

**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 up and Next Steps	[REDACTED]	25-26	10 min

Decision and Action Item Review

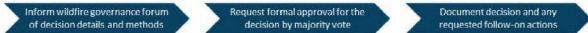


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Key Wildfire Risk Model Governance Forum Decision

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 Reliability work	<ul style="list-style-type: none">ApprovedApprovedApprovedNot 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 piweb was challenged

Approvals	
	Approved
	Approved
	Approved
	Approved
	Abstain – Not Present

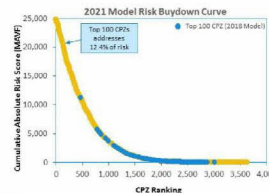
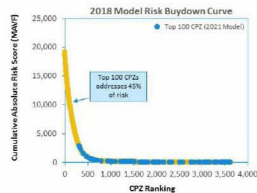
Action Items and Validations

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. OVM 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 to 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 WDR-15/16/2020	Hold a 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 open data release	11/13/2020

Vegetation Model - Contributors Description

Variable	Description
Tree height_max	Maximum tree height, in meters, for each 100m x 100m pixel area using the distribution grid
100-hour-fuels_avg	The dead fuel moisture data from GRDMET
Vapor-pressure-deficit_avg	The average vapor pressure deficit from the GRDMET dataset
Windy-summer-day-act	Percentage of days that have high frequency of gusts
WFI	High fire-hazard district
Precipitation_avg	The average daily precipitation from the GRDMET dataset
Impervious	Impervious ground cover (i.e. non-flammable)
Specific-humidity_avg	The average specific humidity from the GRDMET dataset
Burn index_avg	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 3.5km
Temperature_avg	The average temperature from the GRDMET dataset
Windy-summer-day-act	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_avg	The dead fuel moisture data from GRDMET
Energy-release_avg	Average release of energy from fuels

Conductor Model - Contributors Description

Variable	Description
Non-flammable-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 status	Spans with more than three sags 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 3.5km
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).	[REDACTED]	Completed. Risk Charter has been updated, included in attached materials.	11/05/2020

See updated slide for the updated wildfire governance Charter

Meeting Purpose

Drive decision making on:

- Risk reduction: Review 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:
 - Discuss completion/consolidation of the highest priority risk mitigation work (consistent with investment, asset, strategic and operational needs; guide creation as needed)
 - Discuss the approved work plans completed and the quality of the completed work is monitored.

Key deliverables:

- Integrate individual wildfire mitigation action items into a single governance session
- Identify key focus on system hardening, operational response 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.

Attendees

- Chief Risk Officer
- Working Members:
 - 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
- Non-Working Members:
 - Sr. Director, Electric Asset Strategy
 - Sr. Director, Major Programs & Project Delivery
 - Sr. Director, Risk Management
 - Director, CIP & M&P
- Workstream Lead:
 - System Hardening Director, Distribution Strategy
 - Enhanced Response Management, Director, Regulatory Management
 - Inspections & Repairs Manager, Transmission Standards
- PGE/Other:
 - Sr. Director, Risk - Special Projects

How Decisions are Made

- Detail of voting mechanism used for an attendance for decisions to be made
- A simple majority vote by attending committee members
- No-tender: Chair hold the tie-break vote.

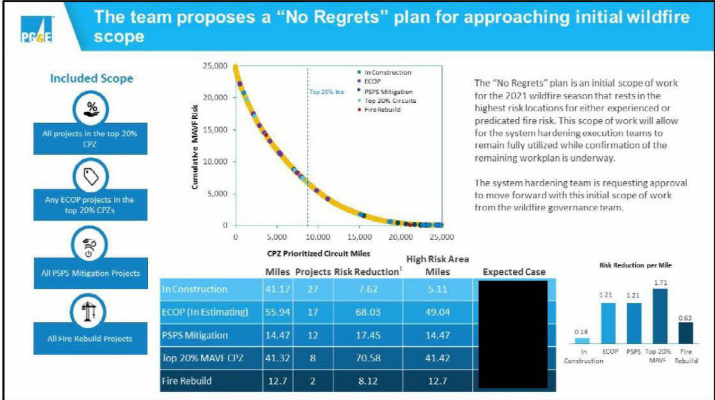
Meeting Logistics

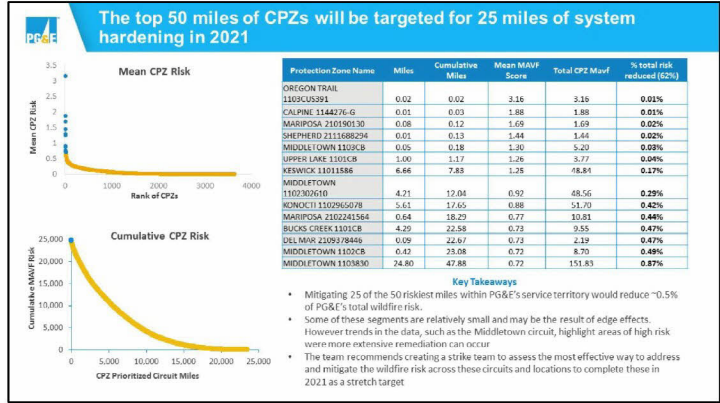
- Frequency/Duration: Weekly (every Friday)
- Schedule:
 - Pre-read materials sent 1 day before meeting
 - Action items included in following meeting material
- Agenda: Sr. Director, Risk - Special Projects to approve final agenda.

System Hardening



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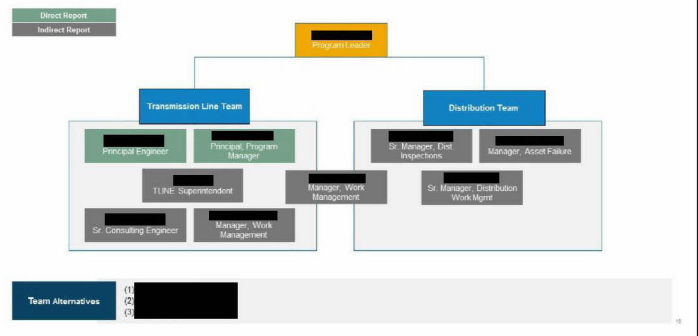
Overhead Inspections



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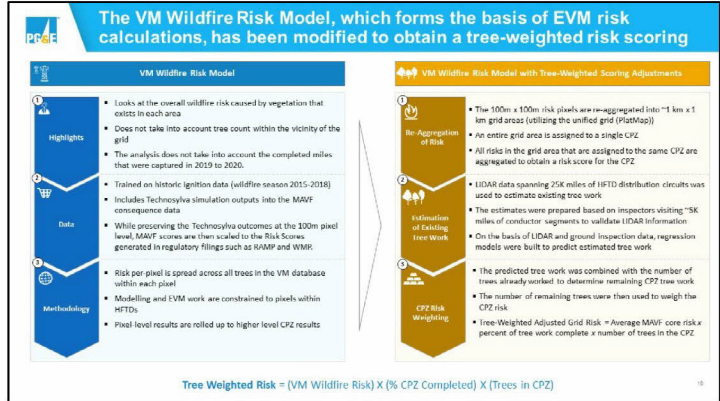
The inspections team is requesting the following structure to support the execution of the defined scope



Enhanced Vegetation Management

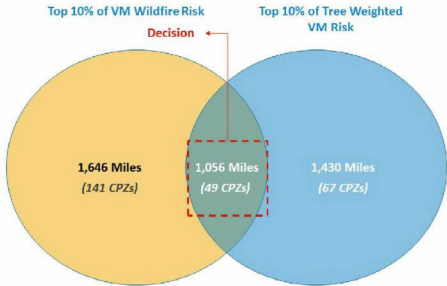


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A "no regrets" approach of tackling the CPZs identified as high risk by both models is proposed for adoption to operationalize work



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

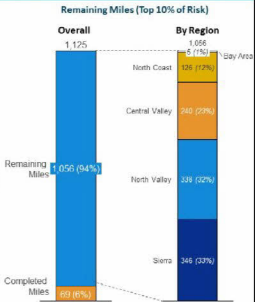
19

EVM is requesting approval to commence work on ~1,056 'no regret' miles involving a total of 49 Circuit Protection Zones (CPZs)

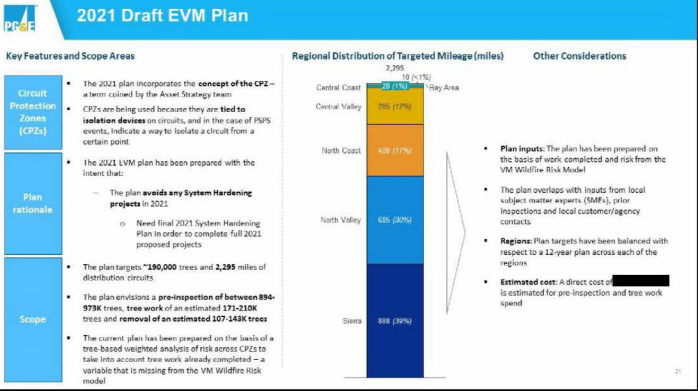
Risk Tier: <=10%


Circuit Protection Zones with 'No Regret' Remaining Miles

CPZ Name	Completed Miles	Total Remaining Miles	Estimated Remaining Tree work
Higgins 110950072	-	51	1,849
Deschutes 11011580	-	45	2,321
Shingle Springs 210913322	-	40	1,632
Red Bluff 11011884	-	40	506
Auberry 110182578	9	40	1,260
Mariposa 210210880	-	39	676
Auberry 1102 Circuit Breaker	1	33	380
Bell 11082202	2	30	886
Cedar Creek 11011664	-	29	2,143
Higgins 1109 Circuit Breaker	-	28	1,217
Remaining 39 CPZs	58	680	29,879
Total	69	1,056	42,749



While the full EVM 2021 work plan is being discussed, the EVM team seeks an approved scope for work starting in December that includes 1,056 miles prior to the approval of the full 2021 work plan



 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 (Waglow) 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 Strike Potential Trees are factored into the 2200 miles of WFTD Circuits. Understand which of the 2200 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]	Ready 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 Model's completion WGR: 10/30/2020	Included in risk areas status of MFD in the next iteration of the Du Model	[REDACTED]	Risk Mapped - This will be added as an enhancement to the model roadmap	11/2/20
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	11/2/20
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	11/2/20
Risk Models	Model Documentation	Asa to be added to the team alpha 22 Sept 11.09.2020 Wildlife Risk Model Review Final v3	[REDACTED]	Completed	11/2/20

25



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	Aud [redacted] in future meetings	[redacted] to be added to future meetings to provide additional direction from audit		Completed – [redacted] 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 units w/ EFS).	[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] in coordination with [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
Offshore 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 risk areas outside of HFDI in the next iteration of the DA 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 DAH data and location data in the next iteration of the DA 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 DA 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) of the Risk Model Review Panel(s)	[REDACTED]	Completed	11/18/2020

Appendix

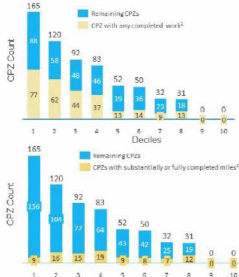


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Comparison of the Tree Weighted model to the Dx Model

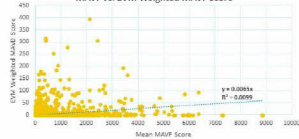
Overlap between the Risk Models



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						

Construction Ready			
Protection Zone Name	Project Miles	Mean MAVT Score	Total Project MAVT
KONNOCT	0.82	0.0091	0.003
KONNOCT	0.78	0.0091	0.003
PINE GROVE	0.41	0.0098	0.028
PINE GROVE	2.40	0.0098	0.049
PINE GROVE	1.41	0.0098	0.018
WEST POIN	1.94	0.0035	0.000
WEST POIN	1.01	0.0035	0.011
WEST POIN	1.61	0.0035	0.009
WEST POIN	0.90	0.0035	0.003
WEST POIN	1.11	0.0035	0.014
WEST POIN	1.05	0.0035	0.003
MINE	2.19	0.0030	0.000
MINE	2.18	0.0035	0.003
MINE	0.76	0.0035	0.015
MINE	0.81	0.0035	0.014
SALT SPRING	1.30	0.0009	0.011
SALT SPRING	1.02	0.0009	0.009
SALT SPRING	2.07	0.0009	0.007
SALT SPRING	1.80	0.0009	0.018
SALT SPRING	1.00	0.0009	0.000
SALT SPRING	1.79	0.0009	0.011
SALT SPRING	1.05	0.0009	0.014
SALT SPRING	1.04	0.0009	0.014
MINE	1.80	0.0002	0.000
MINE	2.05	0.0002	0.008

Estimating Complete			
Protection Zone Name	Project Miles	Mean MAVT Score	Total Project MAVT
PINE GROVE	1.34	0.0058	0.000
WEST POIN	1.63	0.0055	0.006
WEST POIN	2.61	0.0055	0.000
SALT SPRING	1.48	0.0009	0.012
MINE	2.19	0.0002	0.012
MINE	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	0.008
LOS GATOS	0.87	0.0125	0.000
LOS GATOS	0.77	0.0129	0.011
LOS GATOS	1.30	0.0125	0.108
LOS GATOS	0.50	0.0125	0.008
LOS GATOS	0.87	0.0125	0.000
LOS GATOS	1.00	0.0125	0.148
LOS GATOS	1.48	0.0125	0.137
LOS GATOS	0.69	0.0125	0.064
KONNOCT	0.59	0.0091	0.046
ROCKY	0.31	0.0091	0.040
EL DORADO	10.15	0.0041	0.282
MINE	1.80	0.0038	0.074
PINE GROVE	1.00	0.0030	0.009
WEST POIN	1.26	0.0035	0.009
WEST POIN	1.45	0.0035	0.044
MINE	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
HEWLETT	2.74	0.0017	0.054
SALT SPRING	1.81	0.0009	0.019
MINE	2.28	0.0007	0.014
MINE	1.44	0.0002	0.003

Key Takeaways			
• 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)			

