

**Wildfire Risk Governance Forum
November 13th, 2020**



Safety

Earthquake
Duck, Cover & Hold

Emergency Plan & Exit Strategy
Have a plan for yourself and your household

24/7 Nurse Care Line
If you experience a work-related discomfort or injury, call [REDACTED] and notify your supervisor.

Wash your hands!

Wear a Mask

Practice social Distancing

Meeting Agenda

Date:	11/15/2020		
Desire Outcomes:	<ul style="list-style-type: none"> Inform: Decision Items & Action Items Decision: System Hardening "No Regrets" approach Inform: Outline Inspections program – focus areas & needed resources Decision: Enhanced Veg Management "No Regrets" approach 		
Meeting Agenda			
What - Content	Who - Facilitator(s)	Slide Number	Duration
1 Safety Minutes and Agenda	[REDACTED]	1-2	5 min
2 Decision and Action Item Review	[REDACTED]	3-11	15 min
3 System Hardening	[REDACTED]	12-15	20 min
4 System Inspections	[REDACTED]	16-18	20 min
5 Enhanced Vegetation Management	[REDACTED]	19-24	20 min
6 Follow ups and Next Steps	[REDACTED]	25-26	10 min

Decision and Action Item Review

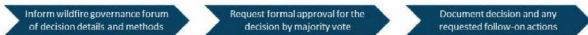


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Key Wildfire Risk Model Governance Forum Decision

Governance Forum Decision Approval Process



Workstream	Decision	Description	Approval Vote	Date
Risk Models	Adoption of the 2021 wildfire risk models for mitigation deployment	<ul style="list-style-type: none">Adopt the proposed ignition model for vegetation ignitions and technology for 2021 BRM workAdopt the proposed ignition model for equipment ignitions and technology for 2021 System Maintenance work	Approved Approved Approved Not Present	10/26/2020



Key Decision – Adoption of the 2021 Risk Model for Mitigation Deployment

Approval Status: Approved

Decision Detail

The approval is for moving from the 2018 wildfire risk model to the 2021 wildfire risk model to inform system hardening, enhance vegetation management and inspections. These changes included:

- Update to vegetation ignition model (LoRe)
- Update to conductor model (LoRe)
- Update to consequence (core)

Concerns and Mitigations

- Inclusion of non-447D areas requested in the next model iteration
- Inclusion of Egress model requested in the next model iteration
- Resource availability to complete "hot risk informed planned work" was challenged
- Detailed description of variables in particular "non-burnable areas" requested
- The ability to calculate tree density within pswh was challenged

Approvals

Approved
Approved
Approved
Approved
Abstain – Not Present

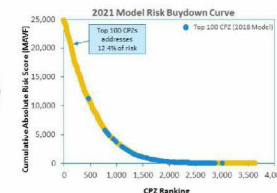
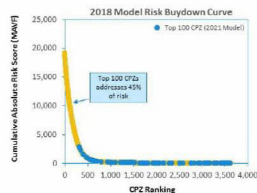
Action Items and Validations

Adoption of the 2021 wildfire risk model for mitigation deployment Deep dive risk model session	Completed - Adopt the proposed ignition model for vegetation ignitions and Technosylva for 2021 DVM work Completed - Adopt the proposed ignition model for equipment ignitions and Technosylva for 2021 System Hardening work
Risk models comparison	Completed - Detailed risk comparison between the 2018 risk model and 2021 risk model for highlight improvement of CP2s (Targeting top 100 circuits or CP2s)
Deep dive risk model session	Completed - Hold a Deep Dive Session with (1) the Federal Monitor and (2) the Operational Closure
Model process documentation	In Process - Bring the Model Process Level documentation to this forum for an official approval
Egress Consideration	Road Mapped - Factor in Egress into process for selecting the protection zones to be worked



Risk Model Action Items

Workstream	Action Item	Description	Responsible party	Resolution	Date
Risk Model	4-63-models comparison WGR - 10/30/2020	Create risk comparison between the 2018 risk model and 2021 risk model to highlight movement of CPZs. The getting top 100 (results of CPZs)	[Redacted]	Complete - See the Risk Model Followup Section	11/3/2020



Key Takeaways

- No CPZs in the top 100 overlap
- This will result in significant change to the prioritization and expected risk buydown of mitigations
- The 2018 risk results were not distance weighted, where the 2021 prioritization included a distance factor.

Risk Model Action Items

Workstream	Action Item	Description	Responsible party	Resolution	Date
NSR Model	Deep dive risk model session NSR-15/16/2020	NSR's Deep Dive session with (1) the Federal Monitor and (2) the Operational Observer	[REDACTED]	Complete - Meetings have been scheduled for 11/8 & 11/12 [REDACTED] to be part of the meeting.	11/12/2020

Updates

- First Deep Dive session held on Monday 11/10/2020 at 1:00pm PST
- Second session will be held on Thursday 11/12/2020 at 12:30pm PST



Risk Model Action Items

Workstream	Action Item	Description	Responsible Party	Resolution	Date
risk model	risk model contributor	provide a detailed description of the top model contributors	[Redacted]	Complete - Targeted for inclusion in next release	11/13/2020

Vegetation Model - Contributors Description

Variable	Description
Tree height	Maximum tree height, in meters, for each 100m x 100m pixel area using the distribution grid
100-hour-fuels-wg	The dead fuel moisture data from GRDMET
Vapor-pressure-deficit-wg	The average vapor pressure deficit from the GRDMET dataset
Windy-summer-day-pct	Percentage of days that have high frequency of gusts
WU	High fuel/moisture district
Precipitation-wg	The average daily precipitation from the GRDMET dataset
Impervious	Impervious ground cover (i.e. non-flammable)
Specific-humidity-wg	The average specific humidity from the GRDMET dataset
Burn index-wg	An derived variable based off of the geographical and topographical aspects of a location
Wind-max	The maximum wind velocity at a height of 10 meters from the Real-Time Mesoscale Analysis (RTMA) dataset at a resolution of 2.5km
Temperature-wg	The average temperature from the GRDMET dataset
Windy-summer-day-pct	Percentage of days that have a high percentage of days with high average wind speed
Local-topography	The topographic position index (TPI) was extracted from a USGS digital elevation model (DEM) at 100-meter resolution
1000-hour-fuels-wg	The dead fuel moisture data from GRDMET
Energy-release-wg	Average release of energy from fuels

Conductor Model - Contributors Description

Variable	Description
Nonflammable-area	land cover description similar to imperviousness that includes surfaces that typically don't ignite when a spark occurs
Daily-precipitation-mean	The average daily precipitation from the GRDMET dataset
Conductor material-area	Aluminum conductor steel-reinforced
Estimated-conductor-age	Number of years since the installation year
Max tree height	Maximum tree height, in meters, for each 100m x 100m pixel area using the distribution grid
Reliability Program score	Score with more than three nulls per phase
Vapor pressure deficit, mean	The average vapor pressure deficit from the GRDMET dataset
Conductor size-2	Conductor size-2
Conductor size-4	Conductor size-4
100-hour-fuels, mean	The dead fuel moisture data from GRDMET
Max temperature, mean	The average maximum temperature from the GRDMET dataset
Wind speed, mean	The average wind velocity at a height of 10 meters from the Real-Time Mesoscale Analysis (RTMA) dataset at a resolution of 2.5km
Local topography	The topographic position index (TPI) was extracted from a USGS digital elevation model (DEM) at 100-meter resolution

 Risk Model Action Items

Workstream	Action Item	Description	Responsible party	Resolution	Date
Risk Models	Model process documentation	Bring the Model Process Level Documentation to this forum for an official approval	[REDACTED]	In Process Targeted for inclusion in deep dive accounts	11/20/2020

1 User Guide
Model procedure and details will be provided in the user guide to the forum for review at the 11/20 session



Risk Model Action Items

Workstream	Action Item	Description	Responsible party	Resolution	Date
Wildfire Governance Charter	Charter update	Update charter to include review of broader set of WFP risk reduction activities and projects (see slide).		Completed. Risk charter has been updated, included in attached materials.	11/05/2020

See updated slide for the updated wildfire governance Charter

Meeting Purpose	How Decisions are Made
<p>Drive Decision Making on:</p> <ul style="list-style-type: none"> • Risk Model: Drive alignment on the top-level risk model to use to guide the work. Provide a focus to review key risk-based assumptions and associated impacts. • Work: <ul style="list-style-type: none"> • Ensure execution is consistent of the highest priority risk mitigation work consistent with investment, asset, strategy and operational needs; guide charter to needed. • Drive the approved work plans completed and the quality of the completed work is monitored. <p>Key Deliverables:</p> <ul style="list-style-type: none"> • Integrate individual wildfire mitigation workstream meetings into a single governance session • Identify key focus on system hardening, operational expansion management, inspections and repairs and will expand into other areas of wildfire and PPS mitigation work • Meeting topics and supporting material will adjust based on discussion and request from Working Directors. 	<ul style="list-style-type: none"> • Detail of meeting recommendations for an attendance for decisions to be made • A single meeting vote by attending committee members • No transfer. Chair hold the go/no-go vote.
<p>Attendees:</p> <ul style="list-style-type: none"> • Chief Risk Officer • Working Members: <ul style="list-style-type: none"> • VP Asset, Risk Management & Community Wildfire Safety Program • VP Major Projects and Programs, Electric Operations • VP Wildfire Safety and Public Engagement • VP Chief Audit Officer <p>Resource Members:</p> <ul style="list-style-type: none"> • Sr. Director, Electric Asset Strategy • Sr. Director, Major Programs & Project Delivery • Sr. Director, Risk Management • Director, CIP & M&P <p>Workstream Lead:</p> <ul style="list-style-type: none"> • System Hardening Director, Distribution Strategy • Enhanced Inspection Management, Director, Regulatory Management • Inspections & Repairs Manager, Transmission Standards <p>Facilitator:</p> <ul style="list-style-type: none"> • Sr. Director, Risk - Special Projects 	<p>Meeting Logistics:</p> <ul style="list-style-type: none"> • Frequency/Duration: Weekly (every Friday) • Details: <ul style="list-style-type: none"> • Pre-read materials sent 1 day before meeting. • Action items included in following meeting material • Agenda: Sr. Director, Risk - Special Projects to approve final agenda.

System Hardening



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The team proposes a "No Regrets" plan for approaching initial wildfire scope

Included Scope

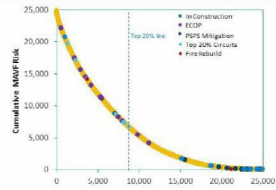
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All projects in the top 20% CPZ
- 

Any ECOP projects in the top 20% MAVI
- 

All PSPS Mitigation Projects
- 

All Fire Rebuild Projects

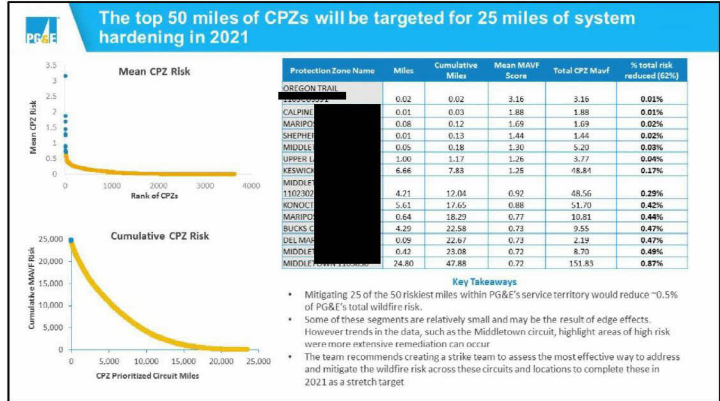


The "No Regrets" plan is an initial scope of work for the 2023 wildfire season that meets in the highest risk locations for either experienced or predicated fire risk. This scope of work will allow for the system hardening execution teams to remain fully utilized while confirmation of the remaining workplan is underway.

The system hardening team is requesting approval to move forward with this initial scope of work from the wildfire governance team.

	CPZ Prioritized Circuit Miles		High Risk Area		Expected Case
	Miles	Projects	Risk Reduction ¹	Miles	
In Construction	41.17	77	7.62	5.11	[REDACTED]
ECOP (In Estimating)	55.94	17	68.05	49.04	
PSPS Mitigation	14.47	12	17.45	14.47	
Top 20% MAVI CPZ	41.32	8	70.58	41.42	
Fire Rebuild	12.7	2	8.12	12.7	



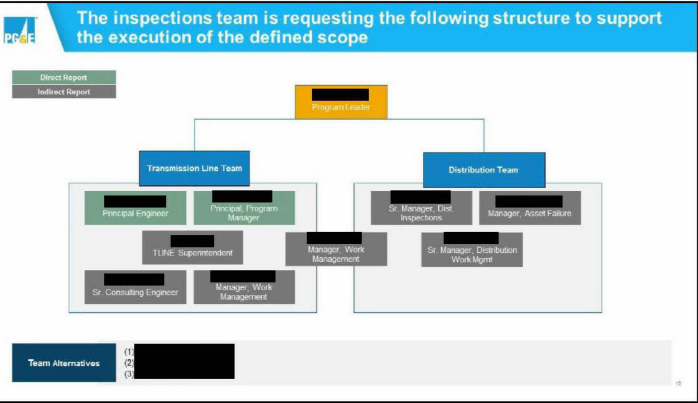


Overhead Inspections



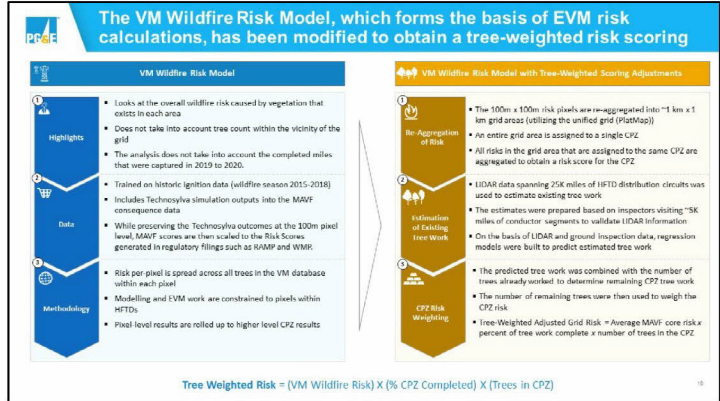
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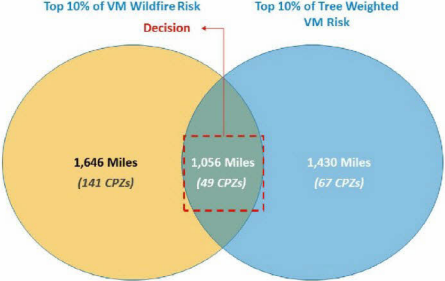
Enhanced Vegetation Management





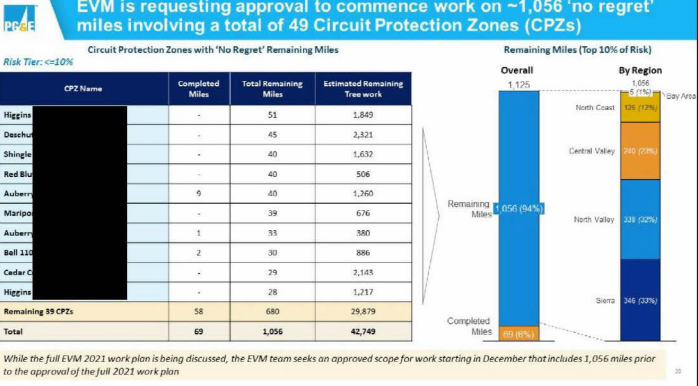


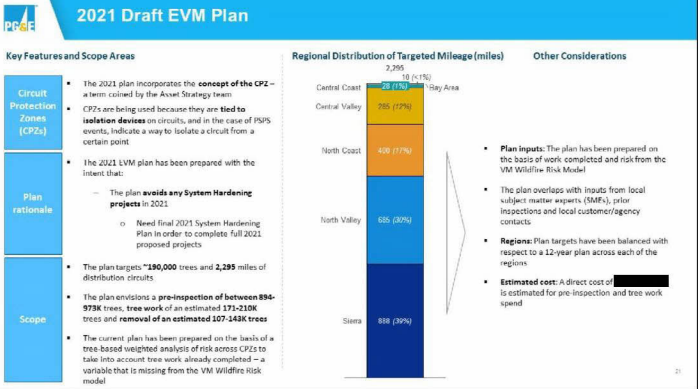
A "no regrets" approach of tackling the CPZs identified as high risk by both models is proposed for adoption to operationalize work




49 CPZs and 1,056 miles were common across the VM Wildfire risk ranking and the Tree Weighted risk ranking. Both models highlight these areas as high impact, and should be prioritized for EVM work.

Note: CPZs indicated are based on the draft 2021 EVM Plan targeting 2,295 miles.





 Action Items					
Workstream	Action Item (Initial Date)	Description	Responsible party	Resolution	Date
Enhanced Vegetation Management	EVM Risk Ruydown Curve WGR – 11/3/2020	Plot and show the 1130 miles (80-90% Carry Over Work that needs to be finished) on the EVM – 02 Dike Tree and Overhang (Wright) Risk Ruydown Curve	Support – [Redacted]	Not Applicable – Scope has moved away from the prior Carryover plan	11/13/2020
Enhanced Vegetation Management	EVM programs timeframes WGR – 11/3/2020	Determine the overall time frame and pace for the EVM program when 50k+ potential trees are factored into the 2500 miles of WFD Circuits. Understand which of the 2500 miles need EVM work	[Redacted]	In Process – Forecast program time is being developed alongside tree weighted risk	11/20/2020
Enhanced Vegetation Management	EVM programs and resources WGR – 11/3/2020	Provide a full picture of all vegetation management work outside of just the enhanced vegetation management.	[Redacted]	In Process – Review of other programs underway, dependent upon total EVM scope for resourcing	11/20/2020
Enhanced Vegetation Management	System hardening and EVM work overlay WGR – 11/3/2020	Evaluate the areas that are being targeted by system hardening to align for operational efficiencies between the two programs. Dependency on 2021 SH Work plan	[Redacted]	Not Applicable – Changes to system assets and structure limit ability to complete to EVM standards	11/13/2020
Enhanced Vegetation Management	Tree density statistic WGR – 11/3/2020	Show tree density from the 2019 and 2020 work. Provide tree density number per mile processed so we show future work 2021, 2022	Support – [Redacted]	Road Mapped – LIDAR tree density will be examined for inclusion in future risk modeling	11/13/2020

Follow-Ups and Next Steps



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Upcoming Review Agenda Items

11/20/2020

- Final Decision on System Hardening Plan (If feasible)
- Initial Review into Inspections 2021 Plan
- Initial Review into Repairs 2021 Plan
- Close out Completed Action Items

12/01/2020

- Final Decision on EVM 2021 Plan (If feasible)
- Decision Items needed for Inspections 2021 Work Plan
- Close out Completed Action Items

12/08/2020

- Decision needed on Inspection. Initial views of 2021 Work Plan
- Decisions needed on Repairs 2021 Work Plan
- Tier 1 – Overhead Conductor Replacement Discussion


24



Complete Action Items from 11/09/2020 (Federal Monitor Meeting)

Workstream	Action Item	Description	Responsible Party	Resolution	Date
Risk Models	Risk Models comparison WGR: 10/30/2020	Include high risk areas outside of MFD in the next iteration of the Du Model	[REDACTED]	Risk Mapped - This will be added as an enhancement to the model roadmap	11/23/20
Risk Models	Risk Model Enhancement	Incorporate 2019 LIDAR data and species data in the next iteration of the Du Model	[REDACTED]	Risk Mapped - This will be added as an enhancement to the model roadmap	11/23/20
Risk Models	Risk Model Enhancement	Include signs on the consequence side for the next iteration of the Du Model	[REDACTED]	Risk Mapped - This will be added as an enhancement to the model roadmap	11/23/20
Risk Models	Model Documentation	Asa to be added to the team alpha 22 Sept 11.09.2020 Wildlife Risk Model Review Final v2	[REDACTED]	Completed	11/23/20

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 Complete Action items					
Workstream	Action Item	Description	Responsible party	Resolution	Date
Inspection	Inspection Workstream Owner	Schedule meeting to identify the owner of the inspection and/or repair workstream		Completed – inspection lead identified	10/21/2020
Risk model	Risk Model Deep Dive	The risk model needed further detailed discussion before voting and approval could take place		Completed – Follow up session held 10/27. Detail on the risk model was provided in advance of 10/30 approval meeting.	10/23/2020
RIM	RIM review meeting	Schedule additional meeting for RIM review		Completed – Follow up meeting was held on 11/05	11/05/2020
Governance meetings	Meeting updates	Update meeting to be 90 minutes		Completed – future meetings updated – effective 11/13	11/01/2020
Governance meetings	All future meetings	to be added to future meetings to provide additional direction from audit		Completed – has been added to all future governance meetings	10/23/2020



Action Item Tracking

Workstream	Action Item	Description	Responsible Party	Resolution	Date
Risk Models	Risk models comparison WGR - 10/30/2020	Compare risk comparison between the 2018 risk model and 2021 risk model to highlight movement of CRs (Targeting top 100 in utility EPS).	[REDACTED]	Completed	11/11/2020
Risk Models	Deep dive risk model session WGR - 10/30/2020	Hold a Deep Dive Session with (1) the Federal Monitor and (2) the Operational Observer.	[REDACTED] to [REDACTED] to be part of the meeting	Completed	11/11/2020
Risk Models	Risk model contributors	Highlight contributors to the risk model	[REDACTED]	Completed	11/11/2020
Risk Models	Model process documentation	Bring the Model Process documentation to the fore for an official approval	[REDACTED]	In Process - Targeted for inclusion in deep dive sessions	11/20/2020
Risk Models	Egress Consideration	Factor in Egress into process for selecting the protection zones to be worked	[REDACTED]	Road Mapped - Egress has been considered as a future enhancement for the risk model	11/09/2020
Utility Governance Charter	Charter update	Update charter to include review of broader set of WP risk reduction activities and project oversight	[REDACTED]	Complete Risk charter has been updated, included in attached materials	11/09/2020



Action Items from 11/09/2020 (Federal Monitor Meeting)

Workstream	Action Item	Description	Responsible party	Resolution	Date
Risk Models	Risk models comparison WGR – 10/29/2020	Identify any risk areas outside of HFD [REDACTED] the next iteration of the Du Model	[REDACTED]	Road Mapped – This will be added as an enhancement to the model road map	XXX
Risk Models	Risk Model Enhancement	Incorporate 2018/19 DMR data and location data in the next iteration of the Du Model	[REDACTED]	Road Mapped – This will be added as an enhancement to the model road map	XXX
Risk Models	Risk Model Enhancement	Include Egress on the connectivity side for the next iteration of the Du Model	[REDACTED]	Road Mapped – This will be added as an enhancement to the model road map	XXX
Risk Models	Model documentation	Area to be added to charts on slide 22 (ppt. 11/09/2020) and the Risk Model Review Panel(s)	[REDACTED]	Completed	11/18/2020

Appendix

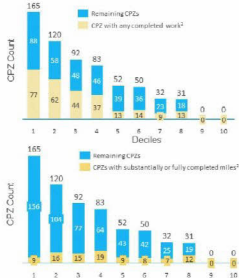


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Comparison of the Tree Weighted model to the Dx Model

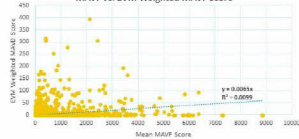
Overlap between the Risk Models



Key Take-aways

- The correlation between the EVM weighted prioritization scores and the MAVF score is low at 0.0099
- Of the top 20% of circuits that were identified in the Dx model, 285 remained in the top two deciles of the Tree Weighted model.
- Of the top 100 CPZs, only 14 were common across both prioritization lists
- Over 10% of the CPZs identified to have risk in the Dx model were zero risk locations in the tree weighted model.

MAVF vs. EVM Weighted MAVF Score



22 circuits have seen at least five unique PSPS events in the 2019-2020 timeframe

Seven PSPS Events			Six PSPS Events			Five PSPS Events		
Circuit Name	County	Total Customer Events	Circuit Name	County	Total Customer Events	Circuit Name	County	Total Customer Events
ORO FINO 1101	BUTTE	25091	WYANDOTTE 1103	BUTTE	13105	WYANDOTTE 1107	BUTTE	14544
ORO FINO 1102	BUTTE	21561	NOTRE DAME 1104	BUTTE	4317	BANGOR 1101	YUBA	12328
PARADISE 1104	BUTTE	14710	PARADISE 1106	BUTTE	3503	DOBBINS 1101	YUBA	7096
PARADISE 1105	BUTTE	12054				CHALLENGE 1102	YUBA	6719
CLARK ROAD 1102	BUTTE	10410				KANAKA 1101	BUTTE	4572
PARADISE 1103	BUTTE	5534				BANGOR 1101	BUTTE	4315
BUTTE 1105	BUTTE	3194				KANAKA 1101	YUBA	417
BIG BEND 1102	BUTTE	2772				CHALLENGE 1102	BUTTE	266
WYANDOTTE 1105	BUTTE	2560				BUCKS CREEK 1101	PLUMAS	35
BIG BEND 1101	BUTTE	2332						

In-Flight Projects for Further Review (Completes Circuit Segment)			
Construction Ready			
Protection Zone Name	Project Miles	Mean MAVT Score	Total Project MAVT
KONNECT	0.82	0.0091	0.003
KONNECT	0.78	0.0061	0.000
PINE GROVE	0.41	0.0008	0.028
PINE GROVE	2.40	0.0008	0.049
PINE GROVE	1.45	0.0008	0.018
WEST POINT	1.94	0.0035	0.000
WEST POINT	1.01	0.0035	0.011
WEST POINT	1.61	0.0035	0.009
WEST POINT	0.90	0.0035	0.003
WEST POINT	1.11	0.0035	0.014
WEST POINT	1.35	0.0035	0.003
MINOVA	2.39	0.0030	0.000
MINOVA	2.38	0.0035	0.003
MINOVA	0.35	0.0035	0.015
MINOVA	0.81	0.0035	0.014
SALT SPRING	1.30	0.0009	0.011
SALT SPRING	1.02	0.0009	0.010
SALT SPRING	2.07	0.0009	0.027
SALT SPRING	1.80	0.0009	0.028
SALT SPRING	1.30	0.0009	0.020
SALT SPRING	1.79	0.0009	0.011
SALT SPRING	1.05	0.0009	0.014
SALT SPRING	1.04	0.0009	0.014
MINOVA	1.80	0.0002	0.000
MINOVA	2.05	0.0002	0.008
Estimating Complete			
Protection Zone Name	Project Miles	Mean MAVT Score	Total Project MAVT
PINE GROVE	1.38	0.0008	0.000
PINE GROVE	1.34	0.0008	0.019
WEST POINT	1.63	0.0035	0.006
WEST POINT	2.81	0.0035	0.000
SALT SPRING	1.48	0.0009	0.012
MINOVA	2.39	0.0002	0.012
MINOVA	1.89	0.0002	0.004
Other In Flight			
Protection Zone Name	Project Miles	Mean MAVT Score	Total Project MAVT
LOS GATOS	0.41	0.0125	0.038
LOS GATOS	0.87	0.0125	0.000
LOS GATOS	0.77	0.0125	0.011
LOS GATOS	1.30	0.0125	0.138
LOS GATOS	0.50	0.0125	0.008
LOS GATOS	0.87	0.0125	0.080
LOS GATOS	1.00	0.0125	0.148
LOS GATOS	1.48	0.0125	0.137
LOS GATOS	0.69	0.0125	0.064
KONNECT	0.59	0.0091	0.046
KONNECT	0.30	0.0091	0.040
EL DORADO	10.15	0.0041	0.282
MINVUK	1.80	0.0038	0.024
PINE GROVE	1.30	0.0030	0.009
WEST POINT	1.26	0.0035	0.009
WEST POINT	1.45	0.0035	0.044
MINVUK	11.60	0.0029	0.228
CAMP EYES	0.44	0.0011	0.008
CAMP EYES	1.99	0.0011	0.029
CAMP EYES	1.95	0.0011	0.041
CAMP EYES	1.90	0.0011	0.033
CAMP EYES	0.87	0.0011	0.015
CAMP EYES	8.87	0.0011	0.105
MINVUK	2.78	0.0017	0.004
SALT SPRING	1.81	0.0009	0.019
MINVUK	2.28	0.0007	0.014
MINVUK	1.84	0.0002	0.003
Key Takeaways			
<ul style="list-style-type: none"> 25 Construction Ready (35 miles); 7 Estimating Complete (13 miles) and 27 Other in flight projects (62 miles) to complete circuit segments need further review by PSS for relative risk reduction benefit evaluation 350 other in-flight projects to be stopped (1,165 miles) 			

