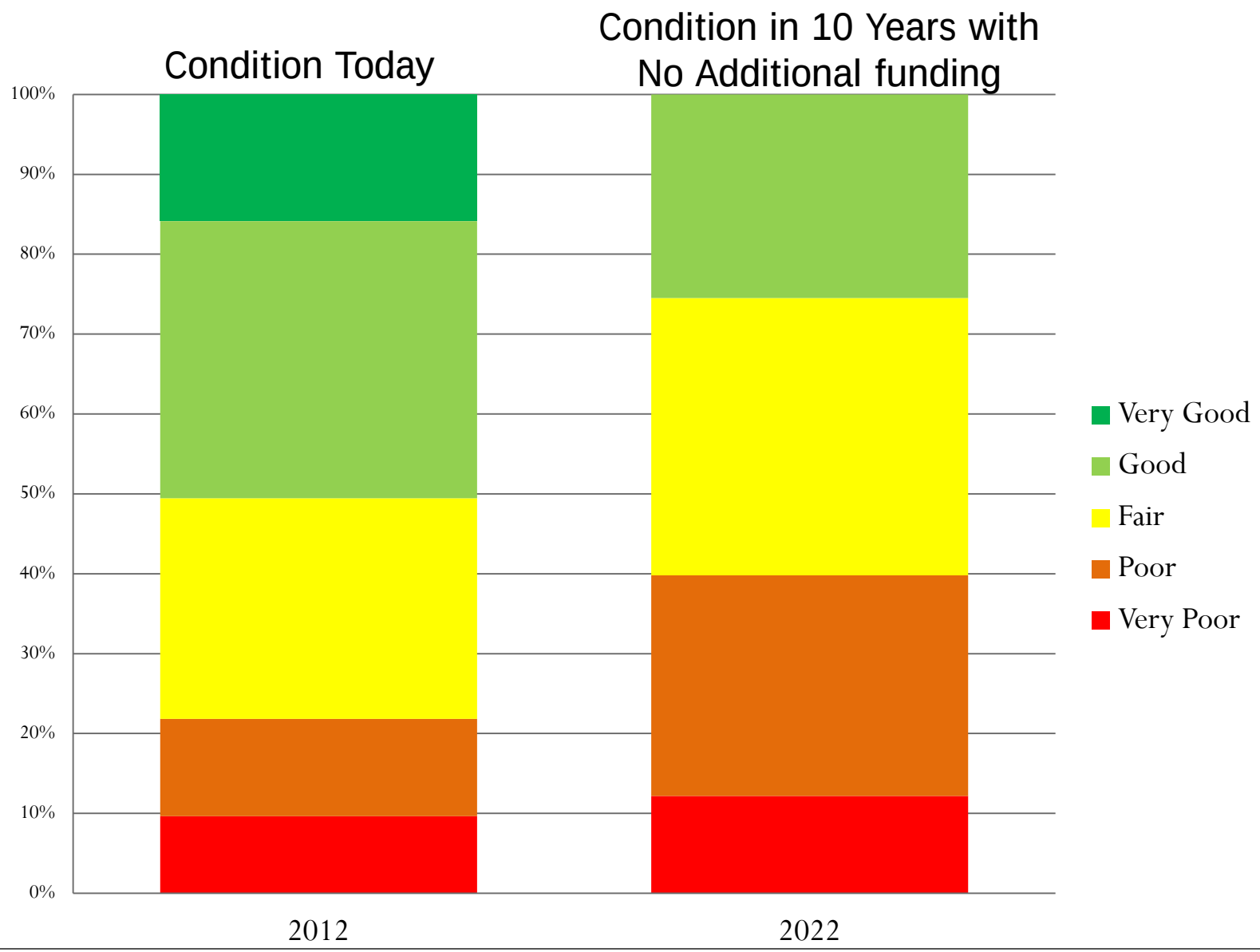
Service Levels – Quality/Condition



10-Year Service Costs – Declining Service Level (in 000's)

Executive Summary - What does it cost?	
Cost over 10 years	**$29,826**
Cost per year	**$2,983**
Available funding over 10 years	**$4,720**
Funding per year	**$472**
Funding shortfall	**($2,511)**
Percentage of cost	**16%**

Life Cycle Cost (long term)'($000)	
Life Cycle Cost [depreciation + ops. and maint. exp year 1]	**$4,955**
Life Cycle Exp. [capital renewal exp. + ops + mtce exp. yr 1]	**$472**
Life Cycle Gap [life cycle expenditure - life cycle cost [-ve = gap]	**($4,483)**
Life Cycle Sustainability Indicator [life cycle expenditure / LCC]	**9.50%**

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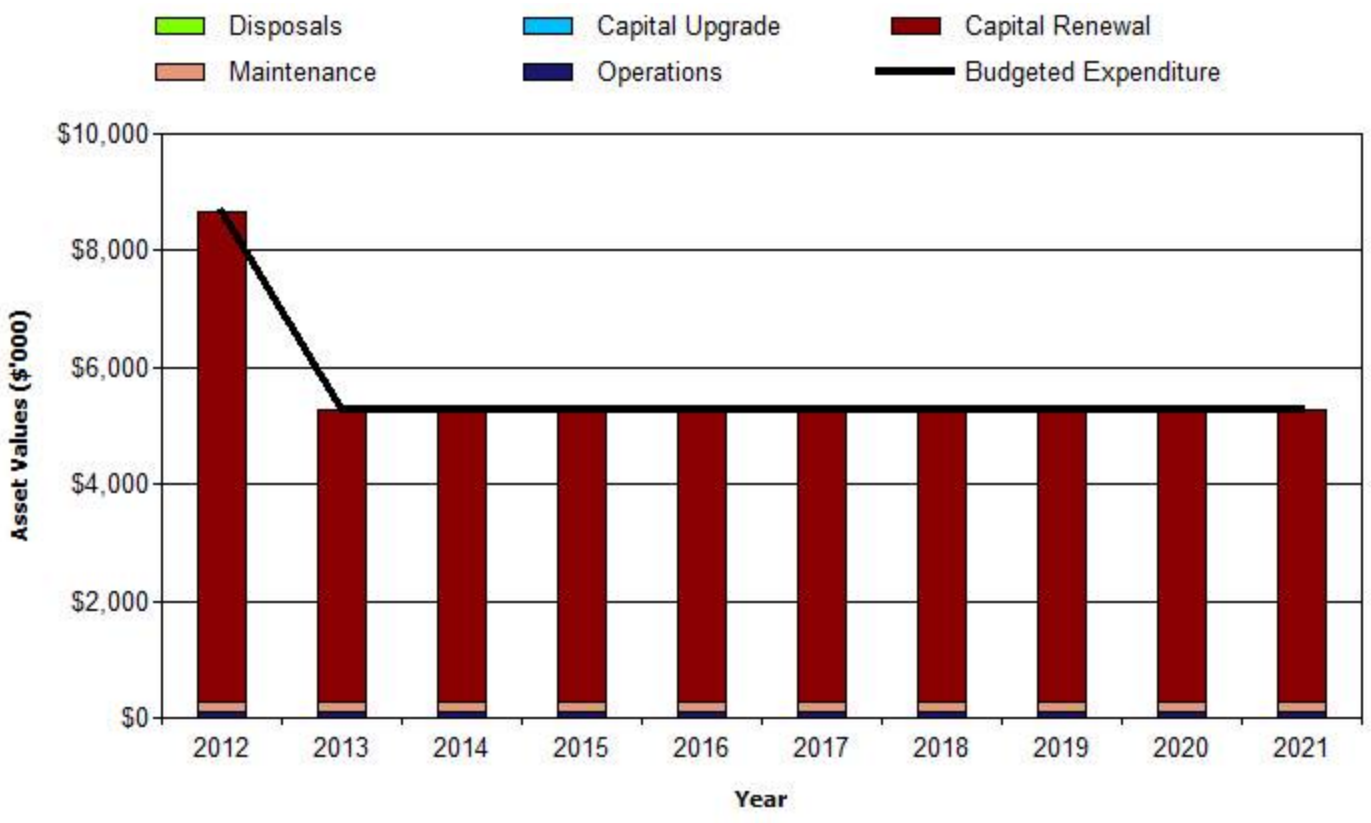
Alternative Service Level: “Mix of Fixes”

- Eliminate Very Poor & Known Deficiencies
- Replace 2% per year
- Assess 20% condition annually – build knowledge

Projected Operating & Capital Expenditures



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Drainage Service Performance Indicators

Indicator	Description	Target*	Result	Status
Projected 10-Year needs vs. Estimated Budget	Balanced Projected Needs to Operating Budget	100%	16%	
Asset Sustainability	Renew culverts at rate of depreciation	80-100%	9.5%	
Asset Consumption Ratio	Culverts in Fair or Better condition	>70%-<80%	62%	
	Culverts in Poor or Failed condition	<30%	32%	
* Draft				

Drainage Service Performance Indicators

Indicator	Description	Target*	Result	Status
Systems & Processes	Retain Employees & Staffing Level	100% of FY 2012 Level (19)	90%	
	Legal compliance - culverts on streams (ESH)	100%	68%	
	Report Drainage Risks in Register	100%	20%	
Service Delivery	Service Requests responded to in 24 hours	>95%	70%	
* Draft				

Communicate Tradeoffs

- Service levels expected to decline over next 10 years with current funds
- Risks include flooding, long detours & higher future costs
- Still need integrated County services resourcing strategy