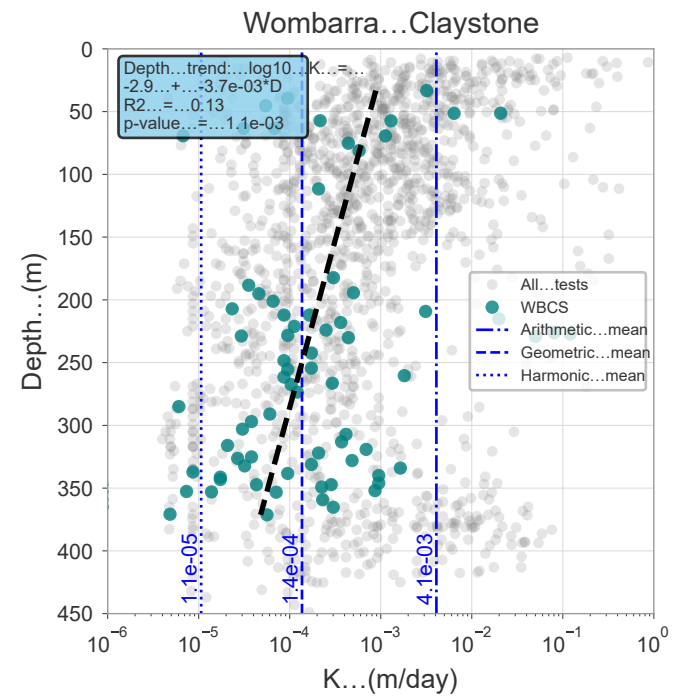
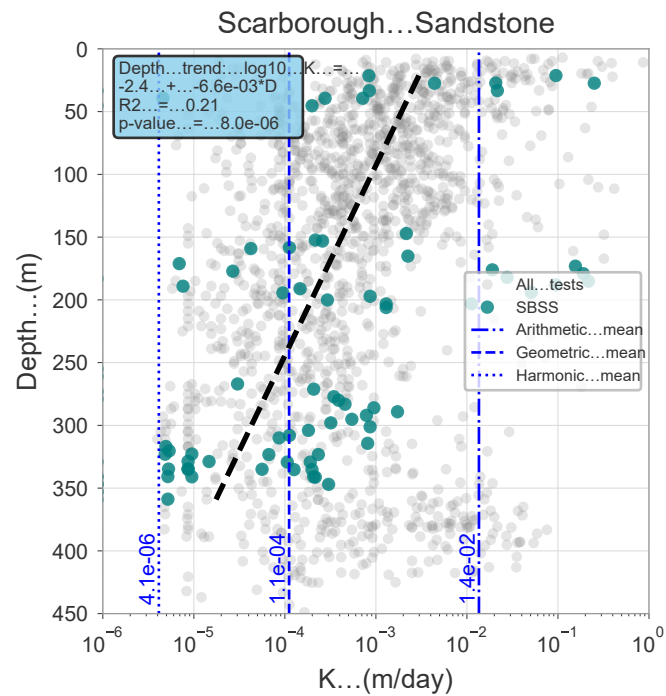
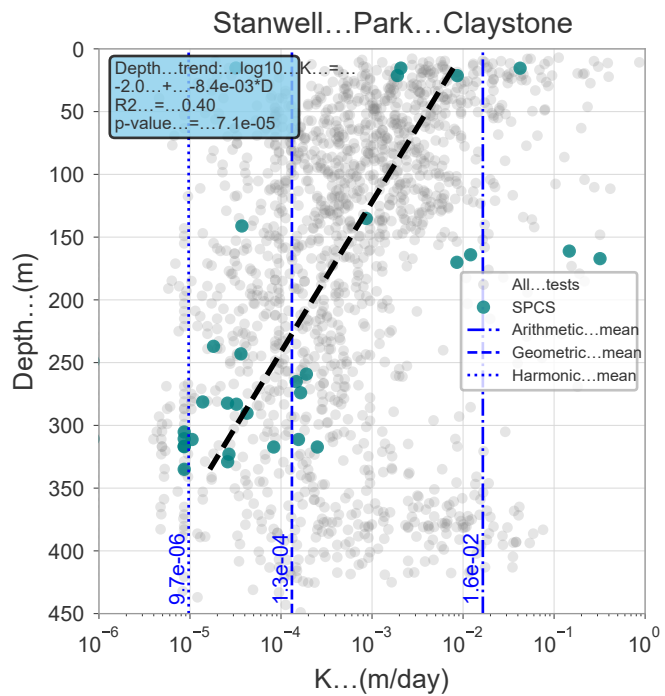
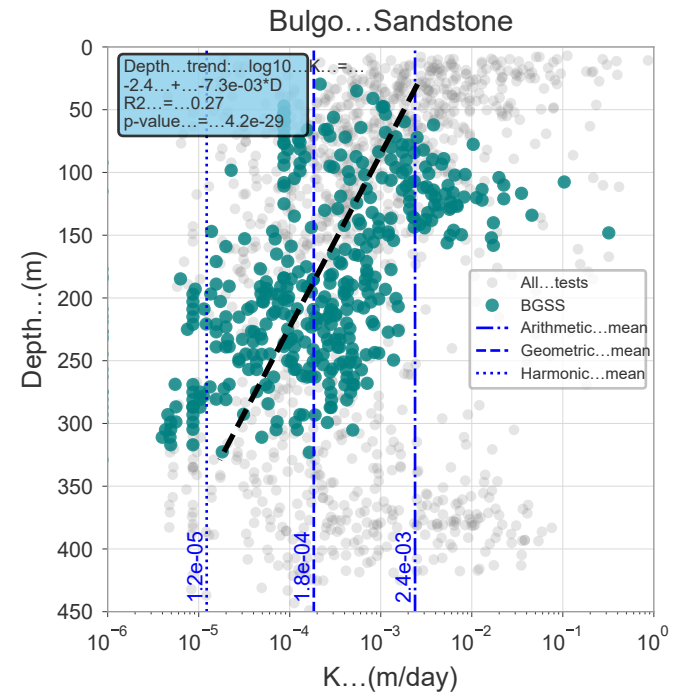
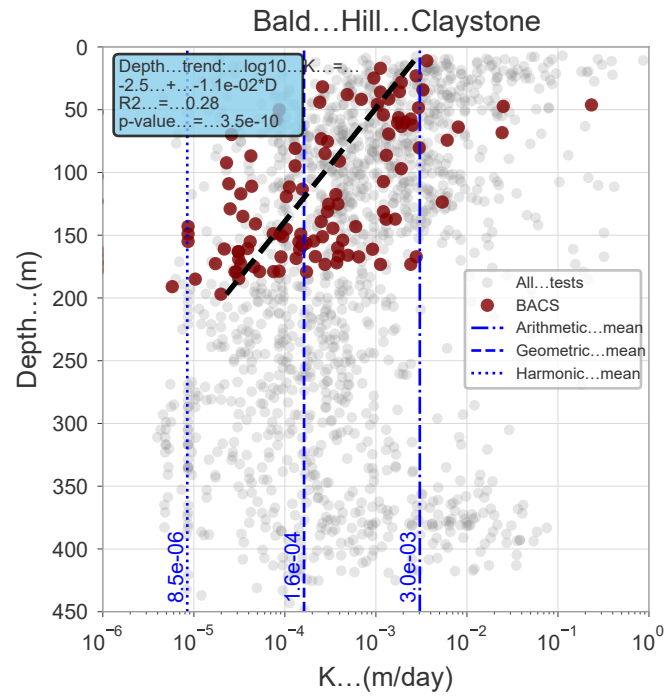
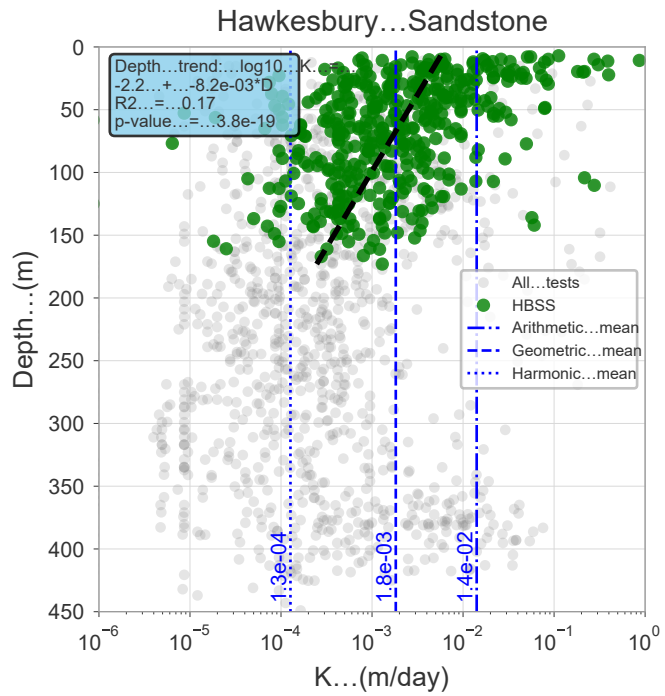
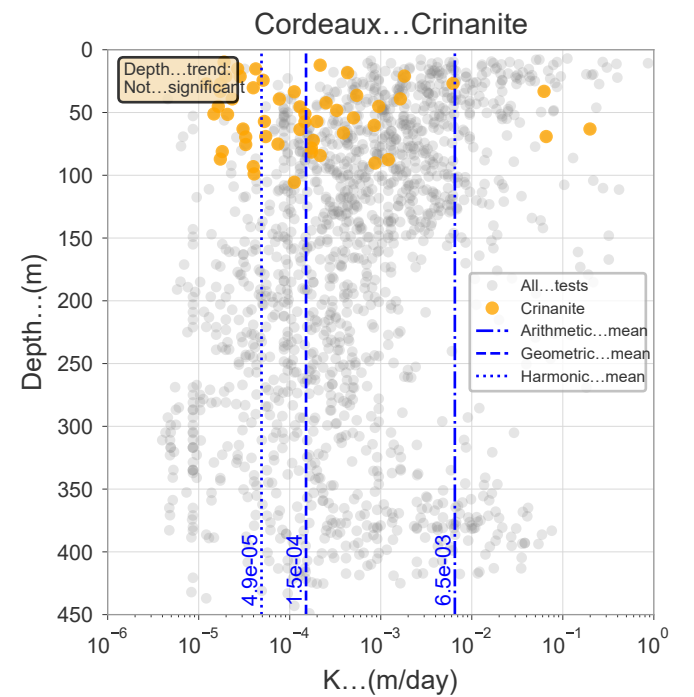
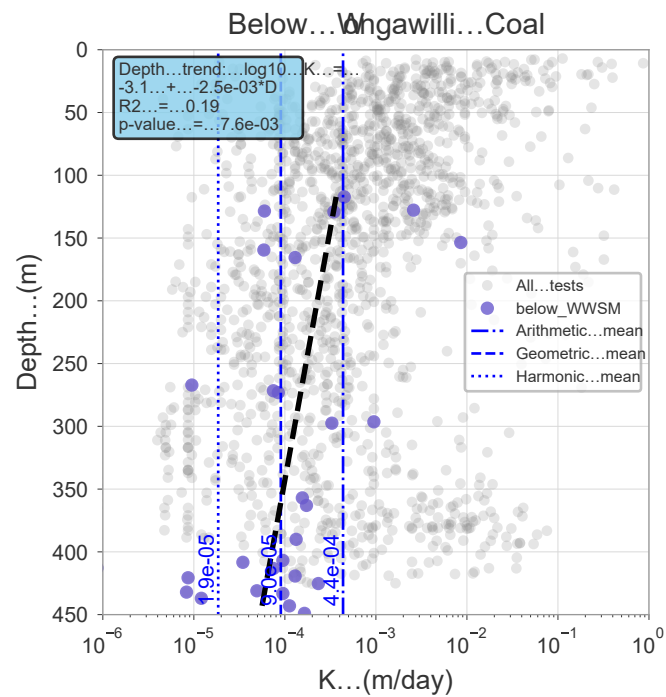
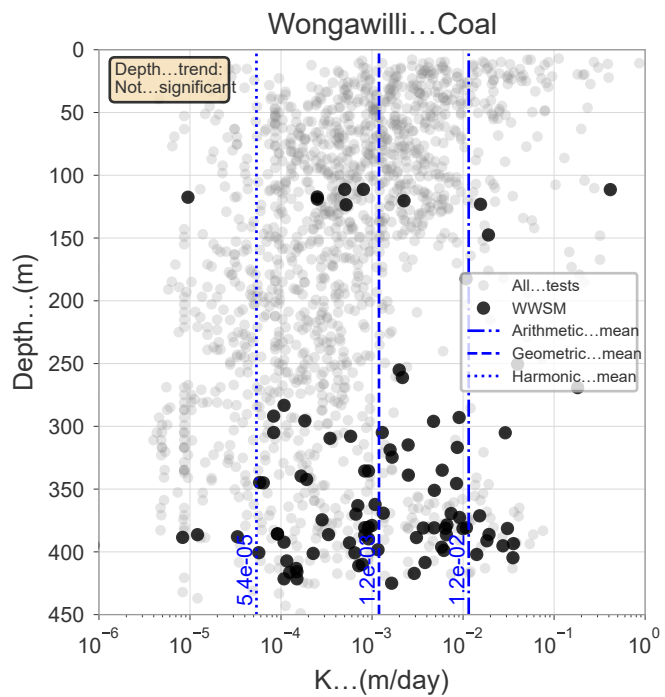
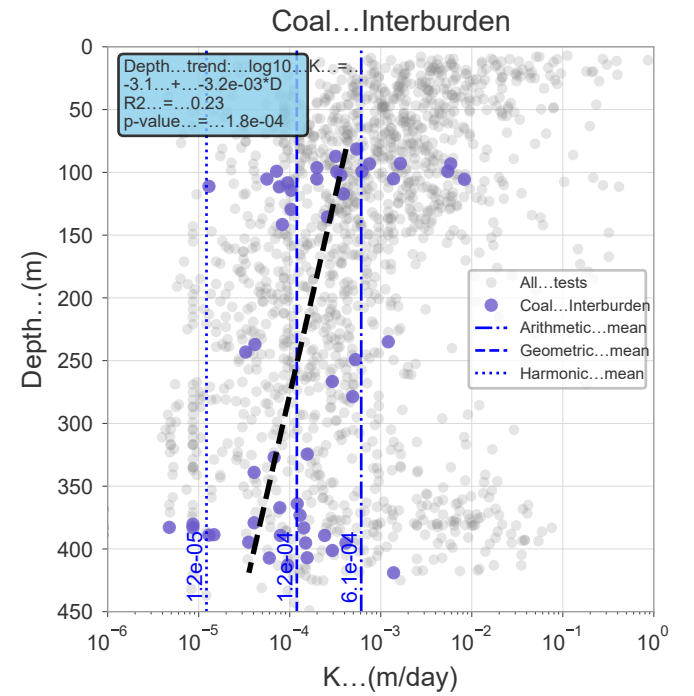
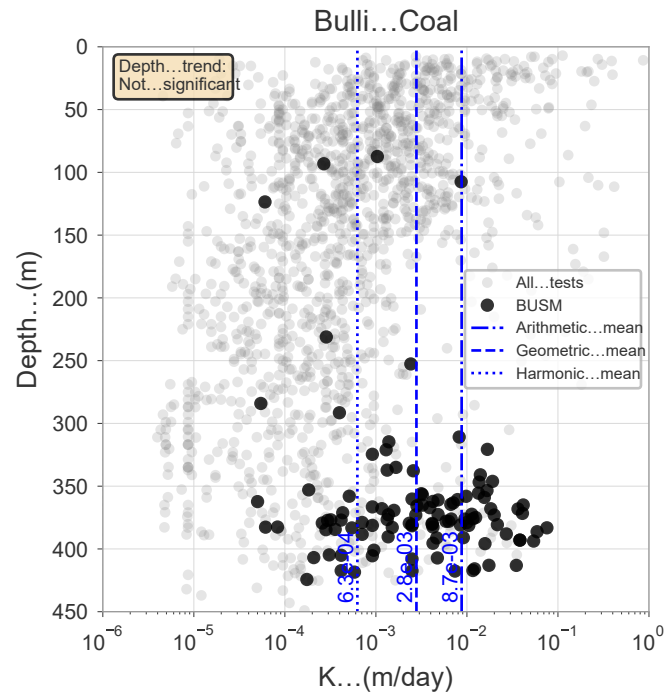
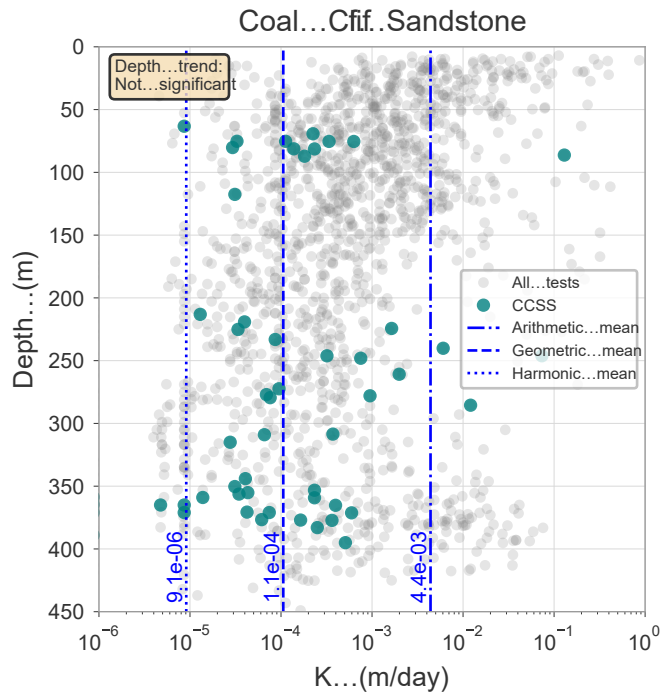


## Appendix A: Hydraulic conductivity data

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## Appendix B: Groundwater model history

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In response to a request by WaterNSW, the following table summarises the history and key features of groundwater modelling for Dendrobium Mine.

Report	Project / Requirement	Software	Grid	Key features	Other features	Peer Review
<b>GHD, 2007.</b> Document: 21/11716/03/AY116.	Area 3 Application	SEEP/W v.6.20	2D "slice" or cross-section model	2D slice model focussing on Area 3A.	Simulated mining: Areas 2-3A Layers: n/a (finite element model). Recharge: estimated as ~2.5% of rainfall. Hydraulic conductivity: zones. Inflow calibration: not calibrated to inflow.	
<b>Coffey, 2012.</b> Document: GEOTLCOV 24507AA-AB2.	Area 3B SMP Approval	MODFLOW-SURFACT v.3	3D rectilinear grid. Detail around A3B.	Fractured zone representation: 'Stacked Drains'. Height of connected fracturing estimated by: Tammetta (2012) H.	Simulated mining: Areas 1-3B. Layers: 15. Recharge: estimated as 2.7% of rainfall. Hydraulic conductivity: zones. Inflow calibration: total mine inflow.	Noel Merrick (Heritage Computing)
<b>HydroSimulations, 2013.</b> Document: HC2013-28.	A3B SMP approval condition	MF-SURFACT v.3	3D (as for Coffey, 2012)	Fracture zone representation: as for Coffey, 2012. Improved representation of topography. Improved simulation of watercourses (MODFLOW-SFR) and included swamp deposits/regolith.	Simulated mining: Areas 1-3B. Layers: 16 (swamp deposits added). Recharge: as per Coffey, 2012 Hydraulic conductivity: zones. Inflow calibration: total mine inflow.	
<b>HydroSimulations, 2014.</b> Document: HC2014-04.	A3B SMP approval condition / DPIE request	MF-SURFACT v.3	3D (as for Coffey, 2012)	Fractured zone represented: transient material properties (TMP). Height of connected fracturing estimated by: Ditton (2012) A-zone.	Simulated mining: Areas 1-3B. Layers: 16. Recharge: as per Coffey, 2012 Hydraulic conductivity: zones. Inflow calibration: total mine inflow.	
<b>HydroSimulations, 2016.</b> Document: HC2016-02c.	Longwalls 14-18 SMP Application	MODFLOW-USG ('transport')	3D (as for Coffey, 2012)	Fractured zone representation: Connected Linear Networks (CLN). Height of connected fracturing estimated as Ditton (2014) A and as Tammetta H. First incorporation of surface cracking via time-varying material properties (TVM) package. Reservoirs simulated with transient stage for historical period.	Simulated mining: Areas 1-3B. Layers: 16. Recharge: soil moisture balance model calibrated against independent estimates. Hydraulic conductivity: zones. Inflow calibration: total mine inflow.	
<b>HydroSimulations, 2017.</b> Document: HS2017-37e.	Longwalls 16-18 SMP Application	MF-USG-T	3D (as for Coffey, 2012)	Fractured zone representation: Stacked Drains with high conductance in line with PSM (2017) conceptualisation. Assumed seam-to-surface connection as per PSM conceptualisation for >300m panels (otherwise Tammetta H). Incorporation of off-goaf valley closure via TVM. Improved representation of surface cracking depth, surface cracking modelled via TVM. Watercourses simulated w MODFLOW River package.	Simulated mining: Areas 1-3B. Layers: 17 (additional layer to allow swamps to sit about uppermost rock layer). Recharge: soil moisture balance model calibrated against independent estimates. Hydraulic conductivity: zones. Inflow calibration: area-by-area calibration.	Frans Kalf (Kalf and Associates)

Report	Project / Requirement	Software	Grid	Key features	Other features	Peer Review
<p><b>HydroSimulations, 2019a.</b></p> <p>Document: HS2018-72c.</p>	Longwall 17 SMP Application	MF-USG-T	3D (as for Coffey, 2012)	Fractured zone representation: primarily Stacked Drains with high conductance in line with PSM (2017) conceptualisation. Assumed seam-to-surface connection as per PSM conceptualisation for >300m panels (otherwise Tammetta H). Surface cracking and off-goaf valley closure via TVM.	Simulated mining: Areas 1-3B. Layers: 17. Recharge: soil moisture balance model calibrated against independent estimates. Hydraulic conductivity: zones. Inflow calibration: area-by-area calibration.	Frans Kalf (Kalf and Associates)
<p><b>HydroSimulations, 2019b.</b></p> <p>Document: HS2019-19g.</p>						
<p><b>HydroSimulations, 2019c.</b></p> <p>Document: HS2018-76.</p>	Area 5 and 6 EIS	MF-USG-T	3D unstructured mesh, detail around longwalls, local watercourses	Fractured zone representation: primarily Stacked Drains with new method for estimating conductance → better groundwater level and inflow calibration. Assumed seam-to-surface connection as per PSM conceptualisation for >300m panels (otherwise Tammetta H). Surface cracking / off-goaf valley closure via TVM.	Simulated mining: Areas 1-3B + 3C + A5 + A6 Layers: 17 Recharge: soil moisture balance model calibrated against independent estimates and against BoM AWRA model. Hydraulic conductivity: K/depth relationship and zones. Inflow calibration: area-by-area calibration.	Frans Kalf (Kalf and Associates)
<p><b>SLR, 2020a</b></p> <p>Document: 665.10009-R02.</p>						
<p><b>SLR, 2020a</b></p> <p>Document: 665.10009-R02.</p>	Longwall 19 SMP Application	MF-USG-T v.1.3	3D (as for Coffey, 2012)	Fractured zone representation: primarily Stacked Drains using drain conductance parameters from HydroSimulations, 2019c. Assumed seam-to-surface connection as per PSM conceptualisation for >300m panels (otherwise Tammetta H). Surface cracking / off-goaf valley closure via TVM.	Simulated mining: Areas 1-3B. Layers: 17 Recharge: soil moisture balance model calibrated against independent estimates and against BoM AWRA model. Hydraulic conductivity: zones. Inflow calibration: area-by-area calibration.	Frans Kalf (Kalf and Associates)
<p><b>WatershedHG, 2020.</b></p> <p>Document: Rr014i4.</p>	Longwall 18 SMP Application	MF-USG-T v.1.4.0	3D unstructured. Modified from HS (2019c). 50m regular mesh applied in A3C/5/6 longwalls.	Fractured zone representation: TVM, constrained by data from centreline goaf bore investigations (e.g. HGEO, 2020). Applied 'Stacked Drains' to improve estimation of surface water losses in headwater streams. Surface cracking and off-goaf valley closure via TVM.	Simulated mining: Areas 1-3B + 3C (to LW23) Layers: 17 Recharge: soil moisture balance model calibrated against independent estimates and against BoM AWRA model. Hydraulic conductivity: K/depth relationship and zones. Inflow calibration: area-by-area calibration. Calibration to surface water losses from EOPs.	
<p>Document: R016i8.</p>	Longwall 22-23 SMP Application					

Report	Project / Requirement	Software	Grid	Key features	Other features	Peer Review
<p><b>WatershedHG, 2022.</b></p> <p>Document: R029d.</p>	Area 5 (DMEP) EIS	MF-USG-T v.1.8.0	As previous.	<p>Revised conceptual model of fracture heights and zones from IMC's significant centreline / over-goaf investigation program.</p> <p>Fractured zone representation: TVM, constrained by data from centreline goaf bore investigations (e.g. HGEO, 2020-2021), plus</p> <p>Applied 'Stacked Drains' to improve estimation of surface water losses in headwater streams.</p> <p>Surface cracking and off-goaf valley closure via TVM.</p> <p>Watercourse representation improved from MODFLOW Rivers to MODFLOW Stream-flow (SFR).</p> <p>Incorporated more detailed Closure Concept Plan (SLR, 2022).</p>	<p>Simulated mining: Areas 1-3B + 3C + revised Area 5.</p> <p>Layers: 17</p> <p>Recharge: soil moisture balance model calibrated against independent estimates and against BoM AWRA model.</p> <p>Used AWRA model runoff estimates for inputting to SFR (Stream) package.</p> <p>Hydraulic conductivity: K/depth relationship and zones.</p> <p>Improved calibration to post-mining groundwater level recovery (e.g. above A3B longwalls).</p> <p>Inflow calibration: area-by-area calibration.</p> <p>Further calibration to surface water losses from EOPs.</p>	Brian Barnett (Jacobs)
<p><b>WatershedHG, 2022.</b></p> <p>Document: R042x.</p>						
	Longwall 19A SMP Application	MF-USG-T v.1.9.0	As previous.	As previous.	As previous.	

## Appendix C: Groundwater model temporal discretisation

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Stage	SP	Days	DateFrom	DateTo	Scheduled Mining	Event / Rainfall / Inflow signal	Total days	Elouera	other
	114	90	1/01/2019	31/03/2019	Start LW 15		28946		
	115	61	1/04/2019	31/05/2019			29007		
	116	61	1/06/2019	31/07/2019			29068		
	117	61	1/08/2019	30/09/2019			29129		
	118	92	1/10/2019	31/12/2019	End LW 15		29221		
	119	59	1/01/2020	28/02/2020			29280		
	120	62	29/02/2020	30/04/2020	Start LW 16		29342		
	121	61	1/05/2020	30/06/2020			29403		
	122	92	1/07/2020	30/09/2020			29495		
	123	61	1/10/2020	30/11/2020	End LW 16		29556		
	124	62	1/12/2020	31/01/2021	Start LW 17		29618		
	125	59	1/02/2021	31/03/2021			29677		
	126	61	1/04/2021	31/05/2021			29738		
	127	61	1/06/2021	31/07/2021			29799		
	128	61	1/08/2021	30/09/2021	End LW 17		29860		
	129	61	1/10/2021	30/11/2021			29921		
	130	62	1/12/2021	31/01/2022	Start LW 18		29983		
	131	58	1/02/2022	30/03/2022		End A3B	30041		
	132	31	31/03/2022	30/04/2022	End LW 18		30072		
PREDICTION	133	61	1/05/2022	30/06/2022			30133	End C & M?	Tahmoor Sth
	134	31	1/07/2022	31/07/2022	Start LW 19	A3A recommences	30164		
	135	61	1/08/2022	30/09/2022			30225		
	136	92	1/10/2022	31/12/2022	End LW 19		30317		
	137	31	1/01/2023	31/01/2023			30348		
	138	59	1/02/2023	31/03/2023	Start LW 21	A3C commences	30407		
	139	45	1/04/2023	15/05/2023			30452		
	140	46	16/05/2023	30/06/2023	End LW 21		30498		
	141	92	1/07/2023	30/09/2023	Start LW19A		30590		
	142	92	1/10/2023	31/12/2023			30682		
	143	60	1/01/2024	29/02/2024	End LW19A	End A3A (LW19A)	30742		
	144	61	1/03/2024	30/04/2024			30803		
	145	123	1/05/2024	31/08/2024	Start LW 22		30926		
	146	122	1/09/2024	31/12/2024			31048		
	147	151	1/01/2025	31/05/2025			31199		
	148	92	1/06/2025	31/08/2025			31291		
	149	61	1/09/2025	31/10/2025			31352		
	150	61	1/11/2025	31/12/2025			31413		
151	90	1/01/2026	31/03/2026	End LW 22		31503			
152	91	1/04/2026	30/06/2026	Start LW 23		31594			
153	92	1/07/2026	30/09/2026			31686			
154	92	1/10/2026	31/12/2026			31778			
155	90	1/01/2027	31/03/2027			31868			
156	91	1/04/2027	30/06/2027	End LW 23		31959			
157	92	1/07/2027	30/09/2027	Start LW20		32051			
158	92	1/10/2027	31/12/2027	End LW20	End A3C (part 1)	32143			
POST_MINING	159	91	1/01/2028	31/03/2028		(assumes no further mining)	32234		
	160	91	1/04/2028	30/06/2028			32325		
	161	92	1/07/2028	30/09/2028			32417		
	162	92	1/10/2028	31/12/2028			32509		
	163	90	1/01/2029	31/03/2029			32599		
	164	91	1/04/2029	30/06/2029			32690		
	165	92	1/07/2029	30/09/2029			32782		
	166	92	1/10/2029	31/12/2029			32874		
	167	90	1/01/2030	31/03/2030			32964		
	168	91	1/04/2030	30/06/2030			33055		
	169	92	1/07/2030	30/09/2030			33147		
	170	92	1/10/2030	31/12/2030			33239		
	171	90	1/01/2031	31/03/2031			33329		
	172	91	1/04/2031	30/06/2031			33420		
	173	92	1/07/2031	30/09/2031			33512		
	174	92	1/10/2031	31/12/2031			33604		
	175	91	1/01/2032	31/03/2032			33695		
	176	91	1/04/2032	30/06/2032			33786		
	177	92	1/07/2032	30/09/2032			33878		
	178	92	1/10/2032	31/12/2032			33970		
	179	90	1/01/2033	31/03/2033			34060		
	180	91	1/04/2033	30/06/2033			34151		
	181	92	1/07/2033	30/09/2033			34243		
	182	92	1/10/2033	31/12/2033			34335		
	183	90	1/01/2034	31/03/2034			34425		
	184	91	1/04/2034	30/06/2034			34516		
	185	92	1/07/2034	30/09/2034			34608		
	186	92	1/10/2034	31/12/2034			34700		
	187	90	1/01/2035	31/03/2035			34790		
	188	91	1/04/2035	30/06/2035			34881		
	189	92	1/07/2035	30/09/2035			34973		
	190	92	1/10/2035	31/12/2035			35065		
	191	91	1/01/2036	31/03/2036			35156		
	192	91	1/04/2036	30/06/2036			35247		
	193	92	1/07/2036	30/09/2036			35339		
	194	92	1/10/2036	31/12/2036			35431		
	195	90	1/01/2037	31/03/2037			35521		
	196	91	1/04/2037	30/06/2037			35612		
	197	92	1/07/2037	30/09/2037			35704		
	198	92	1/10/2037	31/12/2037			35796		
199	90	1/01/2038	31/03/2038			35886			
200	91	1/04/2038	30/06/2038			35977			
201	92	1/07/2038	30/09/2038			36069			
202	92	1/10/2038	31/12/2038			36161			
203	90	1/01/2039	31/03/2039			36251			
204	91	1/04/2039	30/06/2039			36342			
205	184	1/07/2039	31/12/2039			36526			
206	366	1/01/2040	31/12/2040			36892			
207	365	1/01/2041	31/12/2041			37257			
208	365	1/01/2042	31/12/2042			37622			
209	365	1/01/2043	31/12/2043			37987			
210	366	1/01/2044	31/12/2044			38353			
211	365	1/01/2045	31/12/2045			38718			
212	1826	1/01/2046	31/12/2050			40544			
213	1826	1/01/2051	31/12/2055			42370			
214	1827	1/01/2056	31/12/2060			44197			
215	5478	1/01/2061	31/12/2075			49675			
216	9131	1/01/2076	31/12/2100			58806			
217	18262	1/01/2101	31/12/2150			77068			
218	18262	1/01/2151	31/12/2200			95330			

## Appendix D: Groundwater model 'Confidence Classification'

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The following pages present the Model Confidence Classification as per the *Australian Groundwater Modelling Guidelines* (Barnett et al., 2012).

## Appendix D: Groundwater model confidence level classification table

Australian Groundwater Modelling Guidelines (Barnett et al., 2012)

	Data	Calibration	Prediction	Key indicator	
<b>Class 3</b>	Spatial and temporal distribution of groundwater head observations adequately define groundwater behaviour, especially in areas of greatest interest and where outcomes are to be reported.	Adequate validation is demonstrated. <i>*Noting that it is not widely agreed that setting aside data for verification is the best use of that information.</i>	Length of predictive model is not excessive compared to length of calibration period.	Key calibration statistics are acceptable and meet agreed targets.	
	Spatial distribution of bore logs and associated stratigraphic interpretations clearly define aquifer geometry.	✓ Scaled RMS error (refer Chapter 5) or other calibration statistics are acceptable.	✓ Temporal discretisation used in the predictive model is consistent with the transient calibration.	✓ Model predictive time frame is less than 3 times the duration of transient calibration. <i>(for operational mine life)</i>	✓
	Reliable metered groundwater extraction and injection data is available. <i>(for Dendrobium Mine)</i>	✓ Long-term trends are adequately replicated where these are important.	✓ Level and type of stresses included in the predictive model are within the range of those used in the transient calibration.	✓ Stresses are not more than 2 times greater than those included in calibration.	✓
	Rainfall and evaporation data is available.	✓ Seasonal fluctuations are adequately replicated where these are important.	Model validation* suggests calibration is appropriate for locations and/or times outside the calibration model.	Temporal discretisation in predictive model is the same as that used in calibration.	✓
	Aquifer-testing data to define key parameters.	✓ Transient calibration is current, i.e. uses recent data.	✓ Steady-state predictions used when the model is calibrated in steady- state only.	Mass balance closure error is less than 0.5% of total.	✓
	Streamflow and stage measurements are available with reliable baseflow estimates at a number of points.	✓ Model is calibrated to heads and fluxes.	✓	Model parameters consistent with conceptualisation.	✓
	Reliable land-use and soil- mapping data available.	Observations of the key modelling outcomes dataset is used in calibration: * Mine inflow ✓ * Groundwater levels ✓ * Watercourse impacts ✓ * Reservoir leakage X		<b>Appropriate computational methods</b> used with appropriate spatial discretisation to model the problem. <i>(although some reviewers would prefer not to rely on equivalent porous media assumptions)</i>	✓
	Good quality and adequate spatial coverage of digital elevation model to define ground surface elevation.	✓		The model has been reviewed and deemed fit for purpose by an experienced, independent hydrogeologist with modelling experience.	✓
<b>Class 2</b>	Groundwater head observations and bore logs are available but may not provide adequate coverage throughout the model domain.	✓ Validation* is either not undertaken or is not demonstrated for the full model domain.	Transient calibration over a short time frame compared to that of prediction.	Key calibration statistics suggest poor calibration in parts of the model domain.	
	Metered groundwater- extraction data may be available but spatial and temporal coverage may not be extensive.	✓ Calibration statistics are generally reasonable but may suggest significant errors in parts of the model domains).	✓ Temporal discretisation used in the predictive model is different from that used in transient calibration.	Model predictive time frame is between 3 and 10 times the duration of transient calibration. <i>(for long-term post-closure estimates)</i>	✓
	Streamflow data and baseflow estimates available at a few points.	Long-term trends not replicated in all parts of the model domain.	Level and type of stresses included in the predictive model are outside the range of those used in the transient calibration.	Stresses are between 2 and 5 times greater than those included in calibration.	
	Reliable irrigation-application data available in part of the area or for part of the model duration.	Transient calibration to historic data but not extending to the present day.	Validation* suggests relatively poor match to observations when calibration data is extended in time and/or space.	Temporal discretisation in predictive model is not the same as that used in calibration.	
		Seasonal fluctuations not adequately replicated in all parts of the model domain.	✓	Mass balance closure error is less than 1% of total.	
		Observations of the key modelling outcome data set are not used in calibration. <i>(see above for those that are used)</i> > cannot directly observe reservoir losses > cannot infer losses from water balance with any reliability	X	Not all model parameters consistent with conceptualisation.  Spatial refinement too coarse in key parts of the model domain.	
				The model has been reviewed and deemed fit for purpose by an independent hydrogeologist.	
<b>Class 1</b>	Few or poorly distributed existing wells from which to obtain reliable groundwater and geological information.	No calibration is possible.	Predictive model time frame far exceeds that of calibration.	Model is uncalibrated or key calibration statistics do not meet agreed targets.	
	Observations and measurements unavailable or sparsely distributed in areas of greatest interest.	Calibration illustrates unacceptable levels of error especially in key areas.	Temporal discretisation is different to that of calibration.	Model predictive time frame is more than 10 times longer than transient calibration period.	
	No available records of metered groundwater extraction or injection.	Calibration is based on an inadequate distribution of data.	Transient predictions are made when calibration is in steady state only.	Stresses in predictions are more than 5 times higher than those in calibration.	
	Climate data only available from relatively remote locations.	Calibration only to datasets other than that required for prediction.	Model validation* suggests unacceptable errors when calibration dataset is extended in time and/or space.	Stress period or calculation interval is different from that used in calibration.	
	Little or no useful data on land-use, soils or river flows and stage elevations.			Transient predictions made but calibration in steady state only.	
				Cumulative mass-balance closure error exceeds 1% or exceeds 5% at any given calculation time.	
				Model parameters outside the range expected by the conceptualisation with no further justification.	
				Unsuitable spatial or temporal discretisation.	
			The model has not been reviewed.		

## Appendix E: Modelled hydraulic properties

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### Calibrated Hydraulic Properties (K and S)

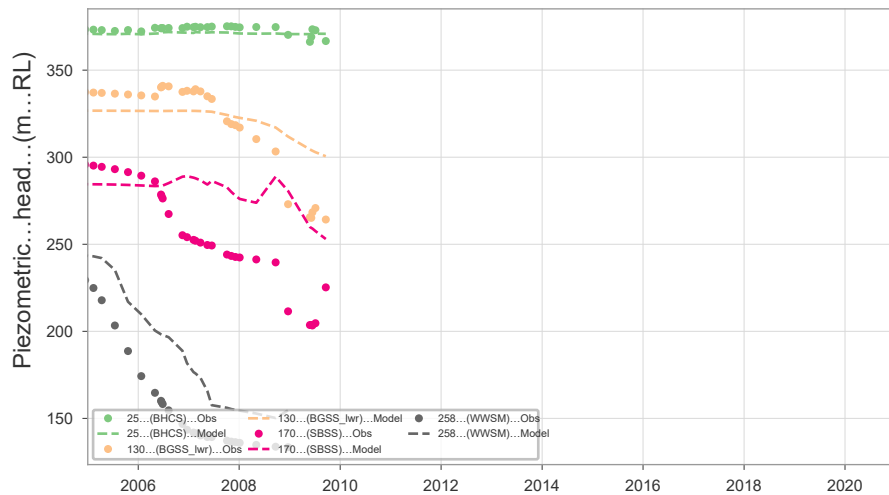
Layer	Zone#	Geology	abbrev.	Kh factor	$K_h$ , m/d	$K_v$ , m/d	Ss m-1	Sy
1	11	Swamps		n/a	1	0.05		0.3
	1, 3	Alluvium		n/a	10, 3	0.3, 5e-3		0.1
	2	Wianamatta Formation	WMFM	n/a	0.015	2.0E-05		0.1
	10	Regolith		n/a	0.03	0.03		0.1
2	20	Hawkesbury Sst (upper)	HBSS	1.3	<i>K-depth</i>	1E-05	5E-03	0.05
3	30	Hawkesbury Sst (mid)	HBSS	0.6	<i>K-depth</i>	1E-04	1E-06	0.025
4	40	Hawkesbury Sst (lower)	HBSS	1	<i>K-depth</i>	3E-05	1E-06	0.012
5	50	Bald Hill Claystone	BACS	0.03	<i>K-depth</i>	3E-06	1E-06	0.006
	51	Crinanite (weathered)		0.8	<i>K-depth</i>	3E-03	5E-04	0.01
6-11	multiple	Crinanite		0.05	<i>K-depth</i>	5E-05	5E-04	0.01
6	60	Bulgo Sst (upper)	BGSS	0.2	<i>K-depth</i>	1E-04	9E-07	0.008
	61	Bulgo Sst (upper)	BGSS	0.25	<i>K-depth</i>	5E-05	9E-07	0.008
	62	Bulgo Sst (upper) / CVSS	BGSS	0.14	<i>K-depth</i>	1E-06	9E-07	0.008
	64	Bulgo Sst (upper) (A2 outcrop)	BGSS	0.3	<i>K-depth</i>	2E-06	9E-07	0.008
7	70	Bulgo Sst (lower)	BGSS	0.3	<i>K-depth</i>	2E-05	8E-07	0.007
	71	Bulgo Sst (lower)	BGSS	0.2	<i>K-depth</i>	5E-05	8E-07	0.007
	72	Bulgo Sst (lower) / CVSS	BGSS	0.2	<i>K-depth</i>	2E-06	8E-07	0.007
	74	BGSS (lwr) near A2/crinanite	BGSS	0.6	<i>K-depth</i>	6E-06	8E-07	0.007
8	80	Stanwell Park Claystone	SPCS	0.25	<i>K-depth</i>	3E-05	7E-07	0.005
	81	Stanwell Park Claystone	SPCS	0.25	<i>K-depth</i>	2E-06	7E-07	0.005
	83	SPCS, near A2	SPCS	2	<i>K-depth</i>	4E-06	7E-07	0.005
9	90-92	Scarborough Sst	SBSS	2	<i>K-depth</i>	1E-06	6E-06	0.01
10	100	Wombarra Claystone	WBCS	0.25	<i>K-depth</i>	5E-06	5E-07	0.0035
11	110	Coalcliff Sandstone	CCSS	1	<i>K-depth</i>	7E-06	4E-07	0.004
	111	Coalcliff Sandstone	CCSS	0.5	<i>K-depth</i>	5E-06	4E-07	0.004
12	120	Bulli Seam	BUSM	20	<i>K-depth</i>	1E-06	2E-07	0.004
	121	Bulli Seam – cindered	BUSM	0.4	<i>K-depth</i>	6E-06	1E-06	0.016
	123	Bulli Seam – faulted (mylonite)	BUSM	0.1	<i>K-depth</i>	3E-05	1E-06	0.016
13	130	Lawrence and Loddon Ssts	LDSS	1	<i>K-depth</i>	1E-06	2E-07	0.004
	131	Nepheline syenite		0.4	<i>K-depth</i>	2E-06	3E-07	0.005
	132	Fault/mylonite		0.3	<i>K-depth</i>	9E-06	3E-07	0.005
14	140	Wongawilli Seam	WWSM	40	<i>K-depth</i>	1E-06	2E-07	0.004
	141	Nepheline syenite		0.4	<i>K-depth</i>	3E-06	4E-06	0.02
	142	Wongawilli Seam – cindered	WWSM	0.5	<i>K-depth</i>	2E-06	3E-06	0.012
	143	Fault/mylonite		0.5	<i>K-depth</i>	9E-06	1E-06	0.015
15	150	Kembla Sandstone	KBSS	1	<i>K-depth</i>	3E-05	3E-07	0.0045
	151	Kembla Sandstone – outcrop	KBSS	1	<i>K-depth</i>	1E-05	1E-04	0.02
	152	Kembla Sandstone – outcrop	KBSS	1	<i>K-depth</i>	8E-04	1E-04	0.02
16	160	lower Permian Coal Meas.	IPCM	1	<i>K-depth</i>	1E-05	3E-07	0.004
	161	lower Permian Coal Meas.	IPCM	1	<i>K-depth</i>	8E-04	3E-06	0.03
17	170	Shoalhaven Group		1	<i>K-depth</i>	2E-06	3E-07	0.005

“*K-depth*” = means that Kh is primarily determined by depth of mid-point of model cell (see Equation 1 and 2).

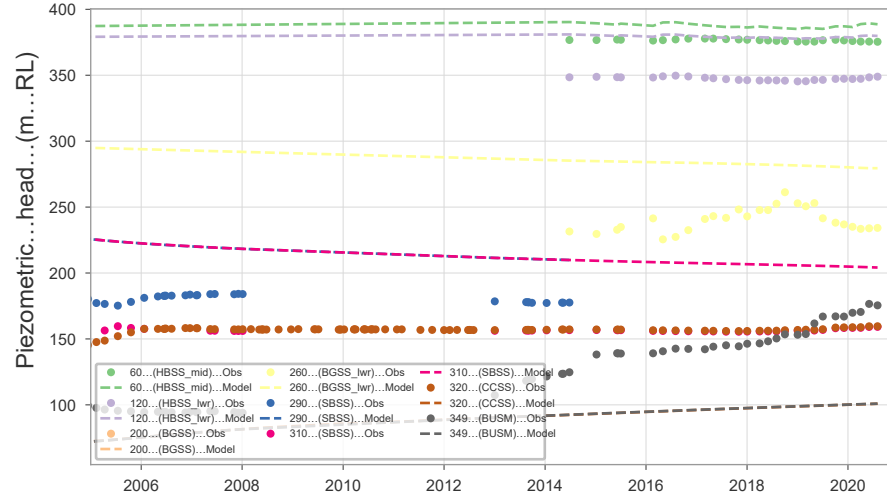
**Kh factor** used to provide additional control based on lithology, facies variation. The K from the K-w-depth relationship is multiplied by this factor. DND5\_mesh\_Kwdepth\_5v44.xlsx

## Appendix F: Modelled groundwater level calibration hydrographs

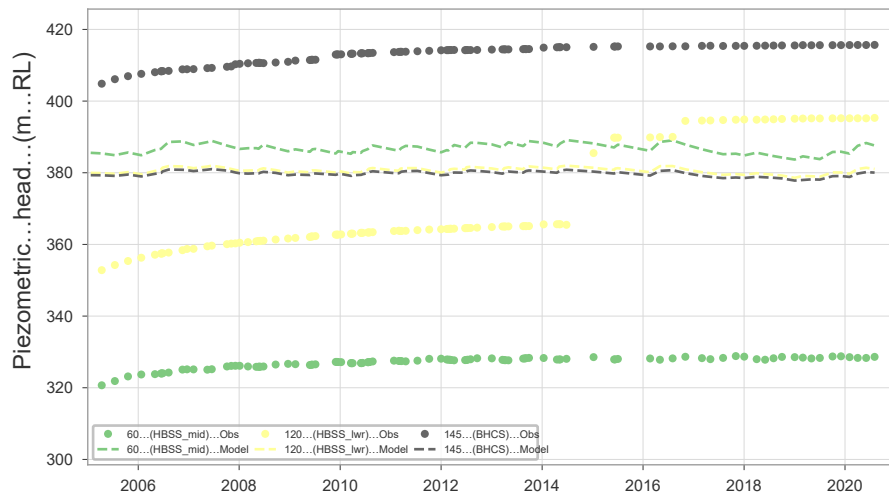
Dendrobium...S1577



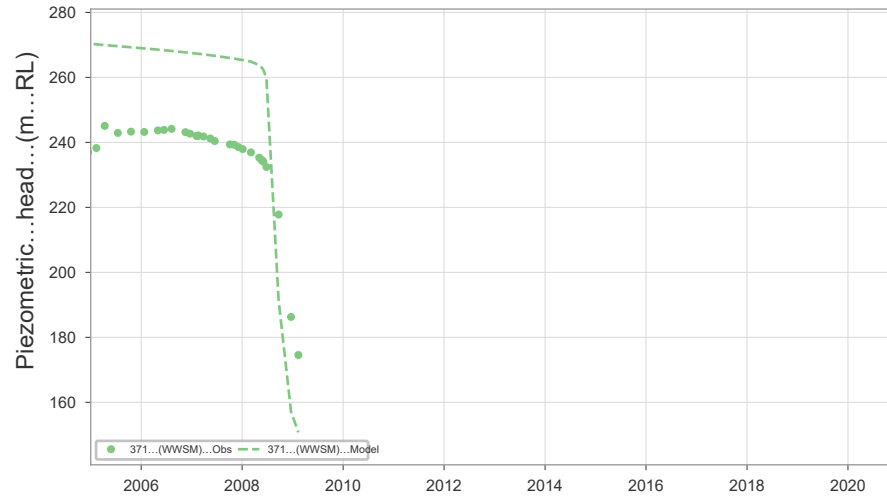
Dendrobium...S1709



Dendrobium...S1710

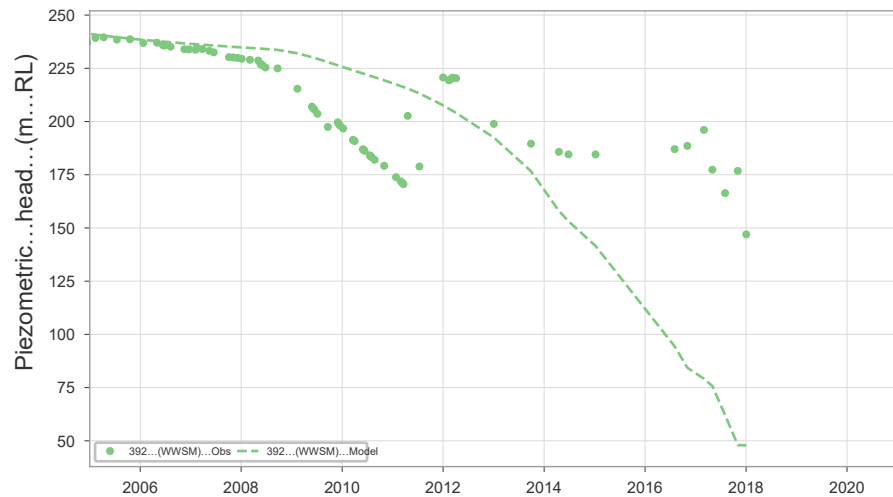


Dendrobium...S1719

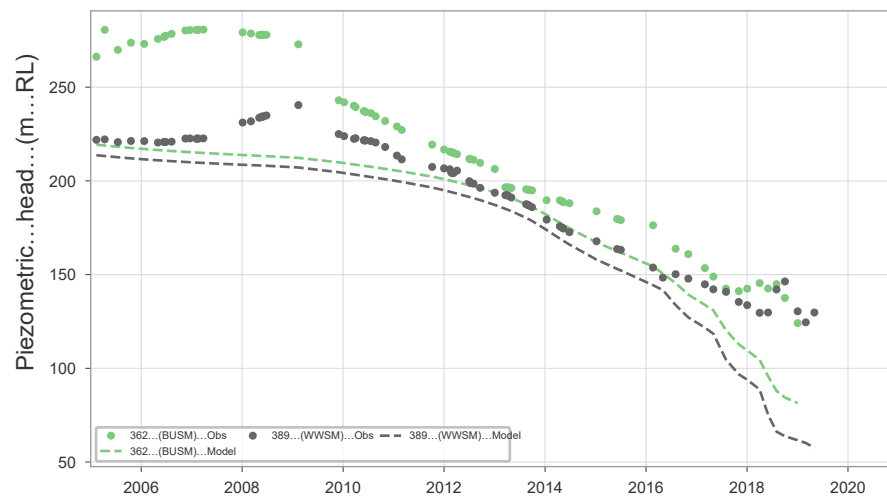




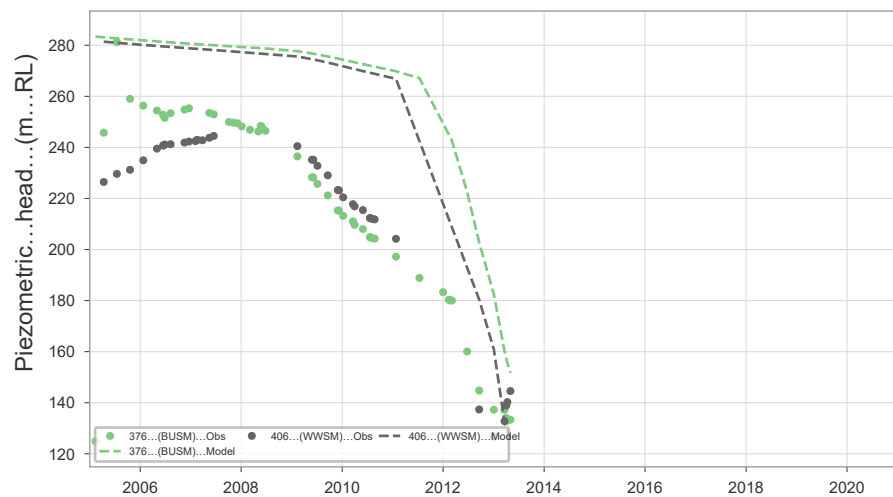
Dendrobium...S1739



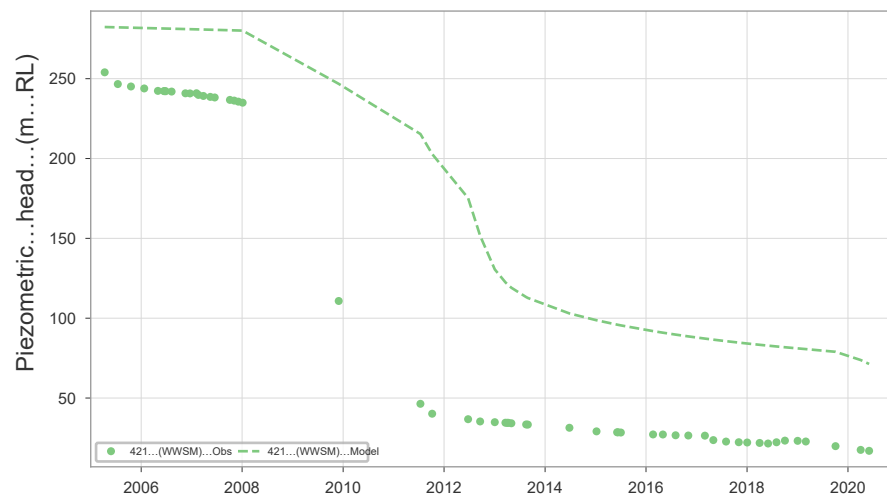
Dendrobium...S1755



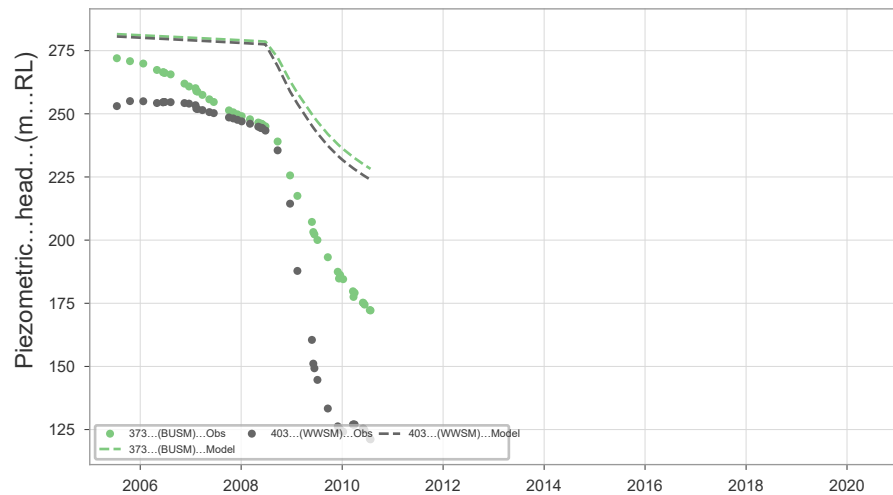
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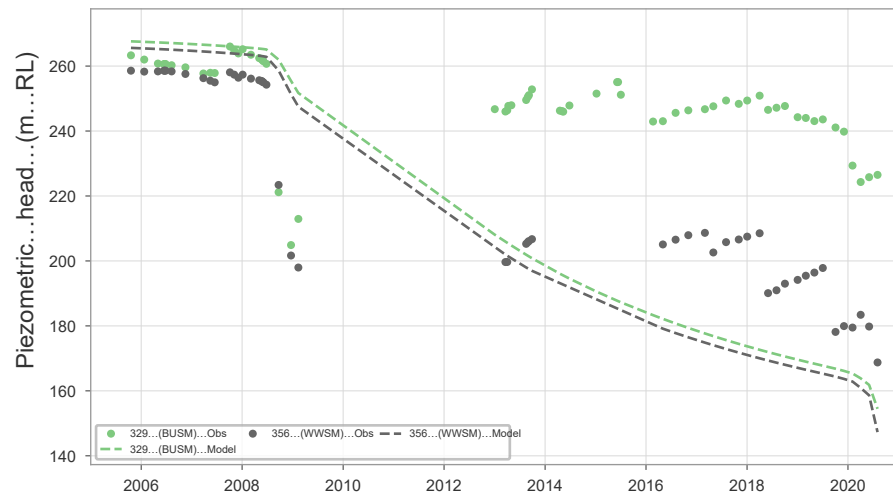
Dendrobium...S1796



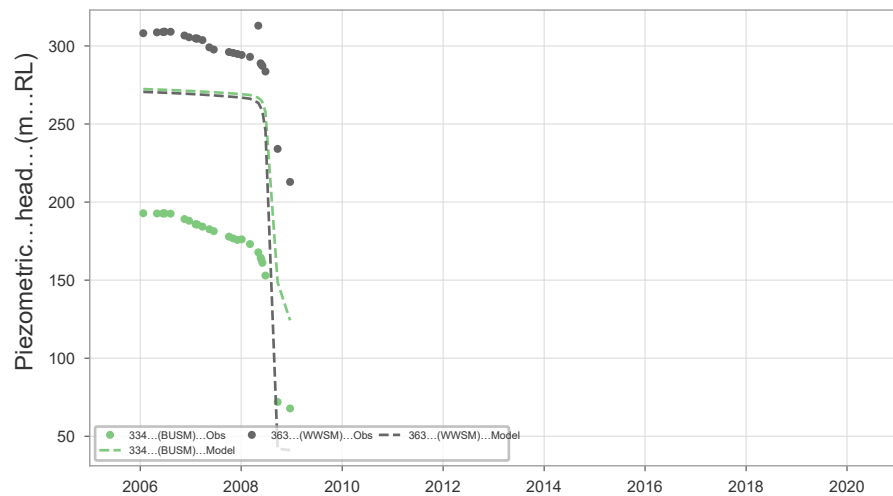
Dendrobium...S1800



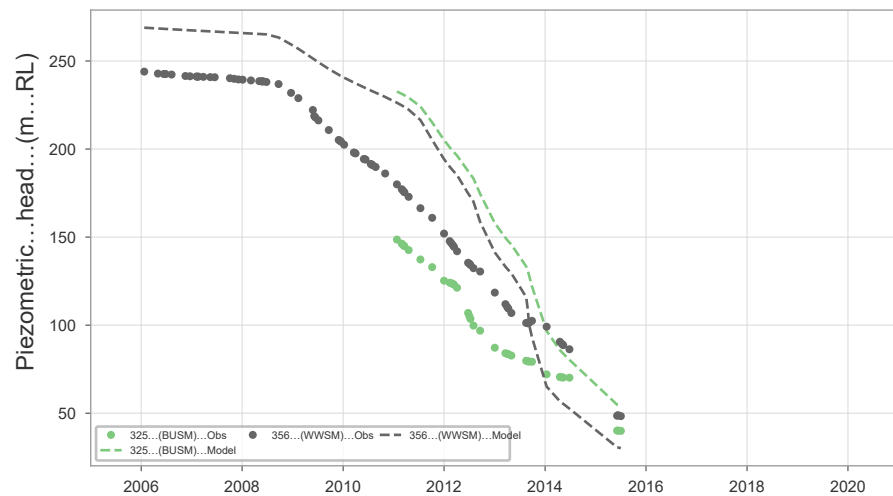
Dendrobium...S1844



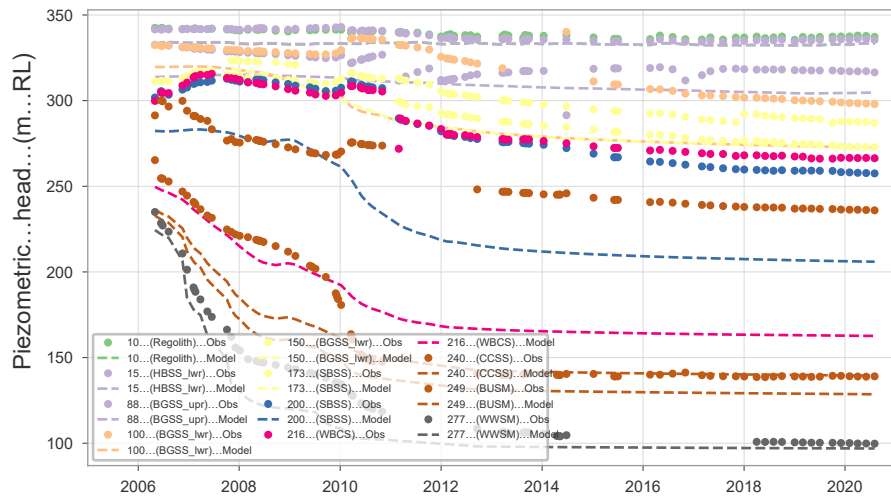
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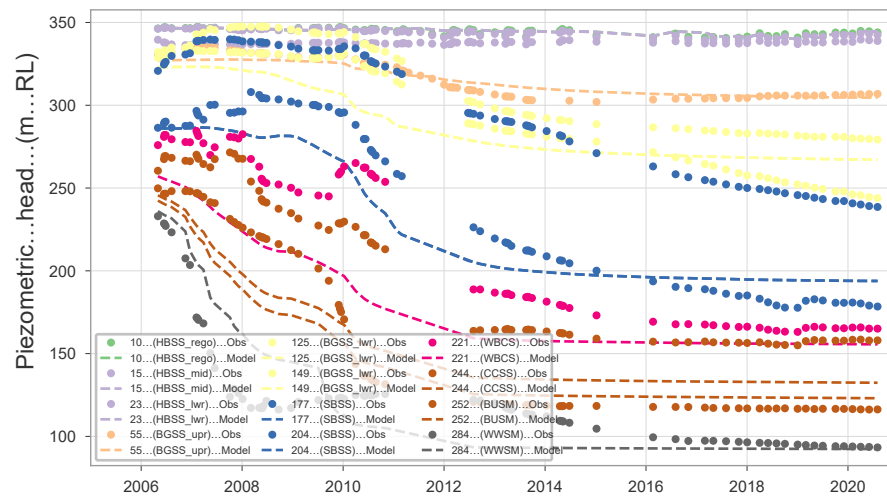
Dendrobium...S1855



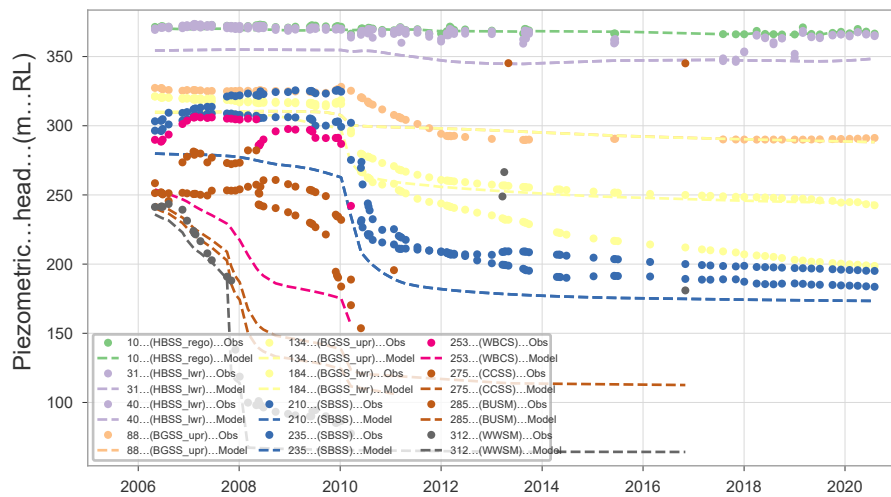
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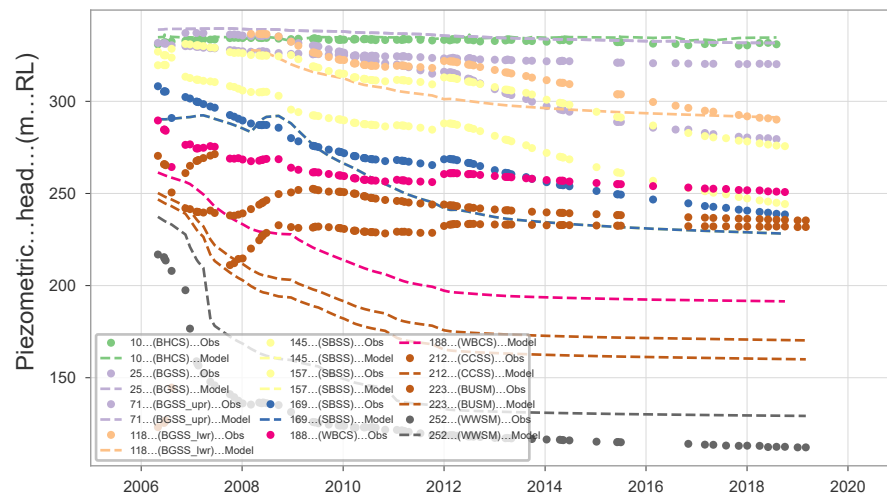
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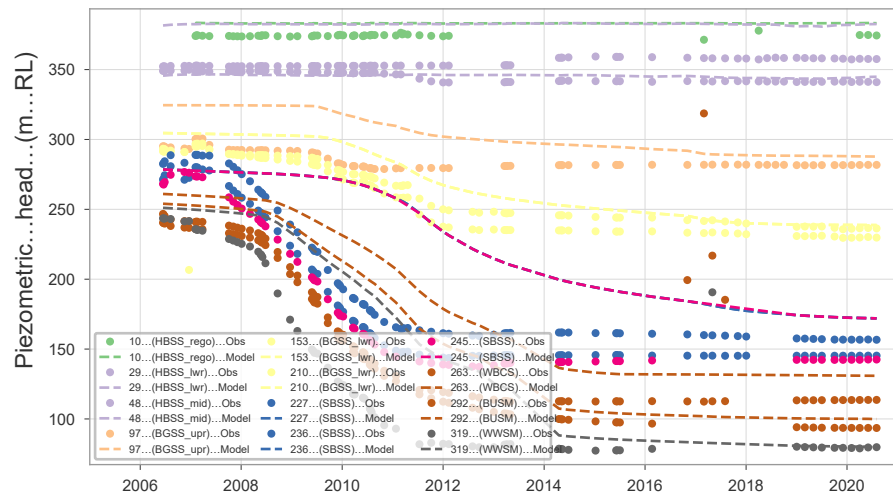
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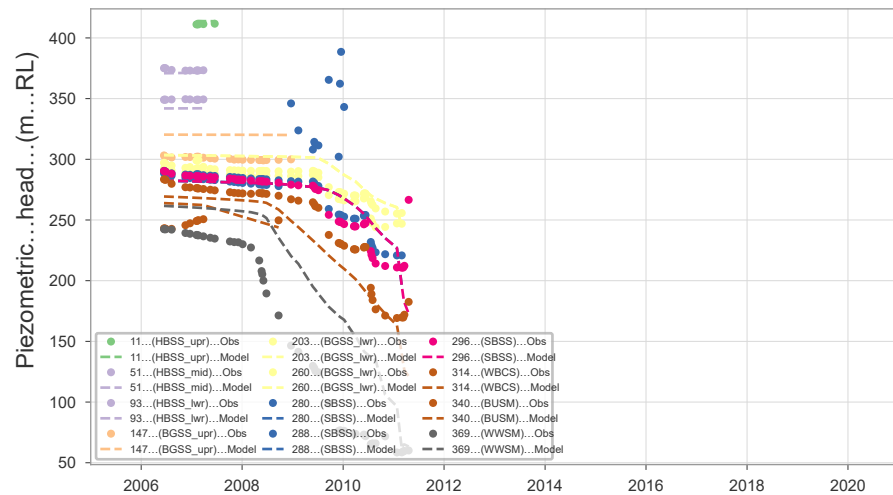
Dendrobium...S1878



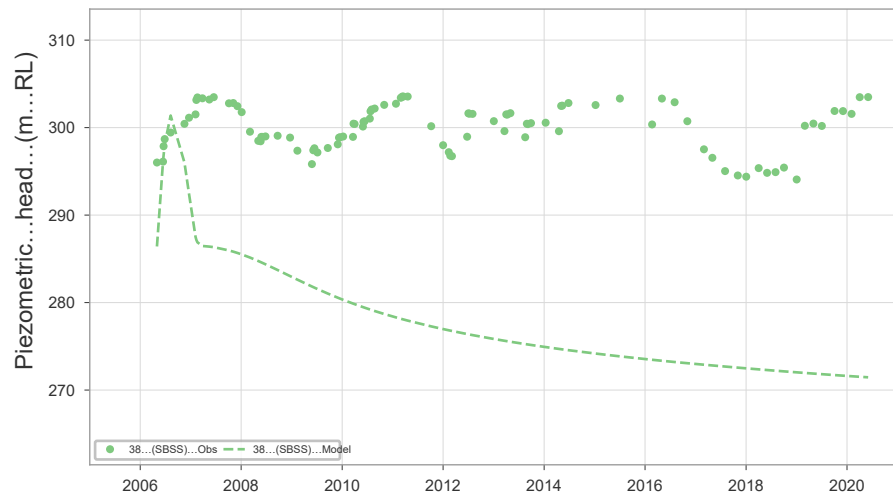
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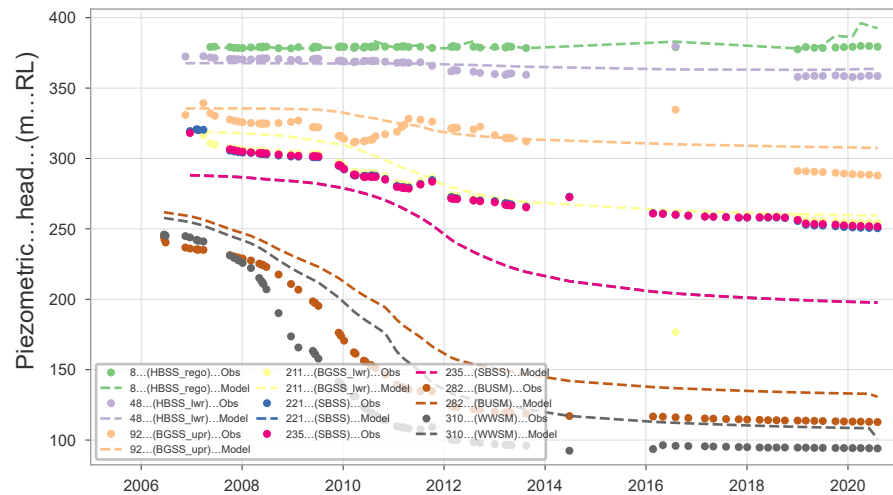
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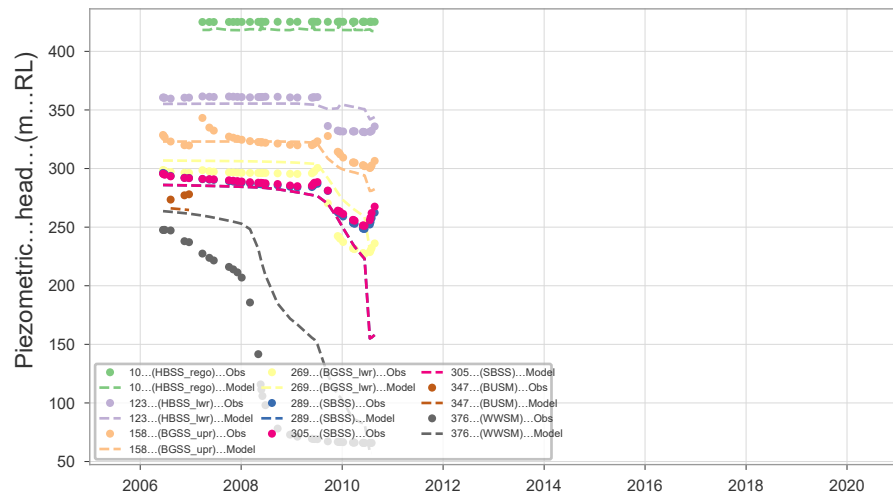
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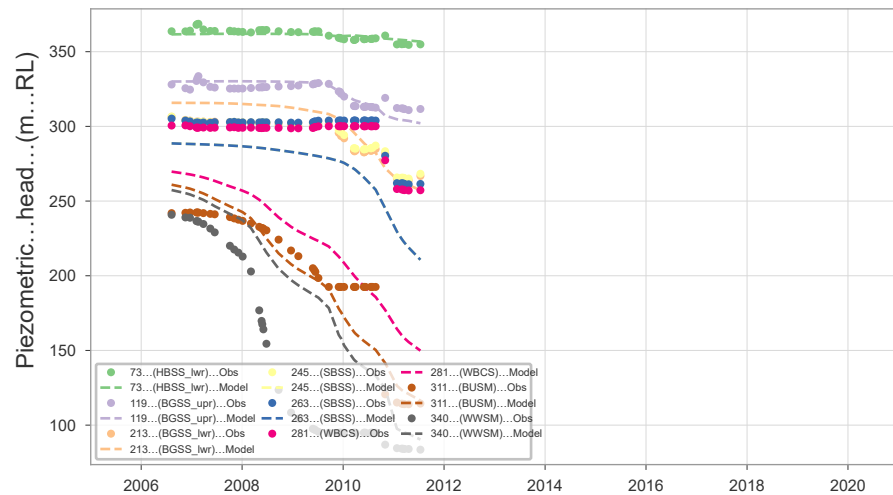
Dendrobium...S1888



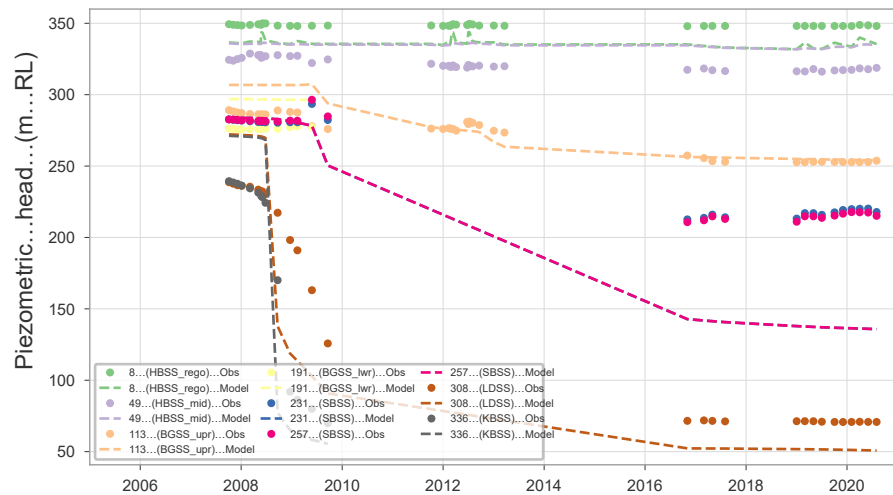
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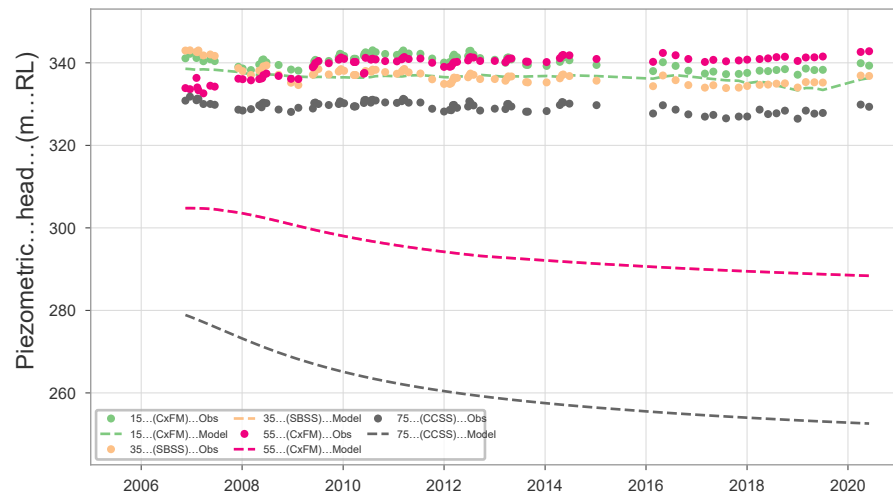
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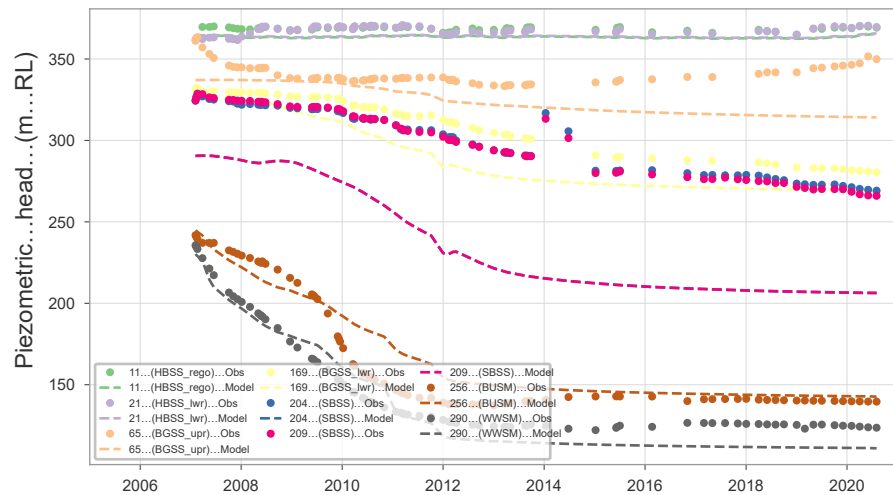
Dendrobium...S1892



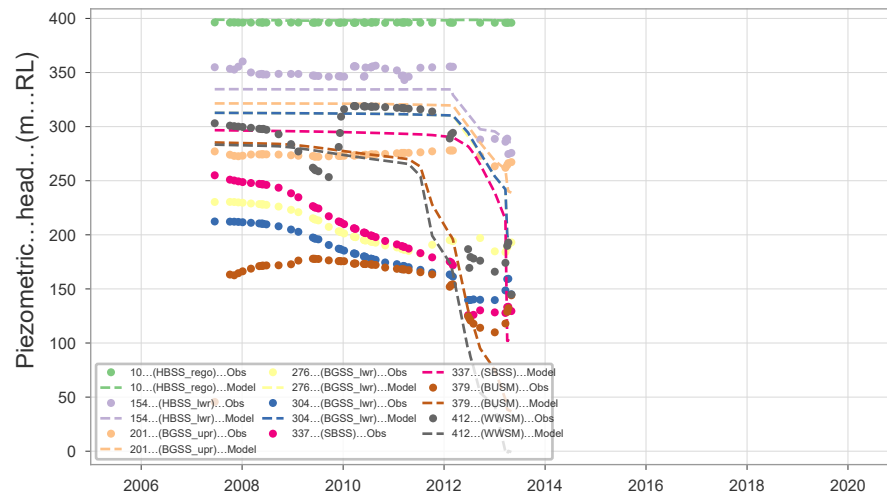
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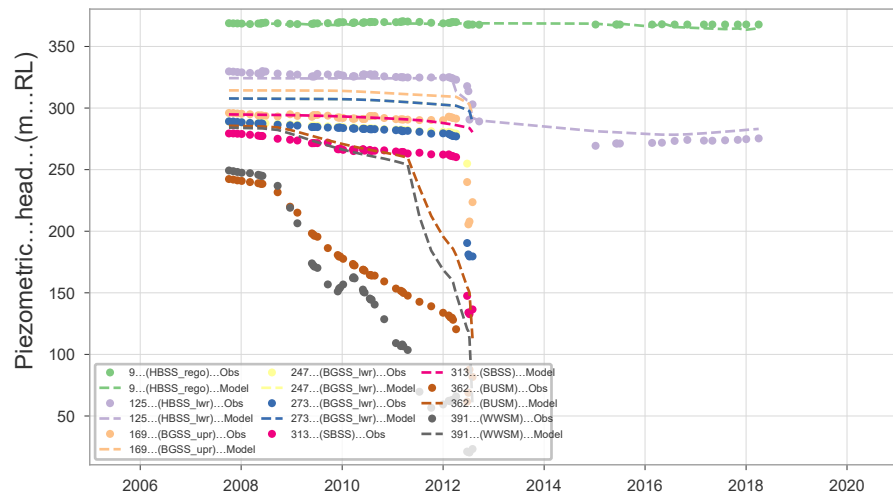
Dendrobium...S1907



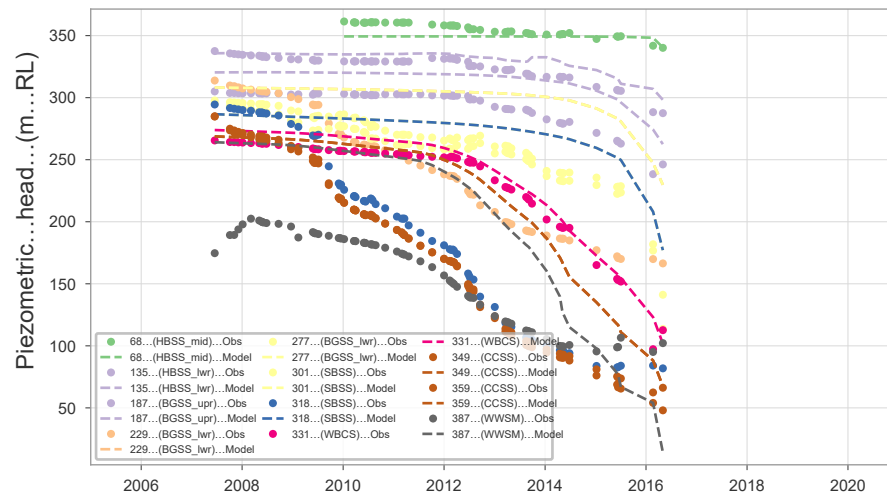
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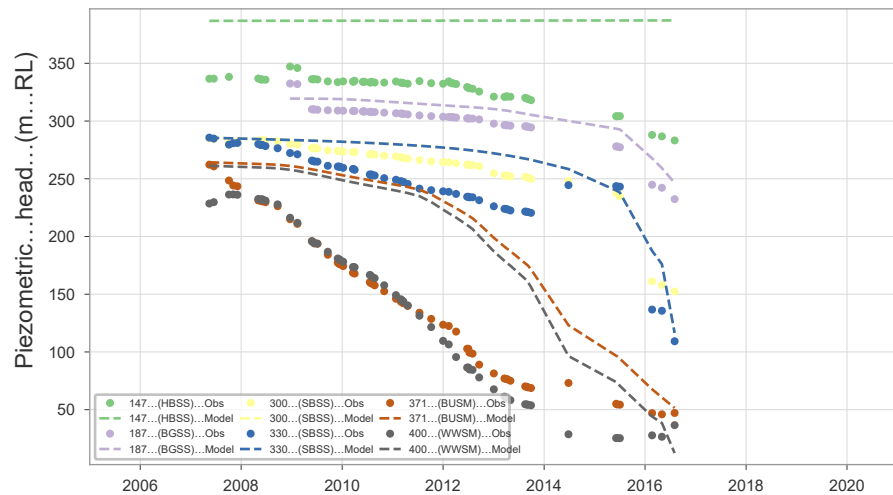
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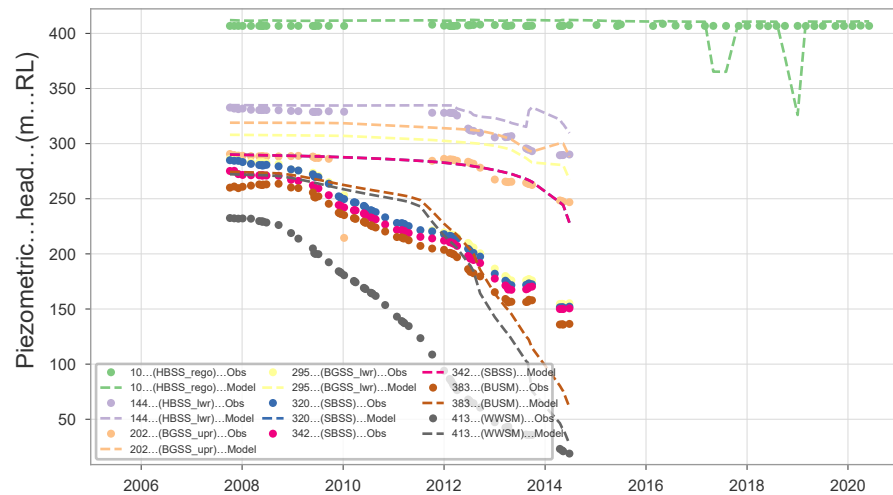
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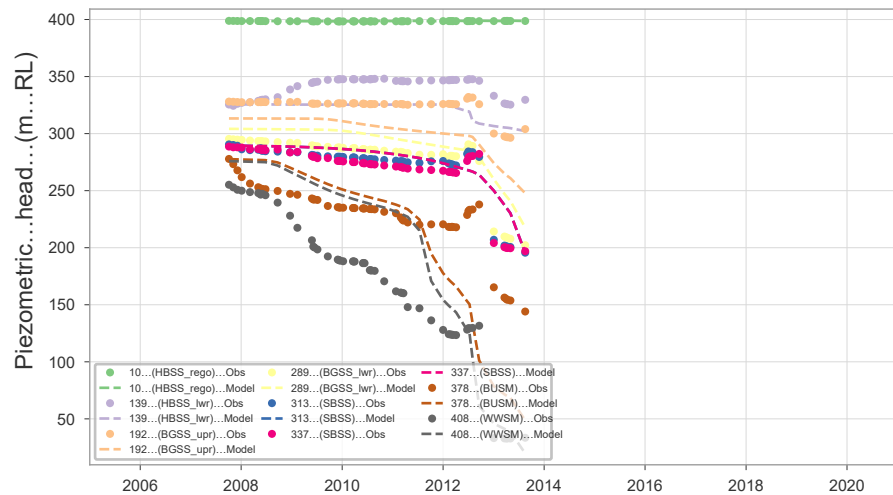
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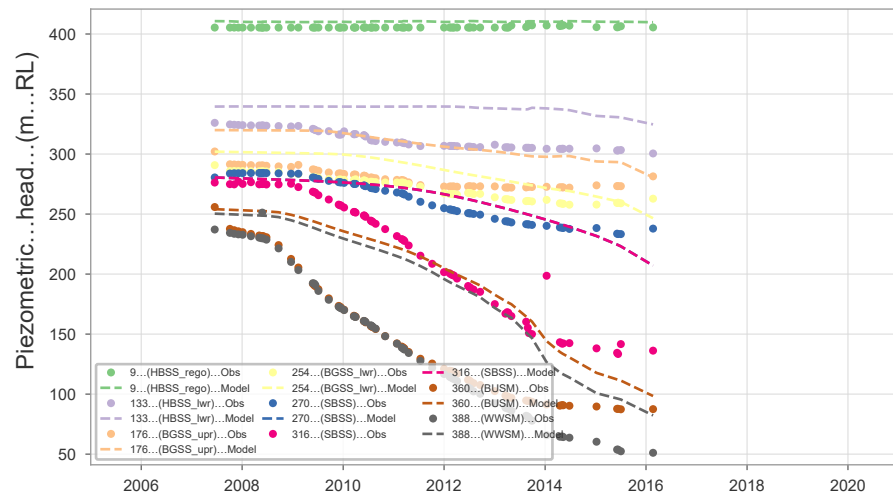
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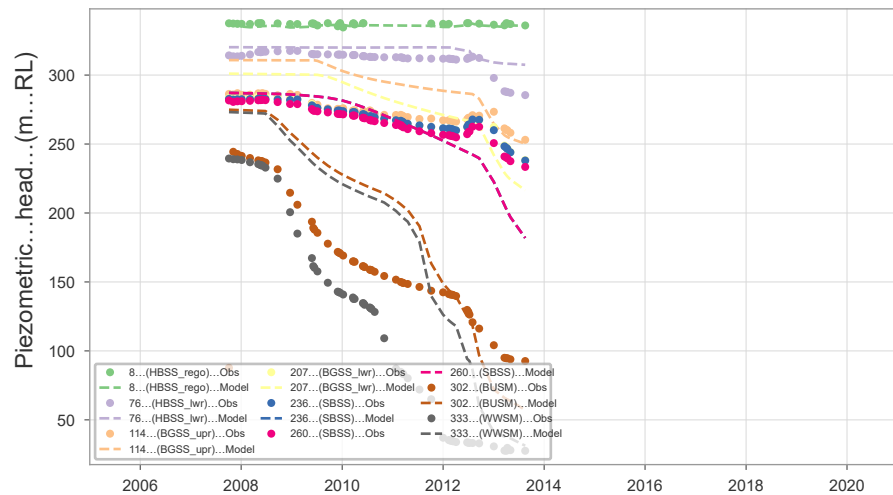
Dendrobium...S1926



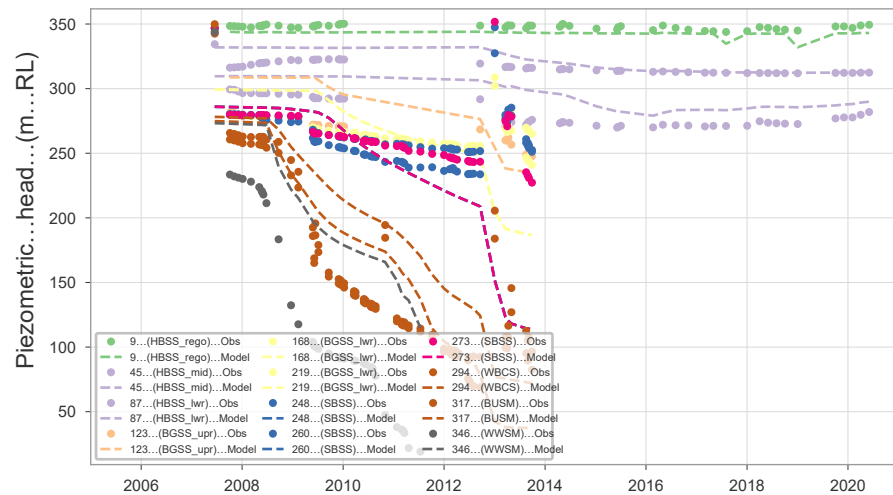
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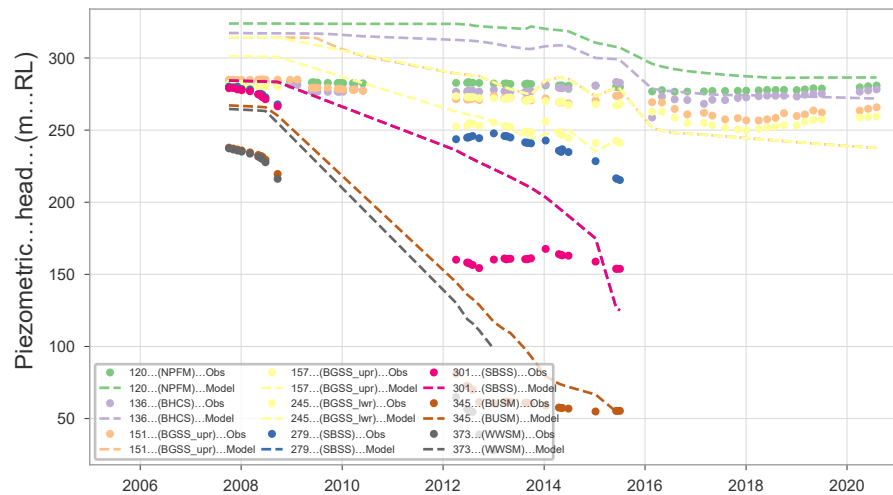
Dendrobium...S1929



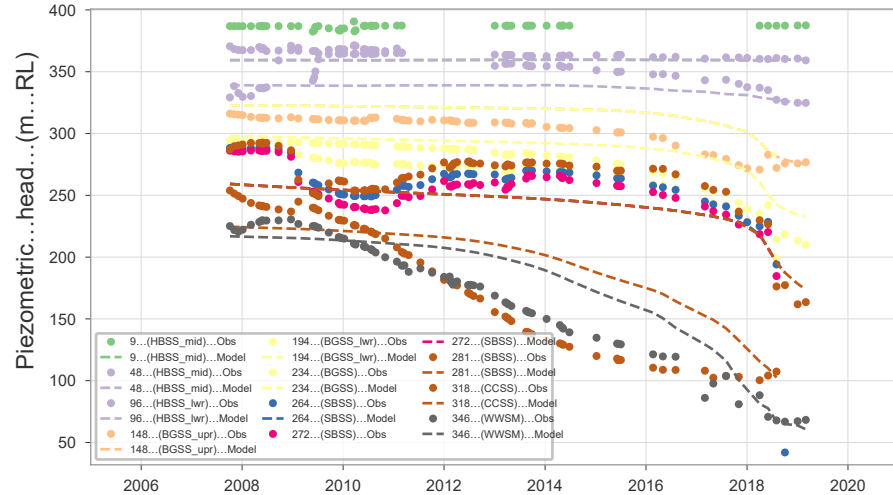
Dendrobium...S1930



Dendrobium...S1931

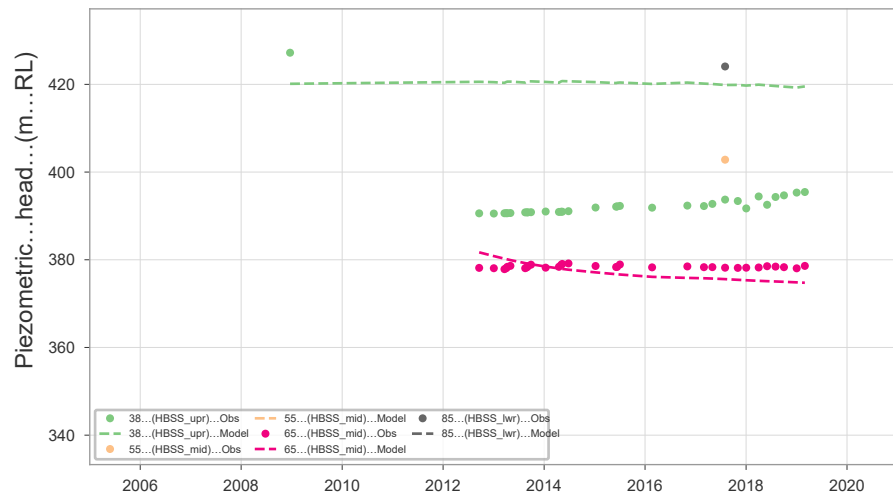


Dendrobium...S1932

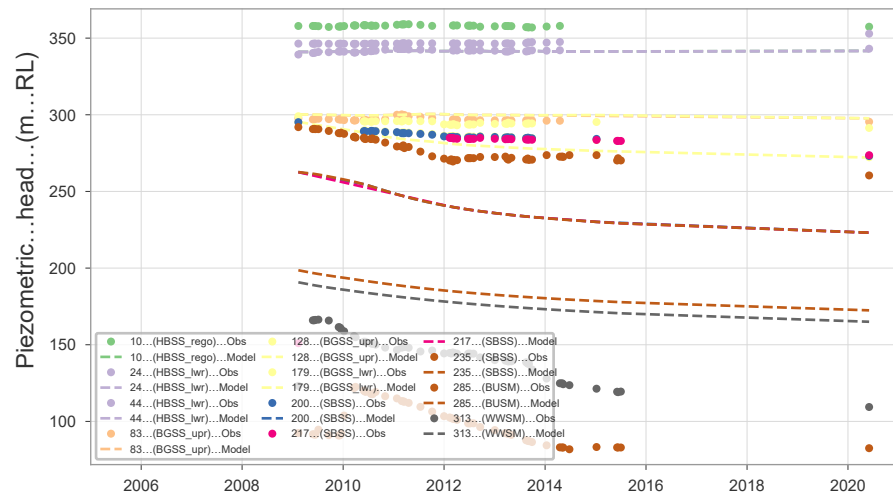




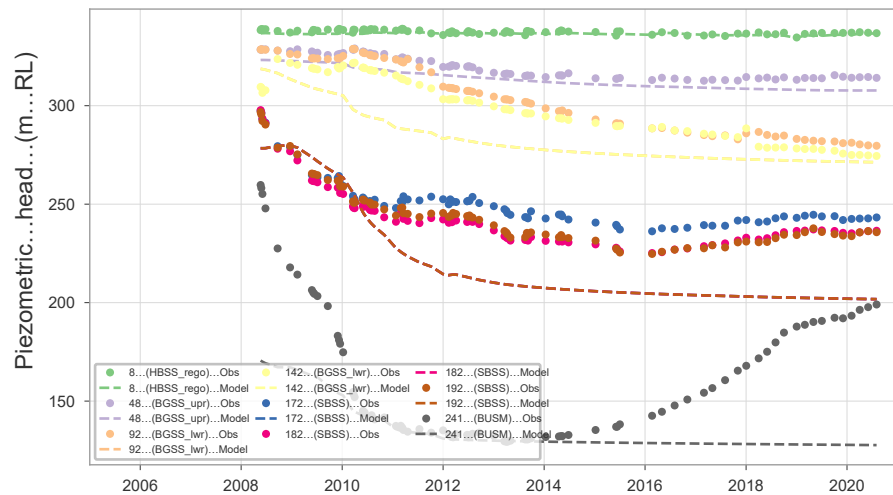
Dendrobium...S1934



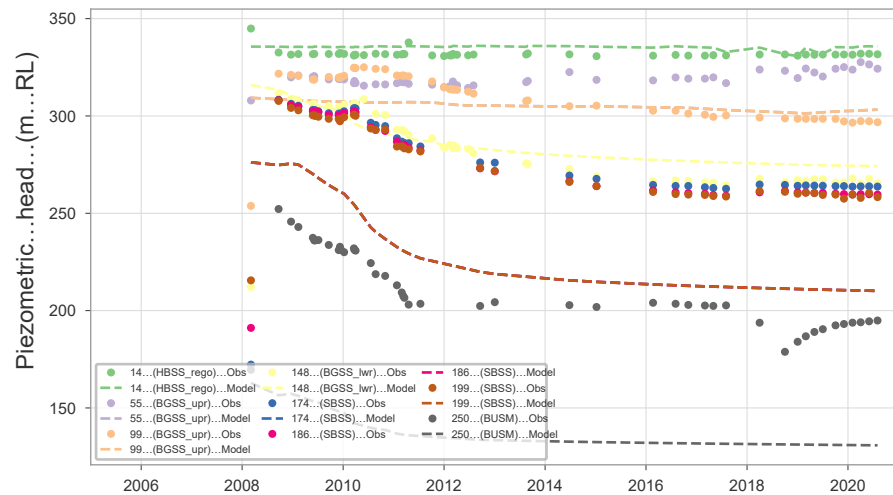
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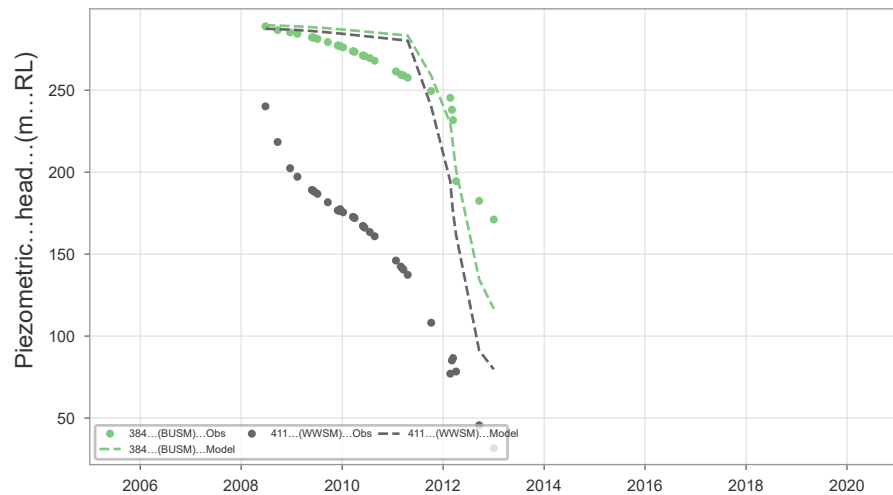
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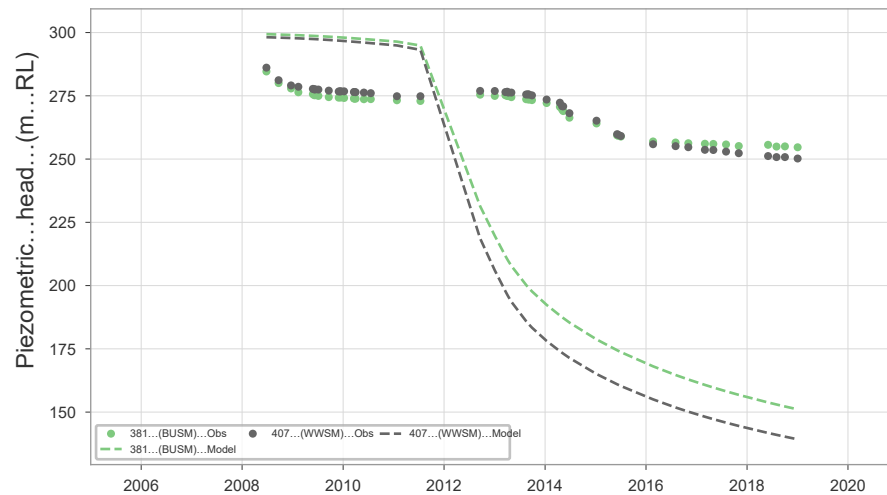
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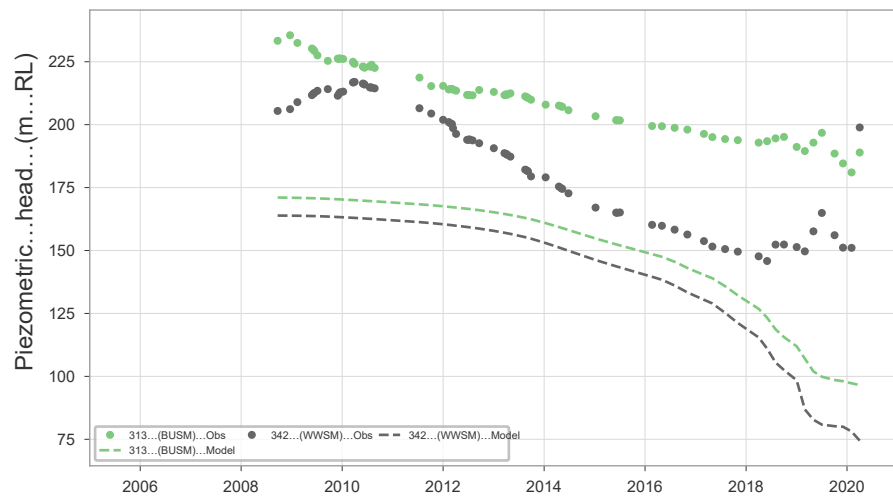
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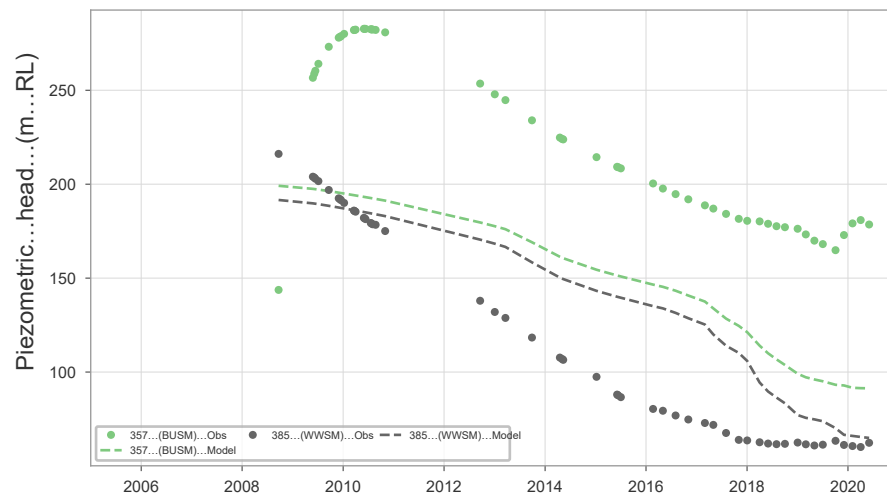
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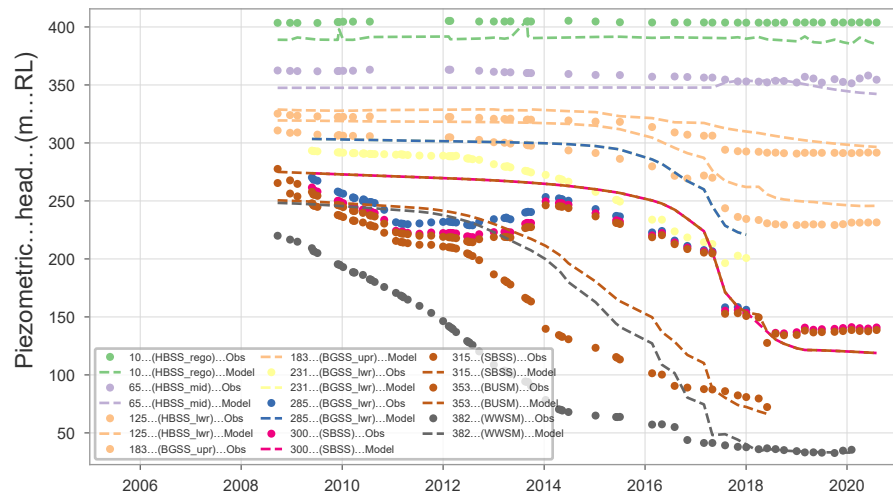
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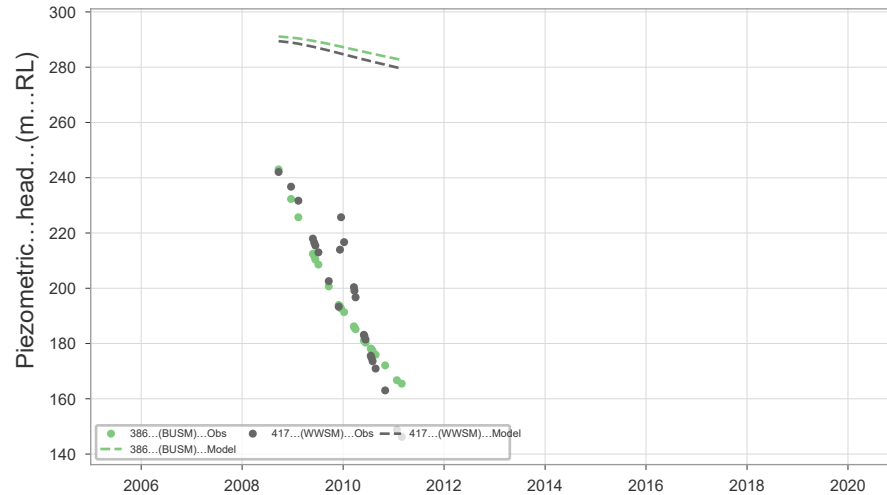
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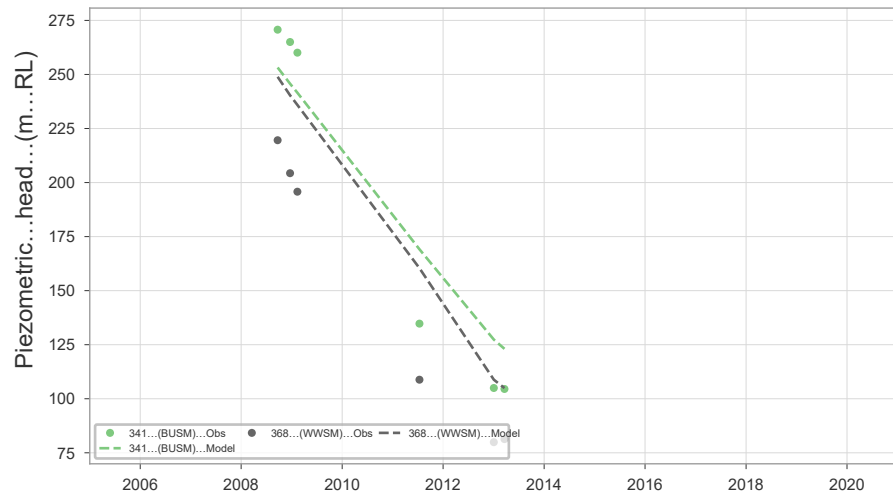
Dendrobium...S2001



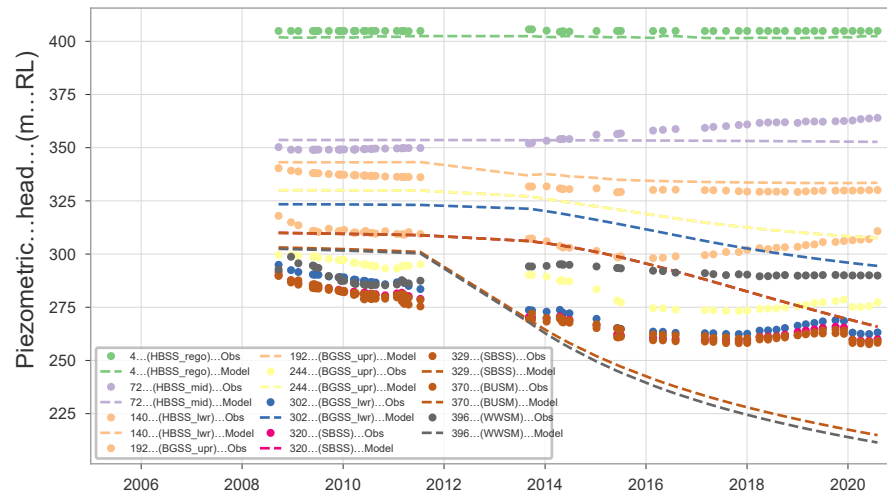
Dendrobium...S2002



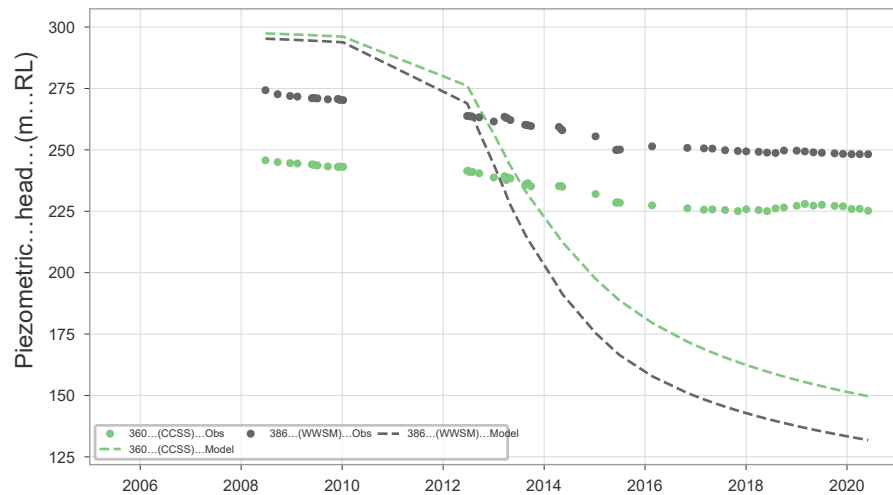
Dendrobium...S2003



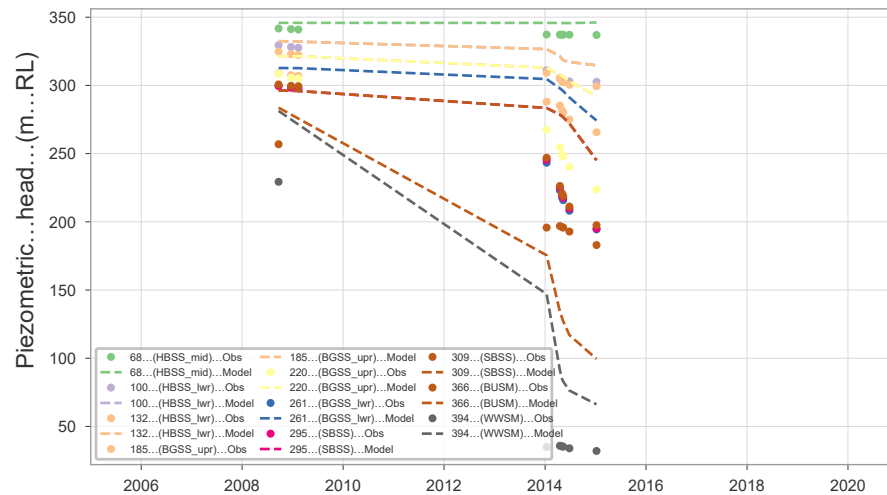
Dendrobium...S2006



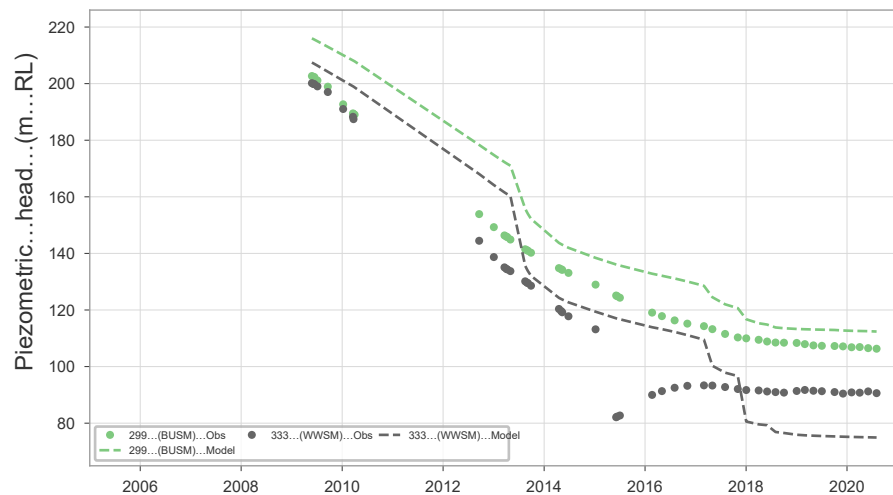
Dendrobium...S2007



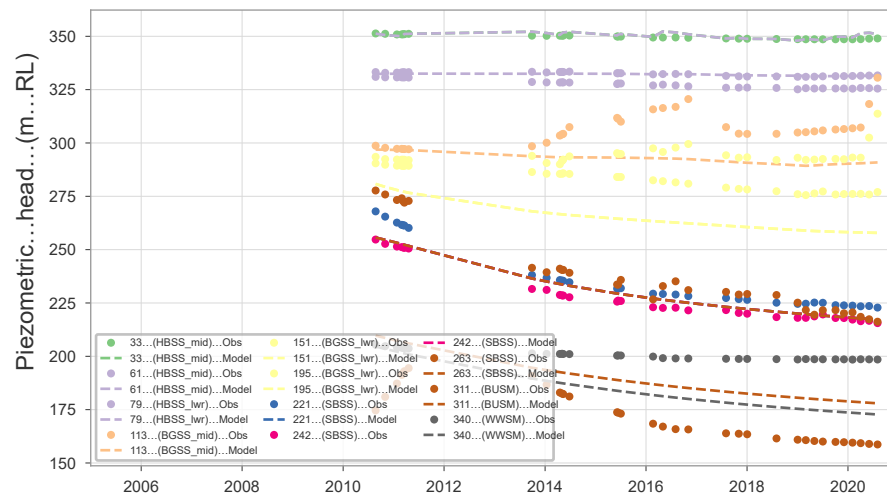
Dendrobium...S2009



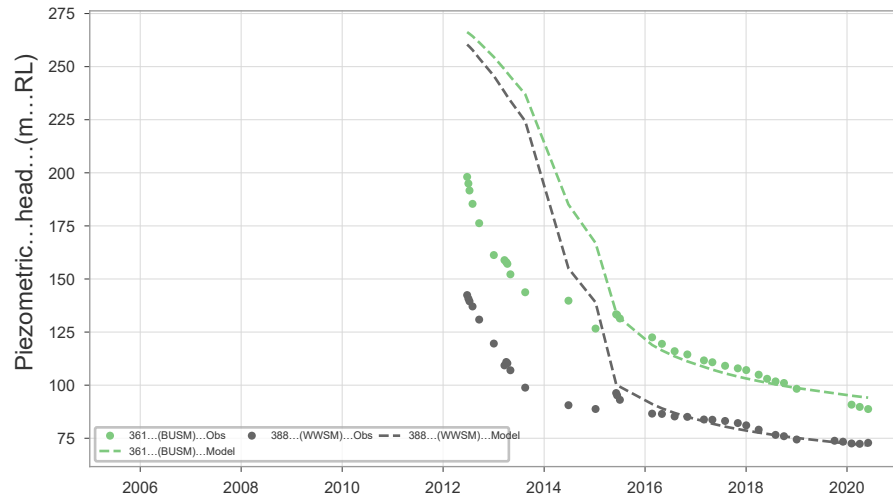
Dendrobium...S2013



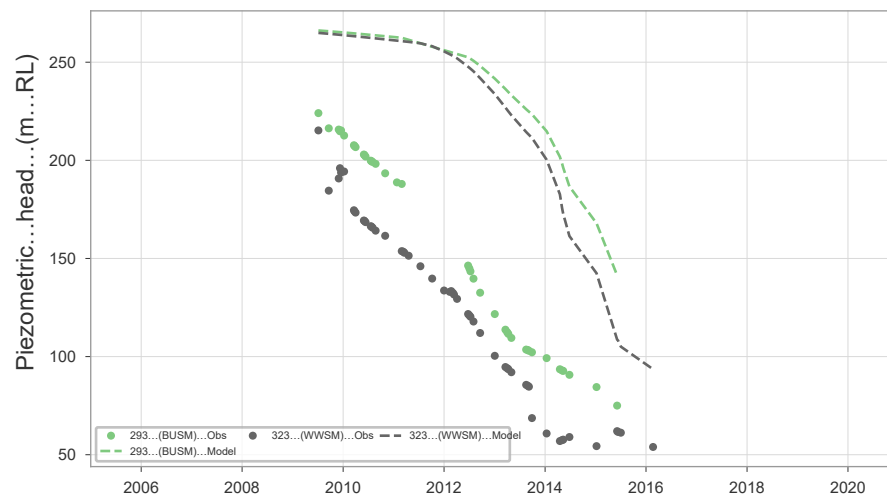
Dendrobium...S2059



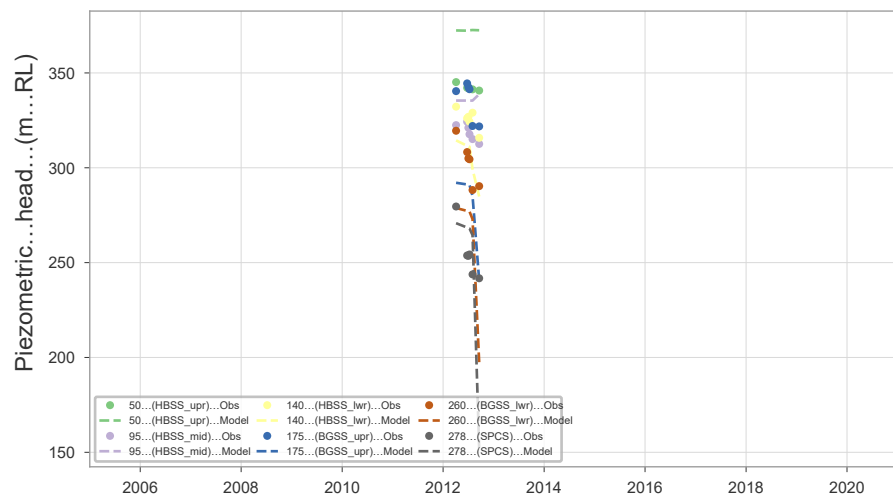
Dendrobium...S2070



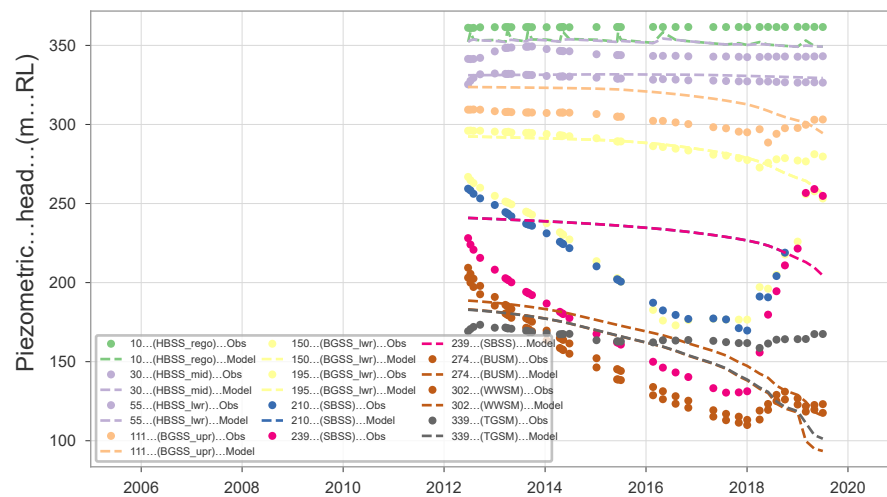
Dendrobium...S2078



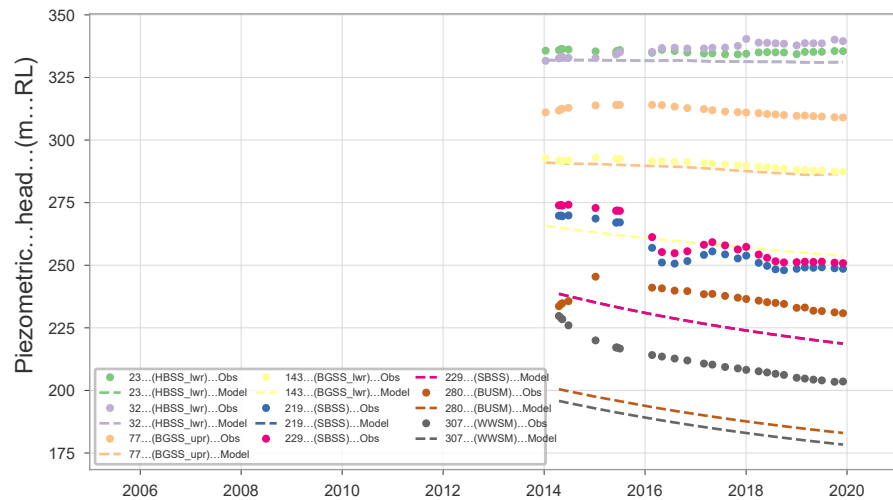
Dendrobium...S2192



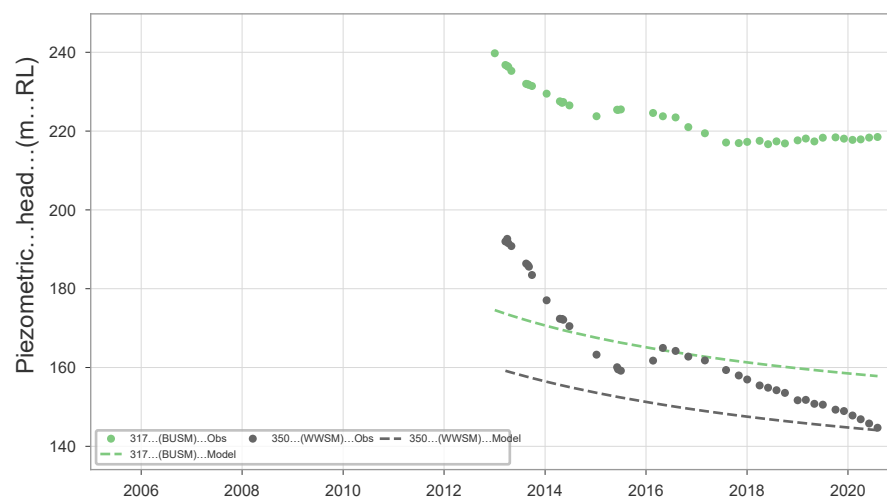
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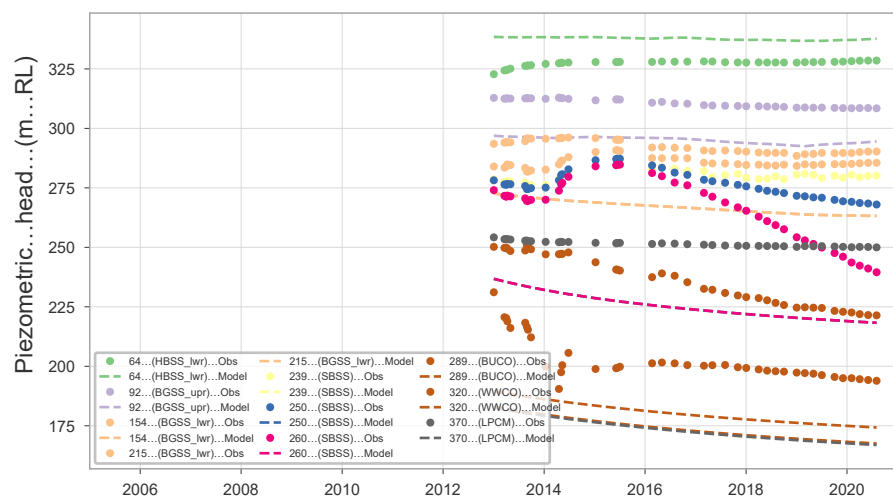
Dendrobium...S2208



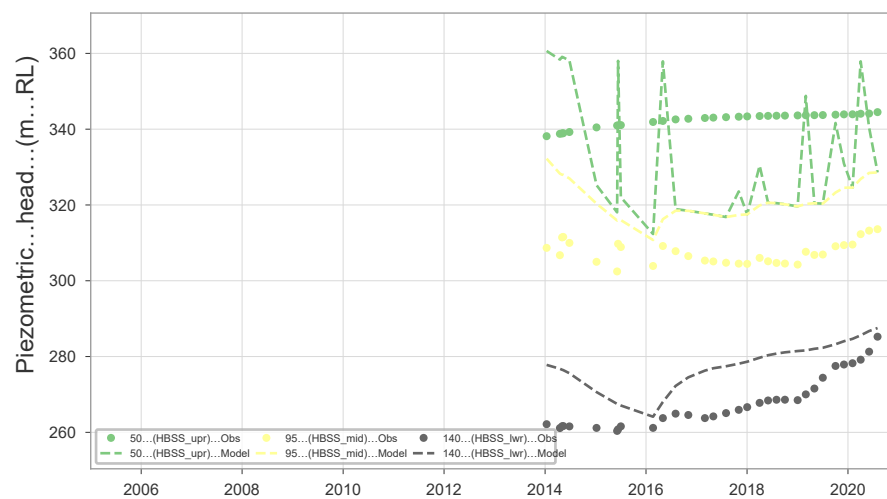
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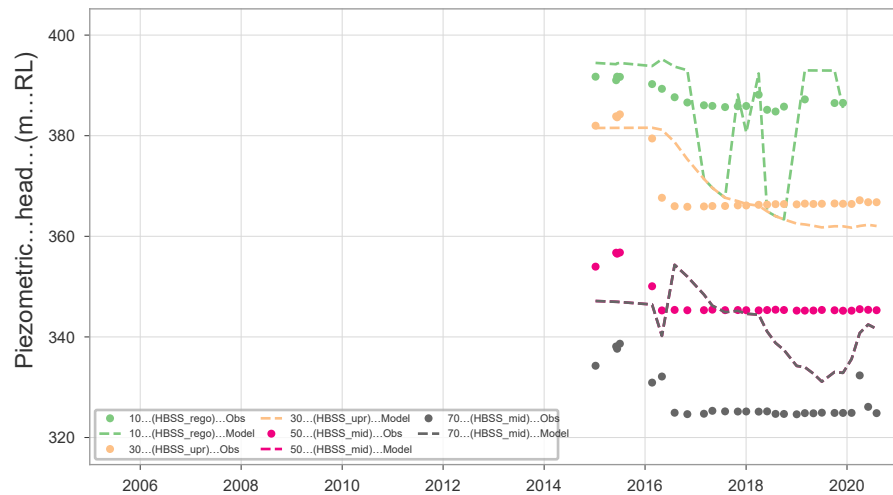
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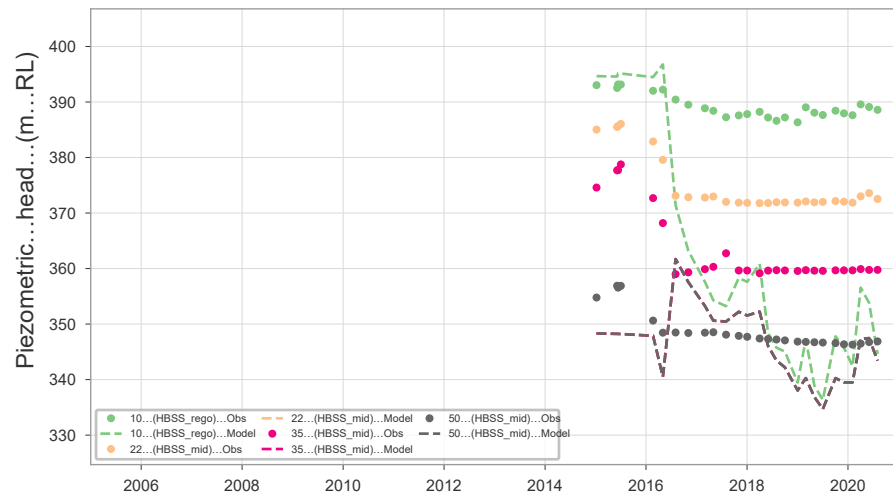
Dendrobium...S2220



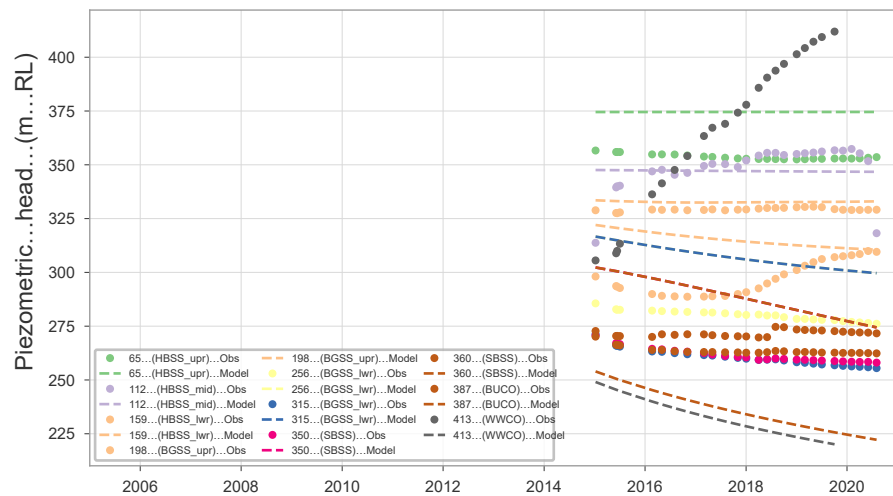
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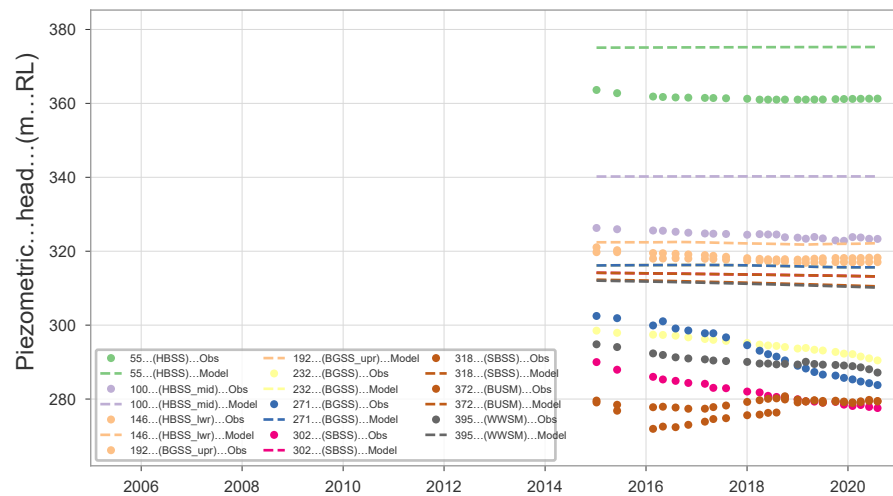
Dendrobium...S2307



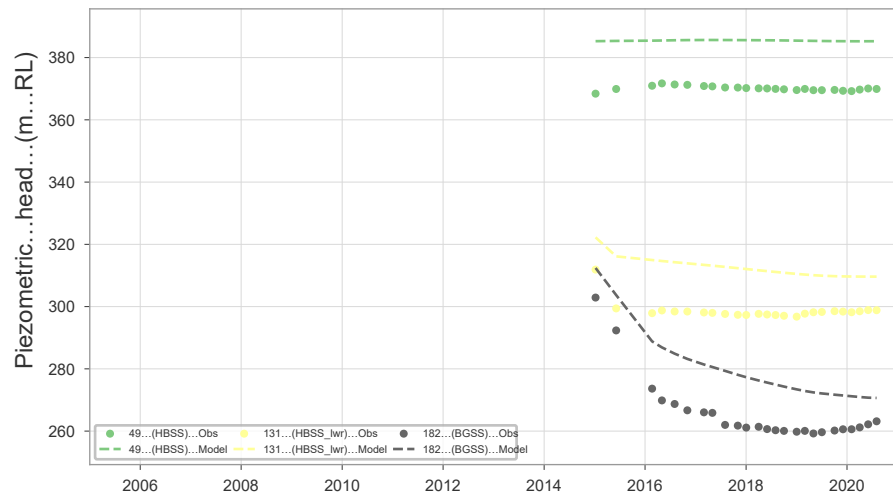
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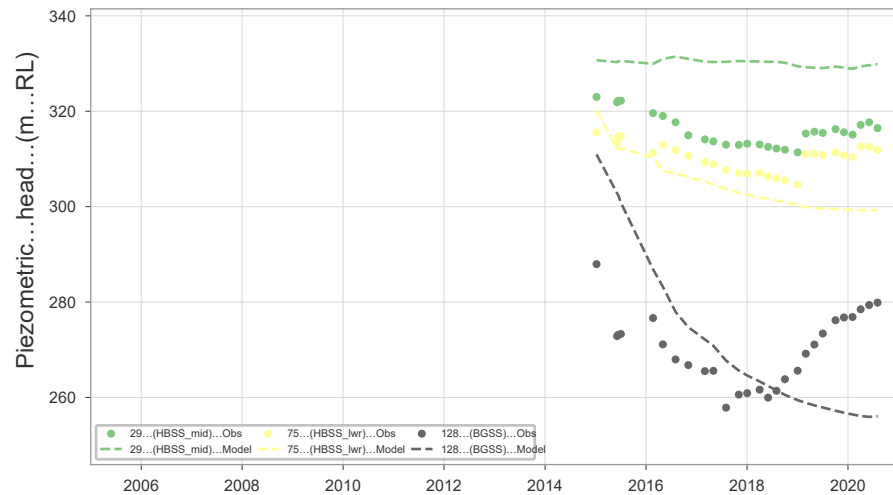
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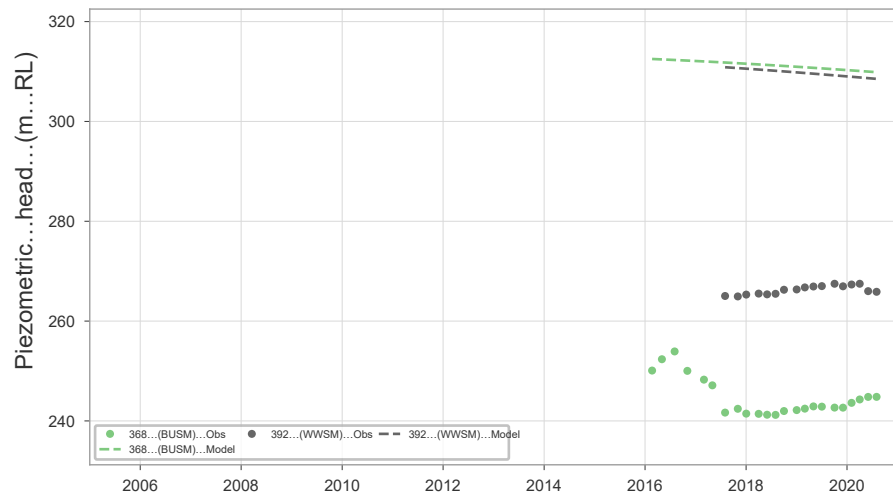
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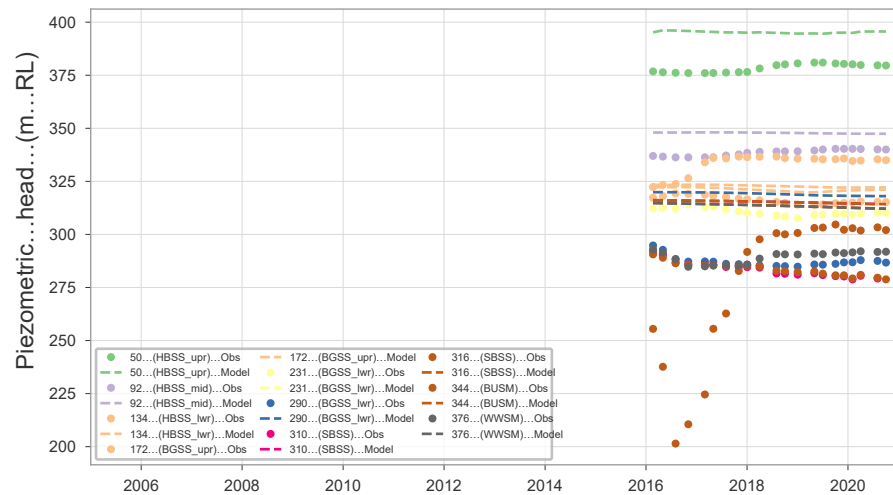
Dendrobium...S2314



Dendrobium...S2321

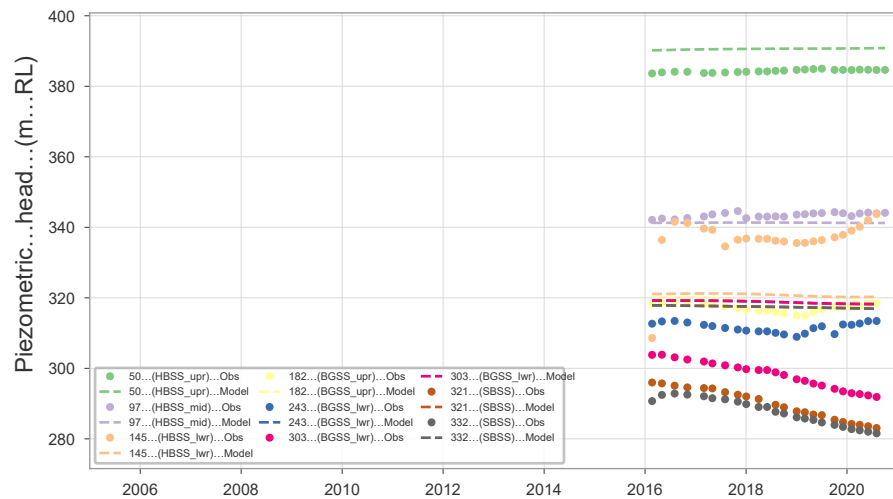


Dendrobium...S2324

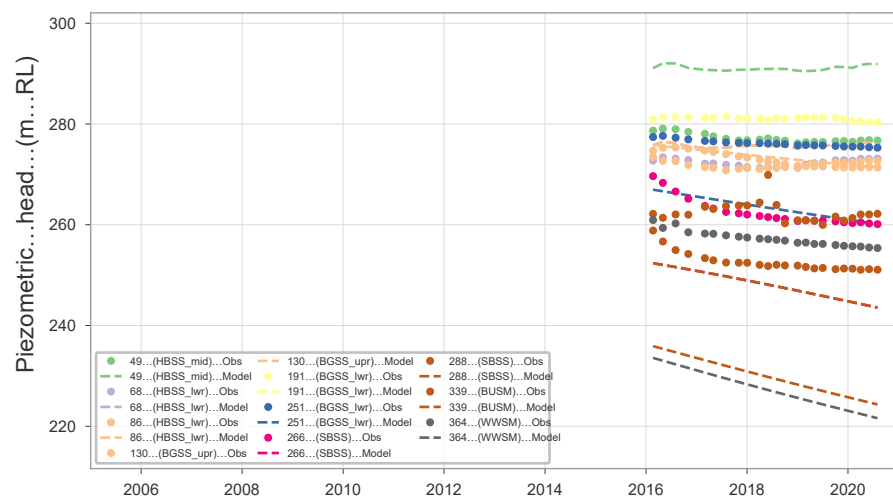




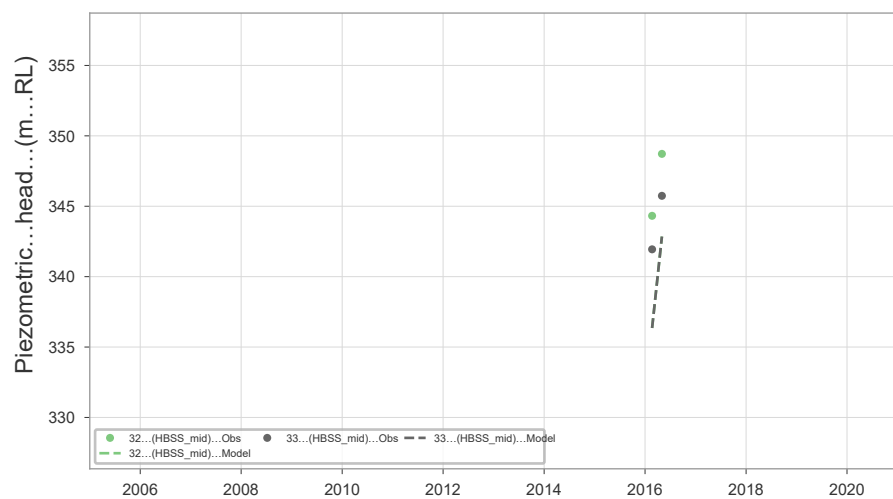
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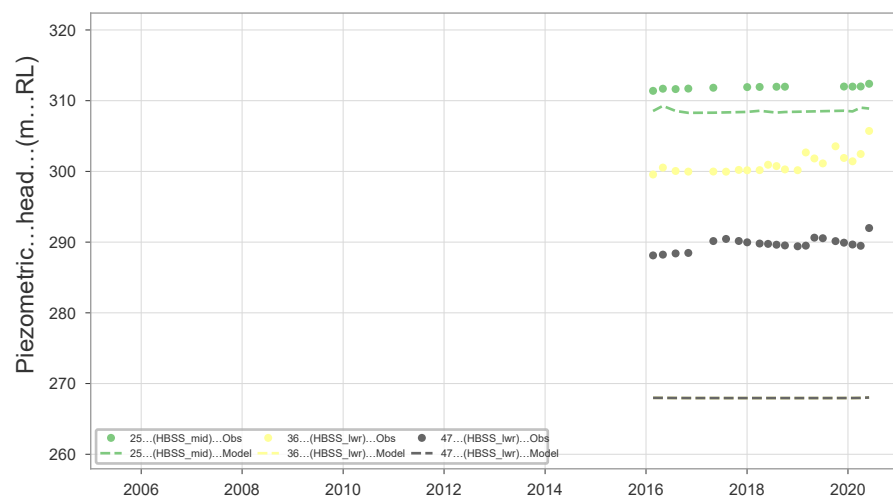
Dendrobium...S2333



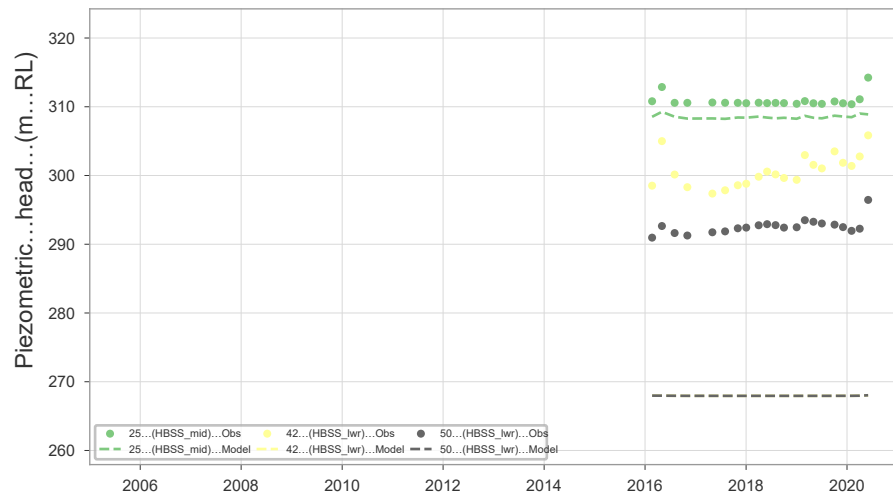
Dendrobium...S2336



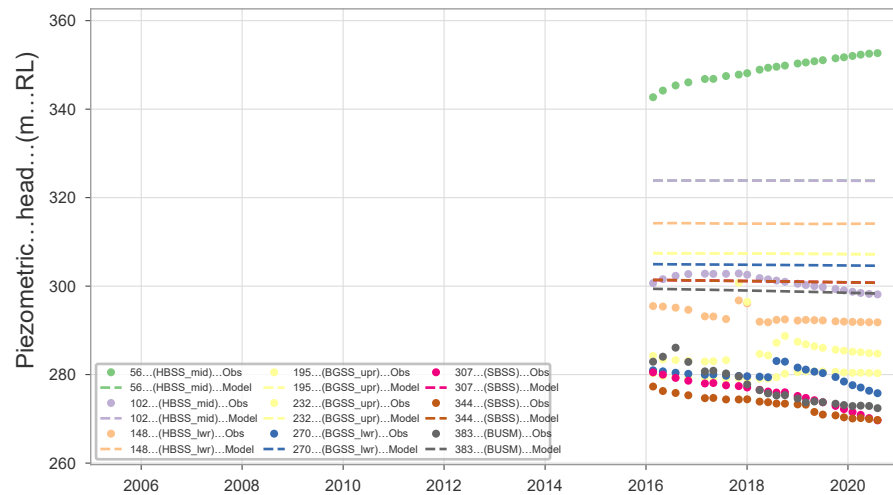
Dendrobium...S2337



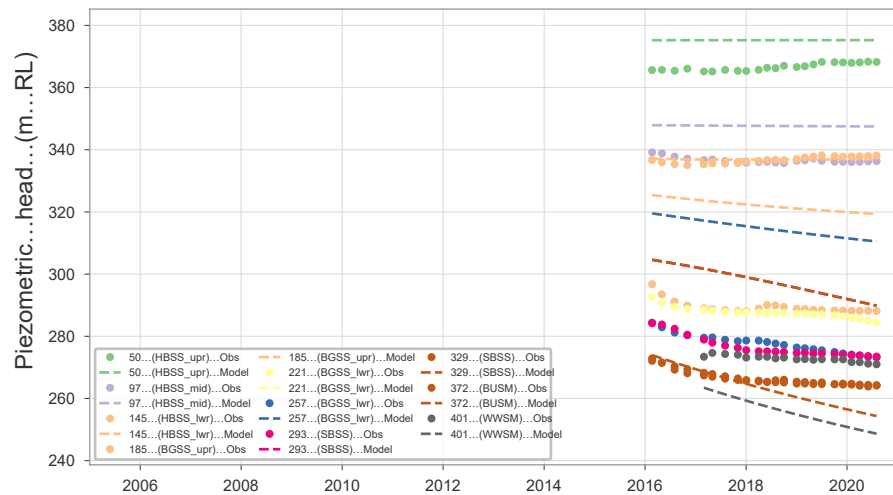
Dendrobium...S2338



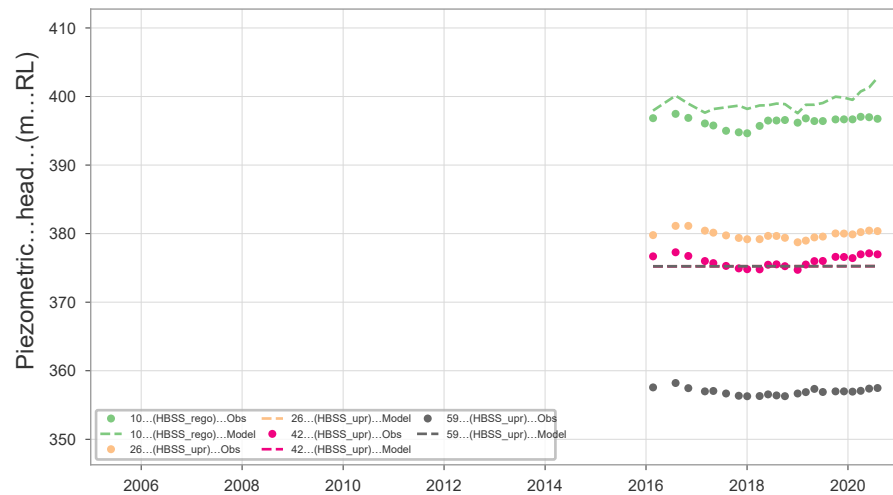
Dendrobium...S2340



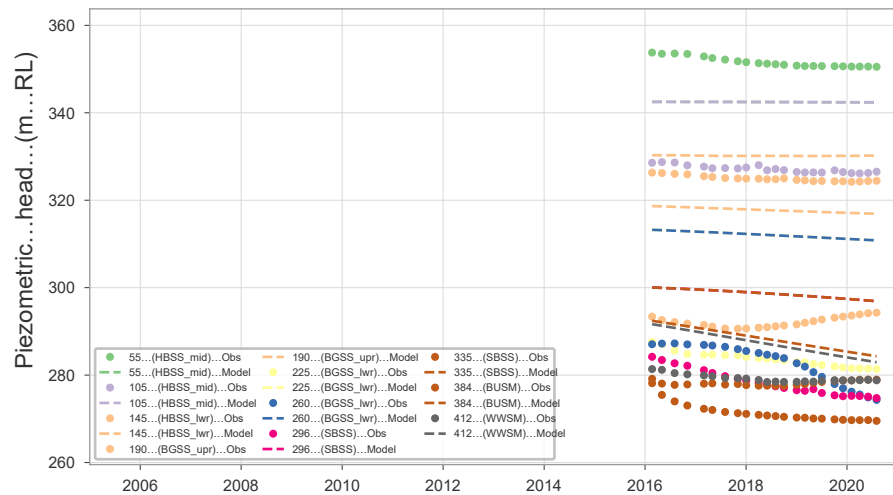
Dendrobium...S2341



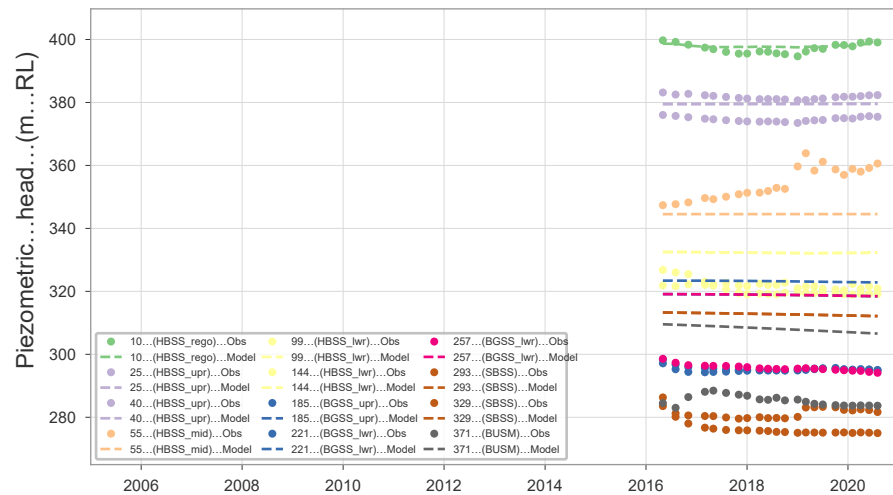
Dendrobium...S2341A



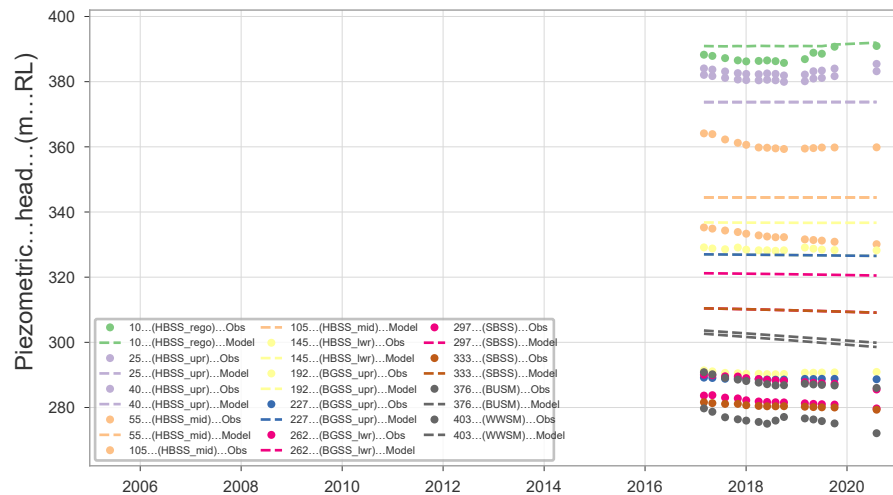
Dendrobium...S2342



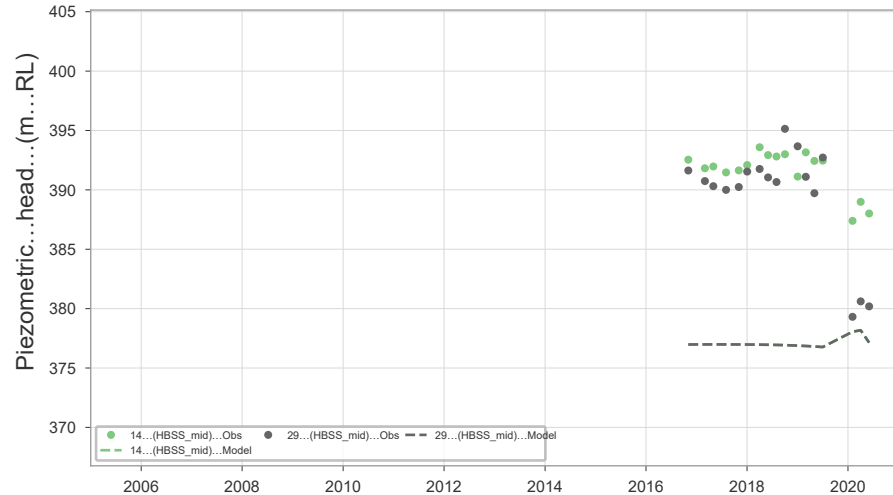
Dendrobium...S2345



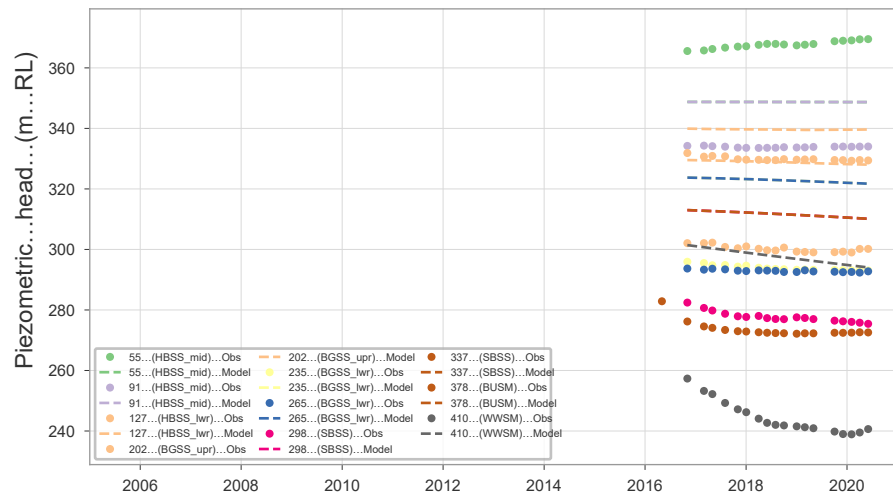
Dendrobium...S2348



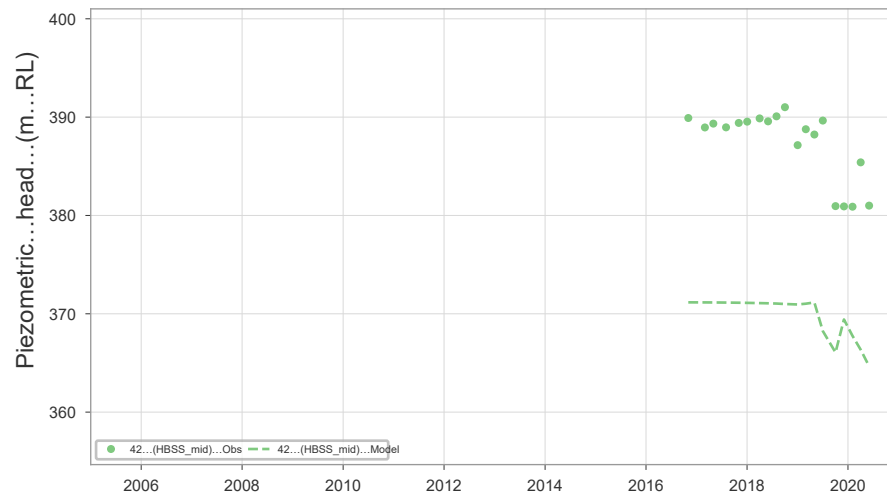
Dendrobium...S2351



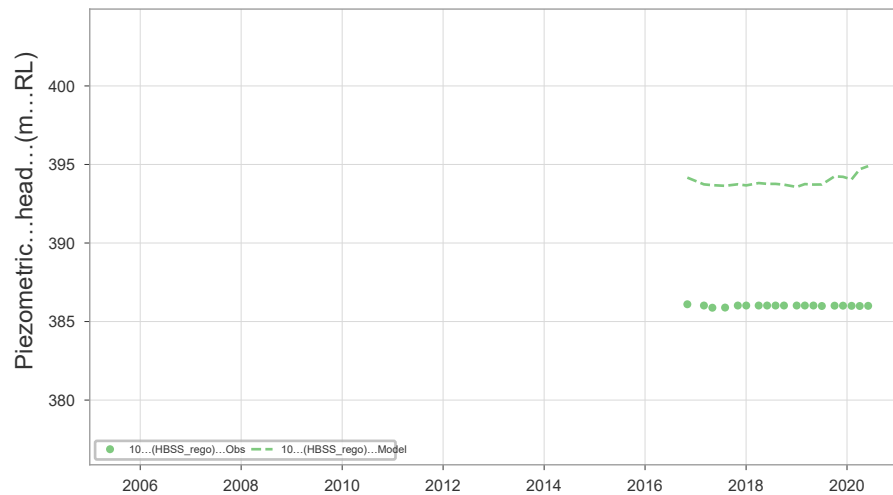
Dendrobium...S2352



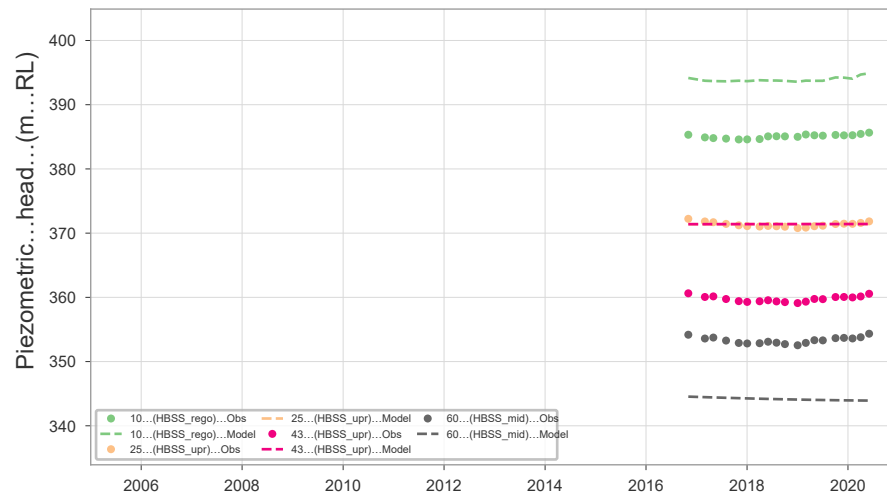
Dendrobium...S2354



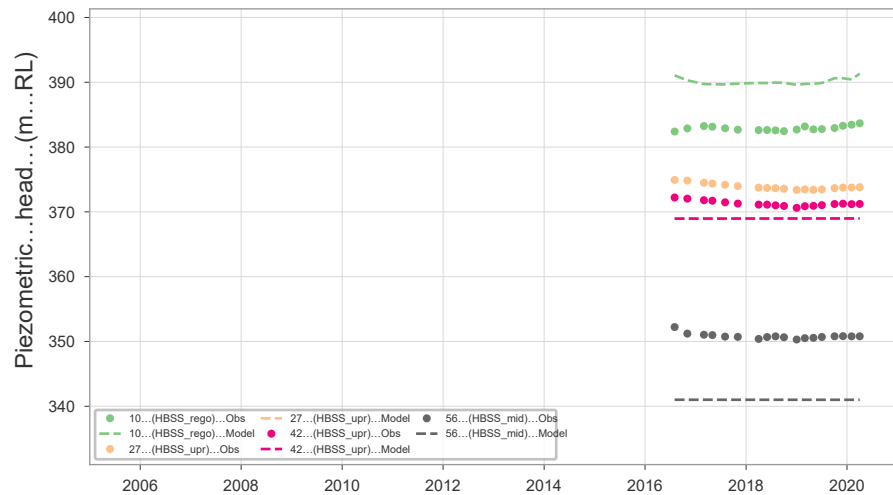
Dendrobium...S2355A



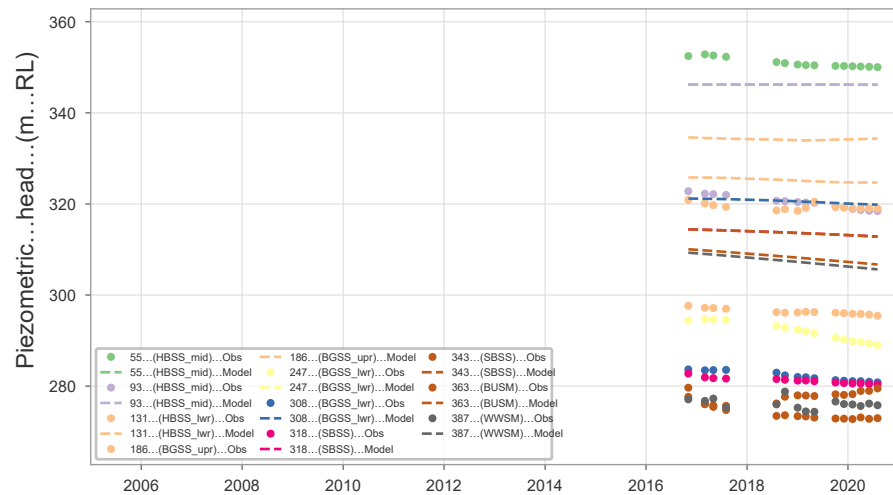
Dendrobium...S2355



Dendrobium...S2357



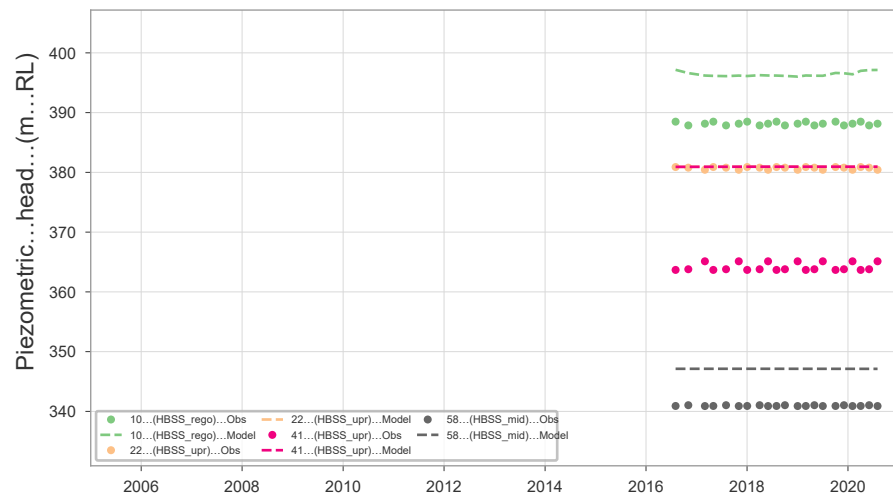
Dendrobium...S2359



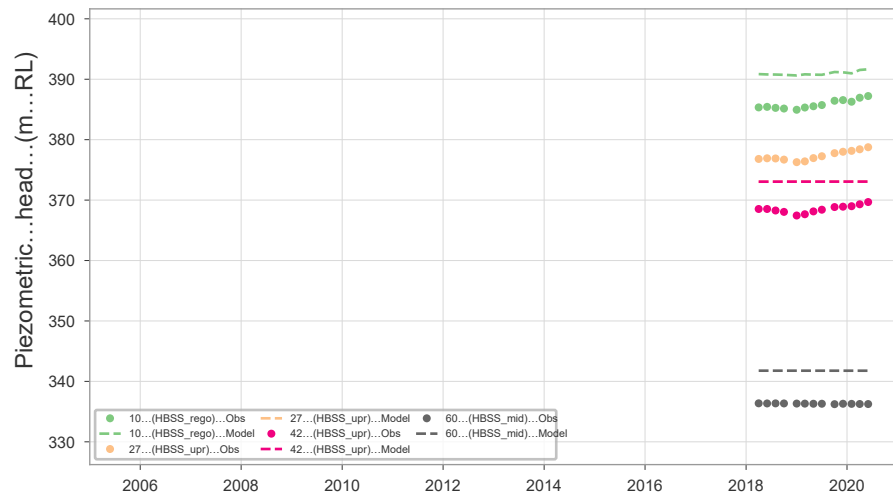
Dendrobium...S2361



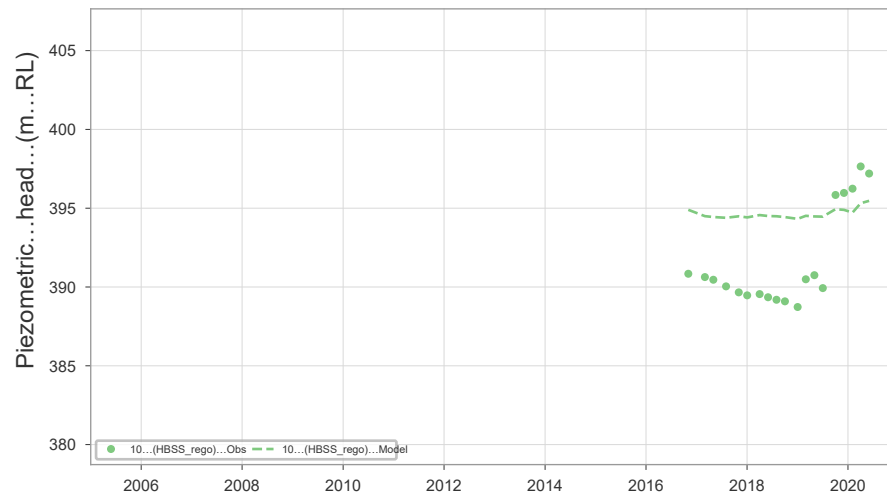
Dendrobium...S2362



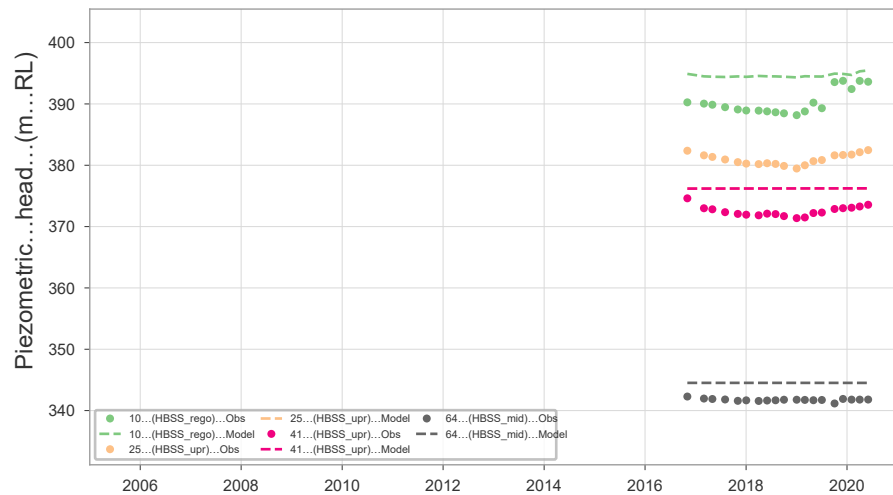
Dendrobium...S2364



Dendrobium...S2365A



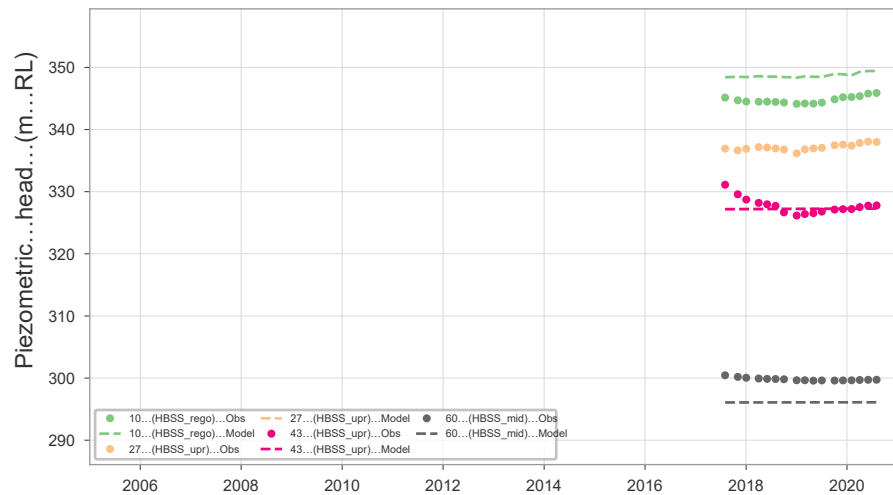
Dendrobium...S2365



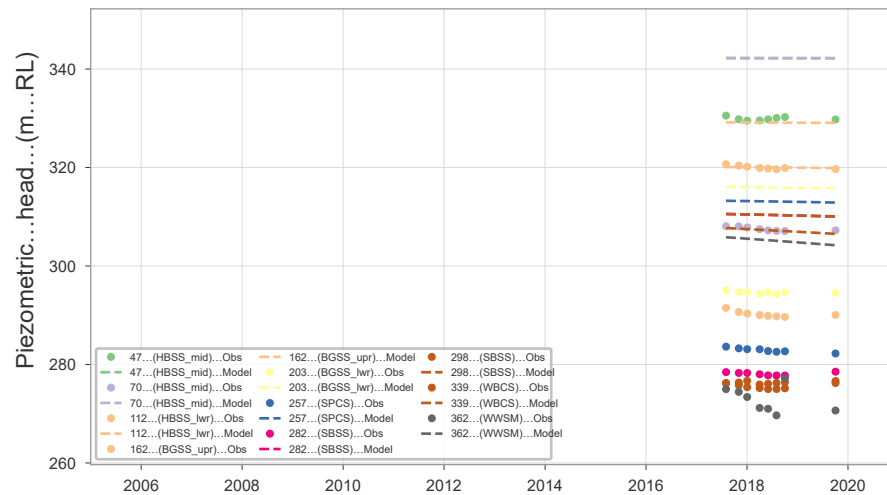
Dendrobium...S2366



Dendrobium...S2367



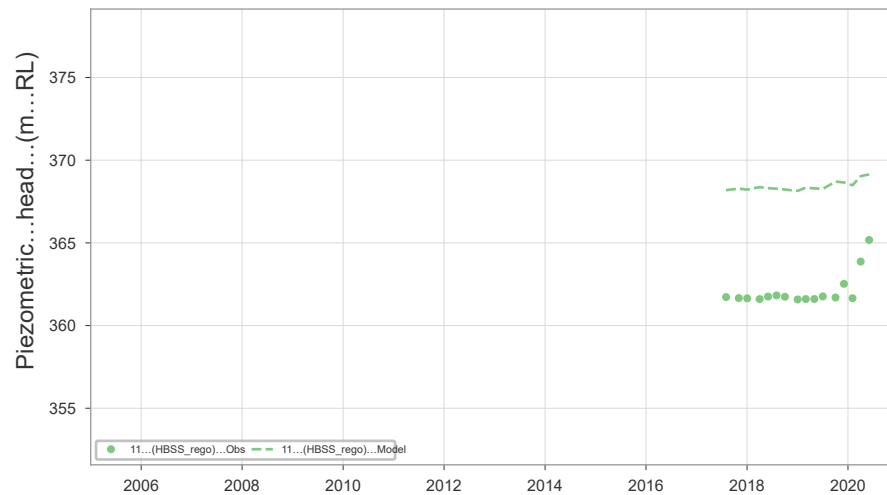
Dendrobium...S2370



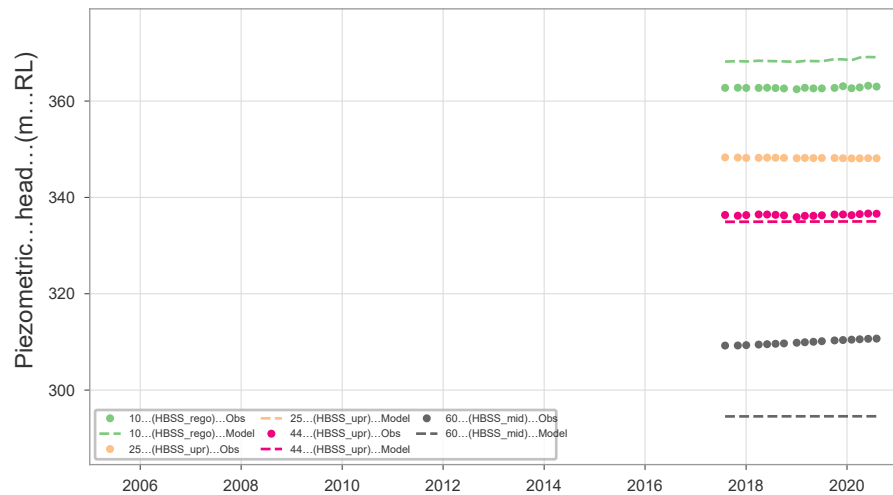
Dendrobium...S2371



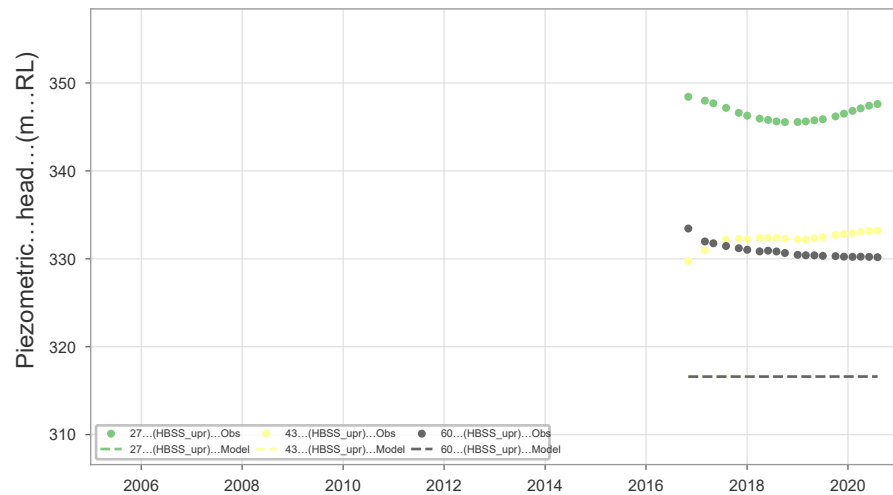
Dendrobium...S2372A



Dendrobium...S2372



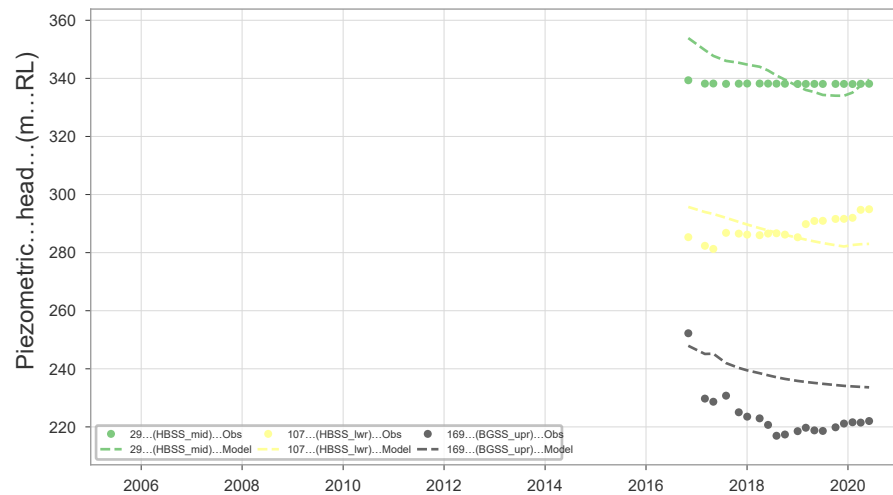
Dendrobium...S2373



Dendrobium...S2374

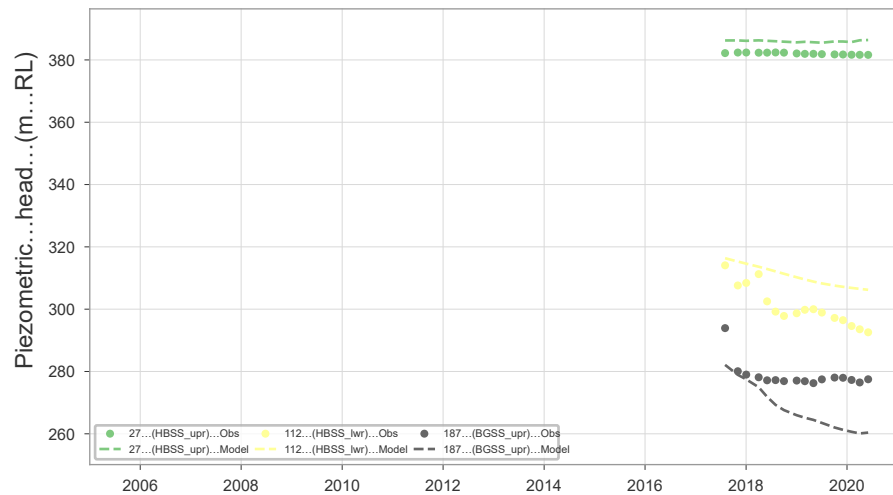


Dendrobium...S2376

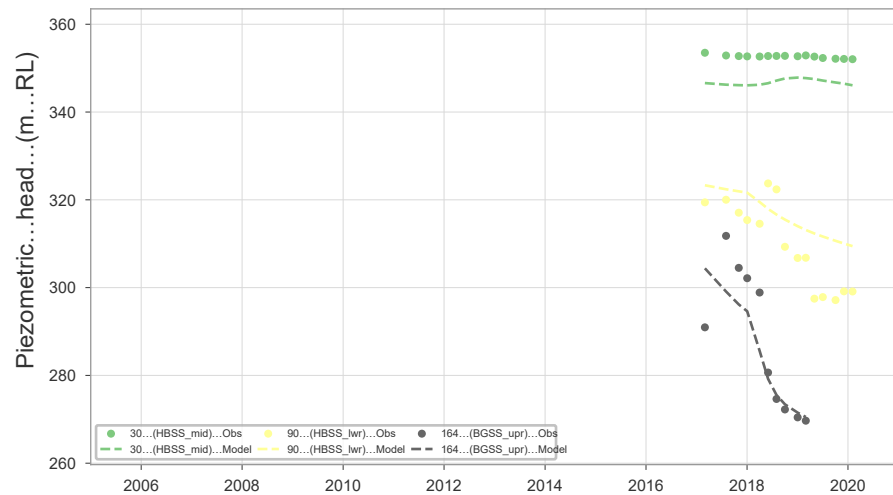




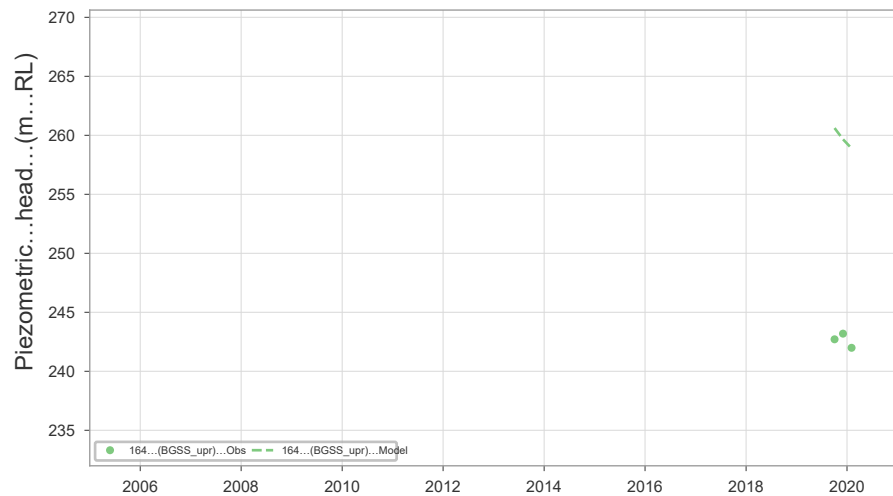
Dendrobium...S2377



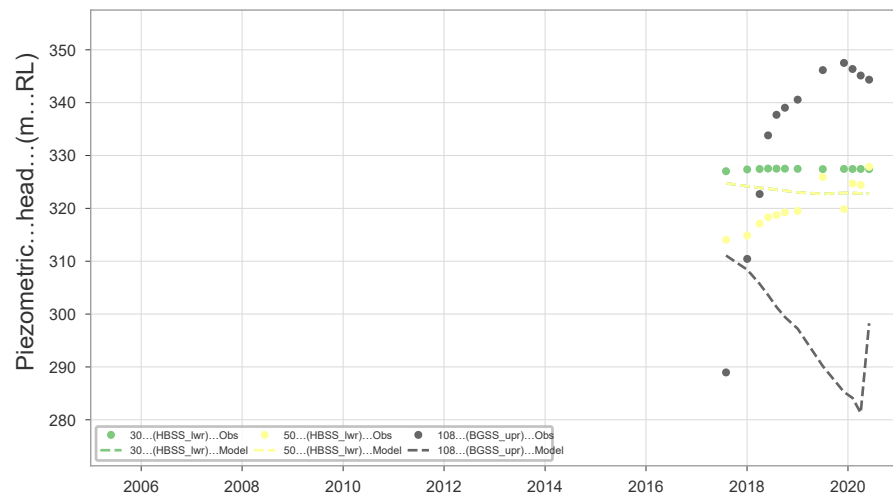
Dendrobium...S2378



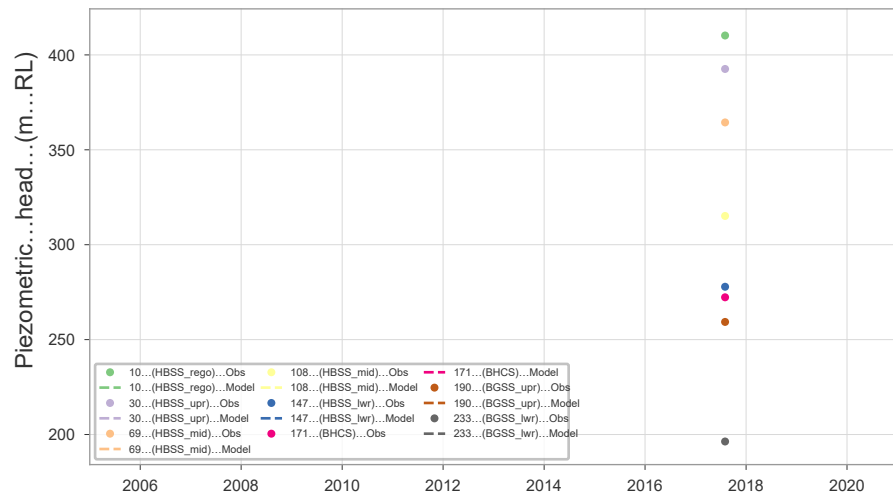
Dendrobium...S2378C



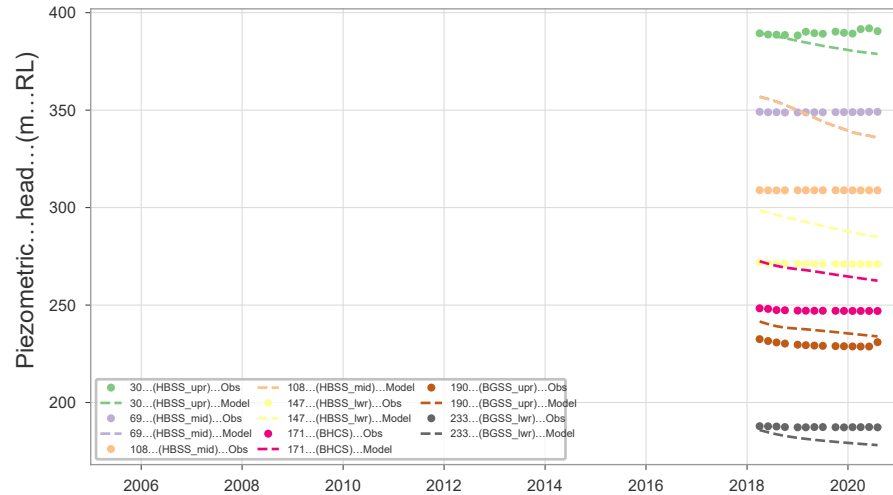
Dendrobium...S2379



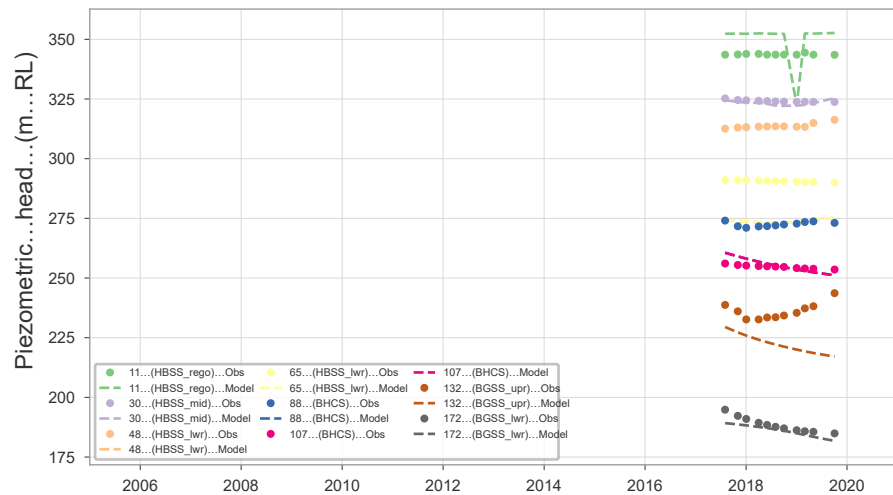
Dendrobium...S2398



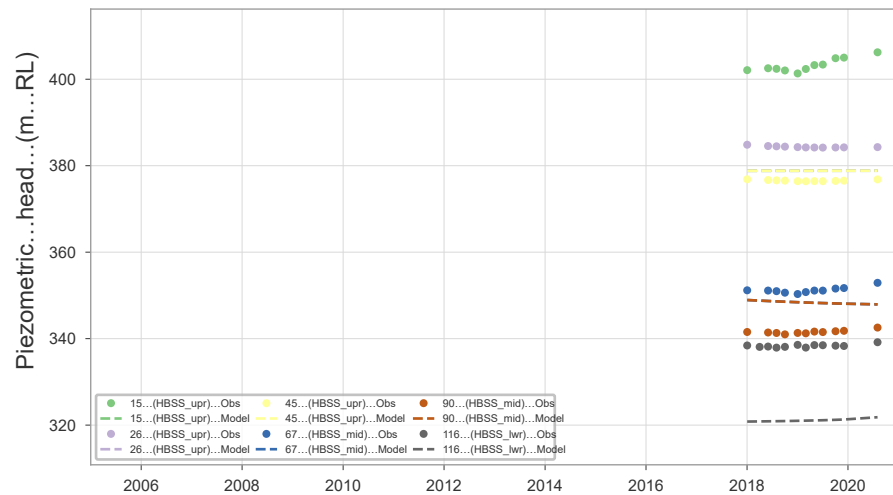
Dendrobium...S2398B



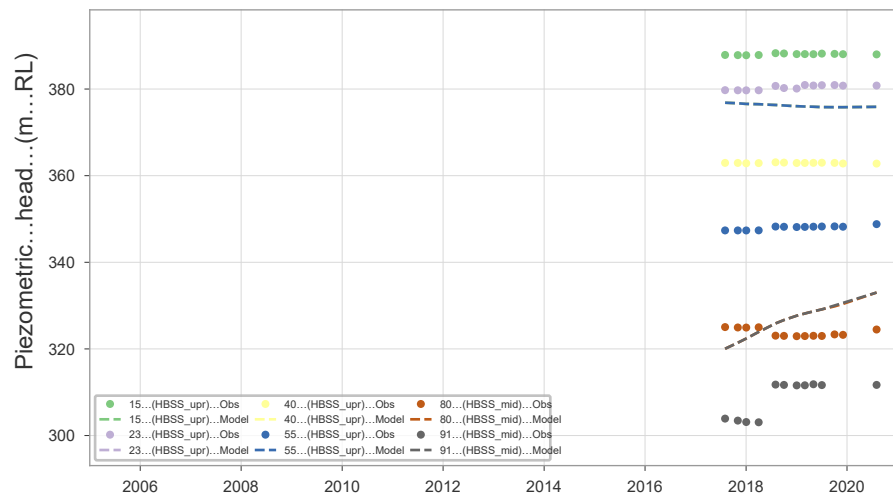
Dendrobium...S2399



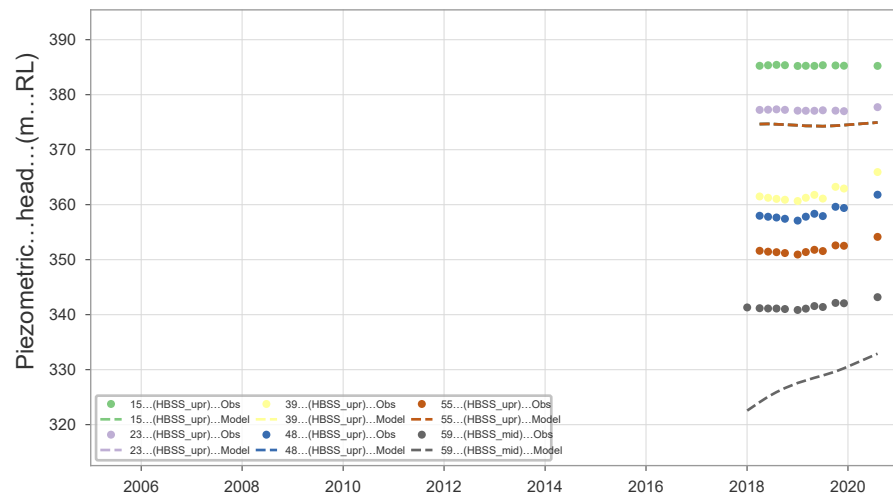
Dendrobium...S2401



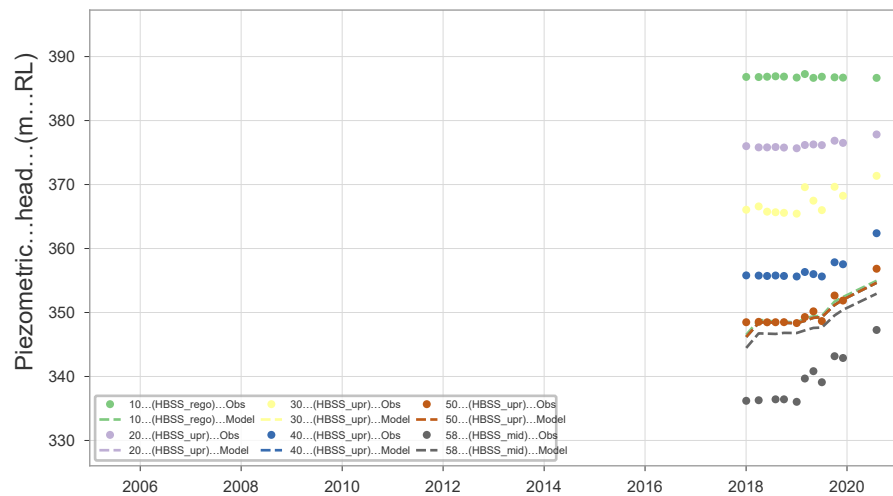
Dendrobium...S2402



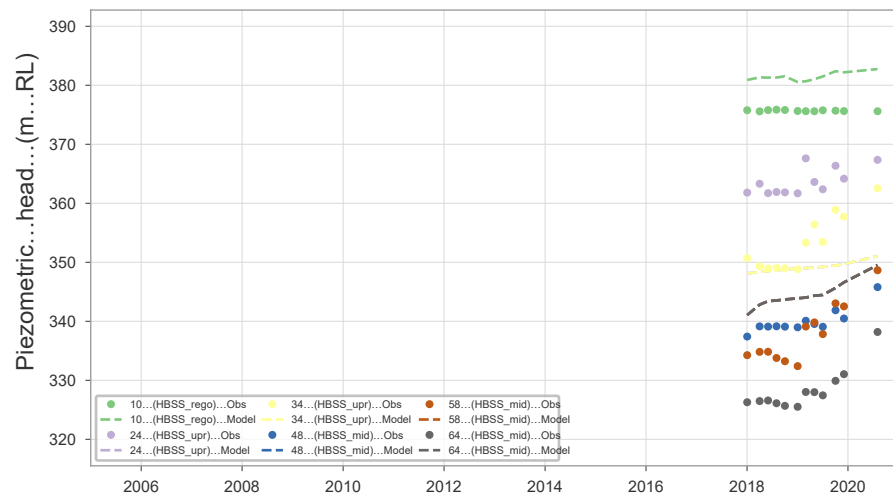
Dendrobium...S2403



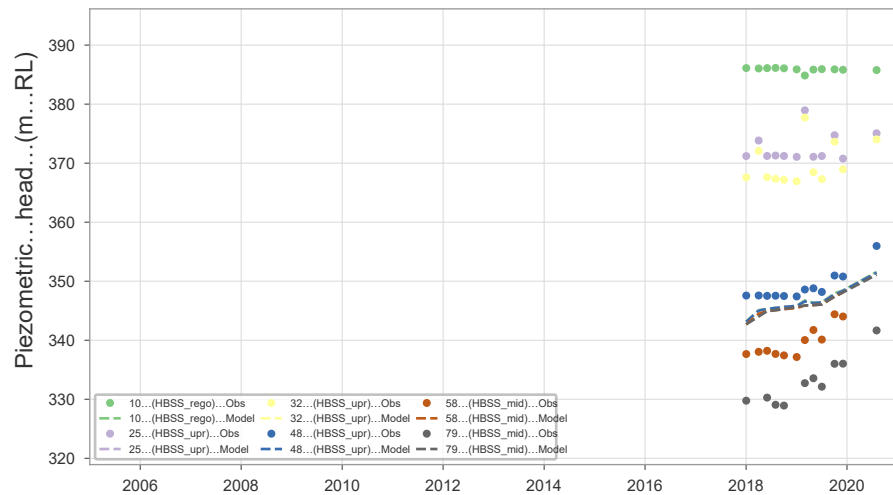
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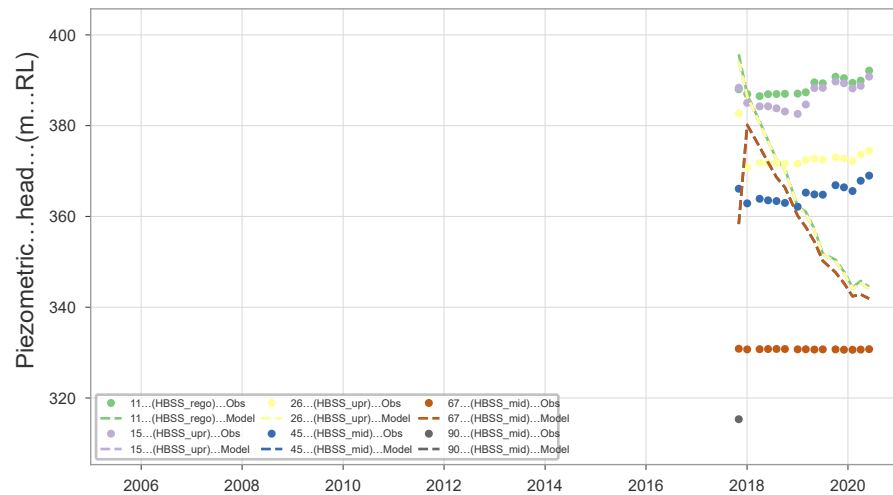
Dendrobium...S2405



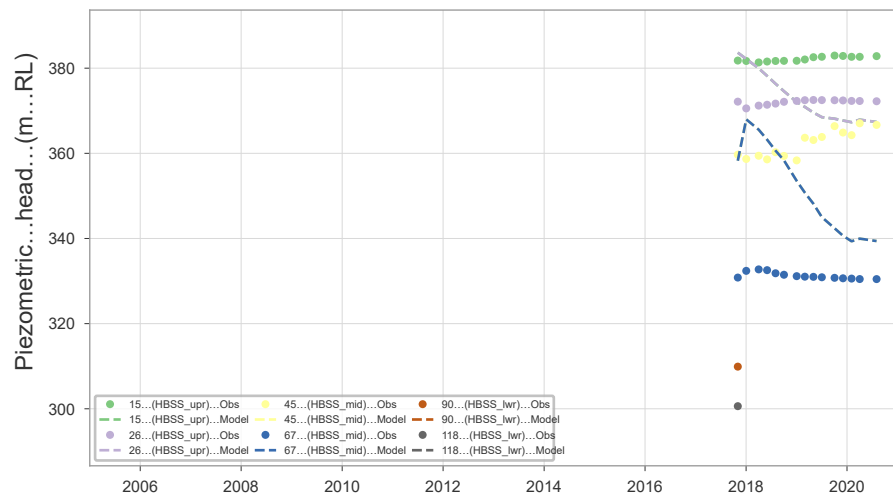
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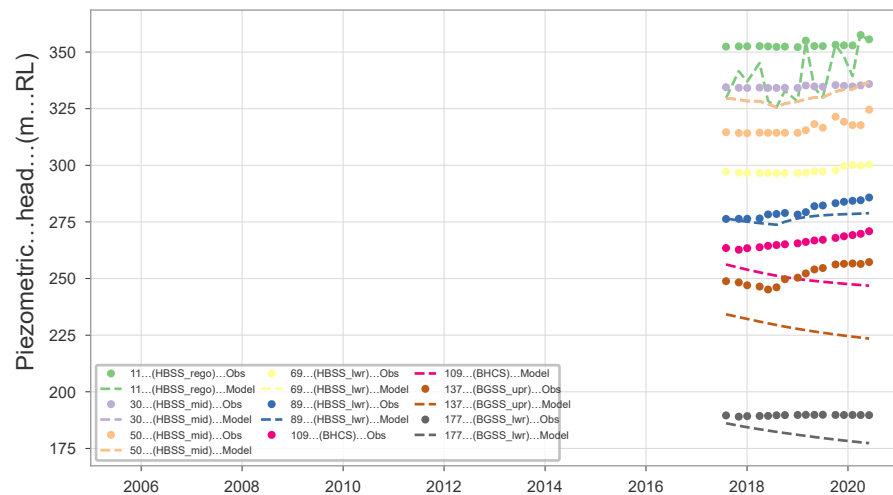
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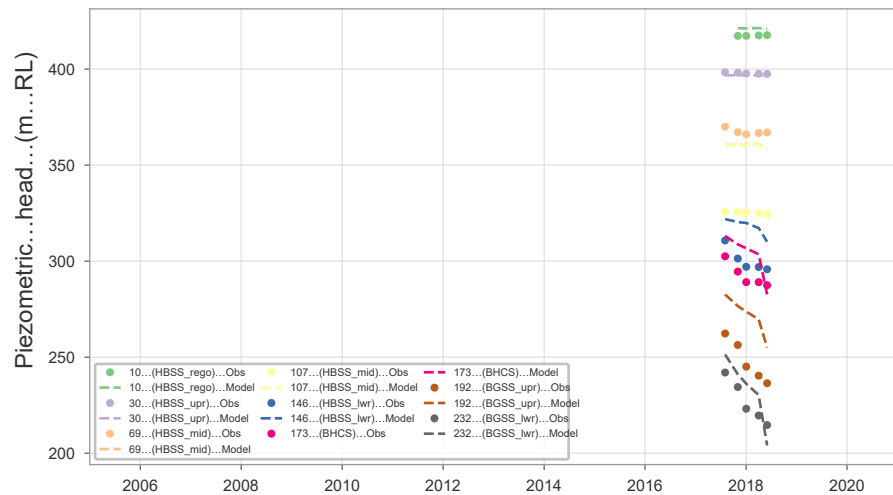
Dendrobium...S2409



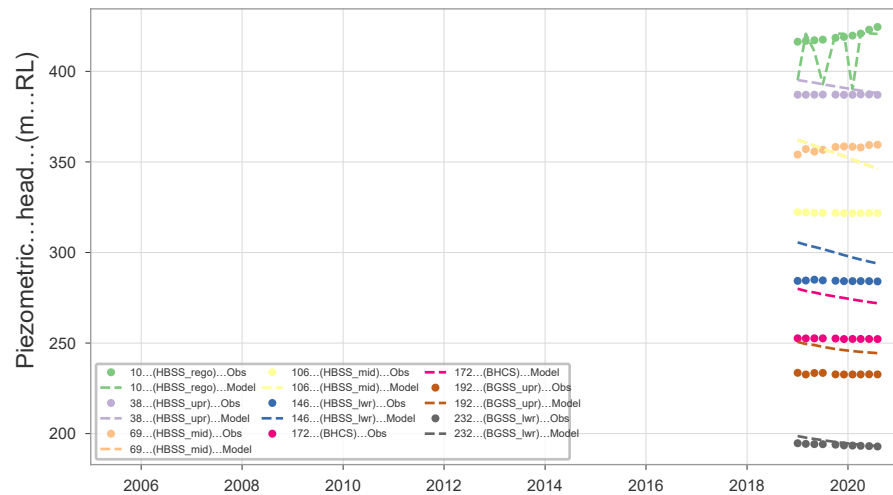
Dendrobium...S2411



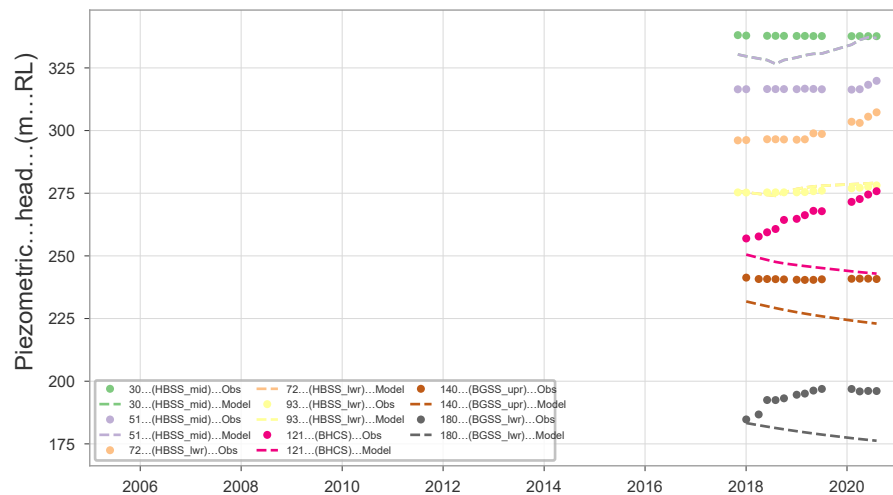
Dendrobium...S2412



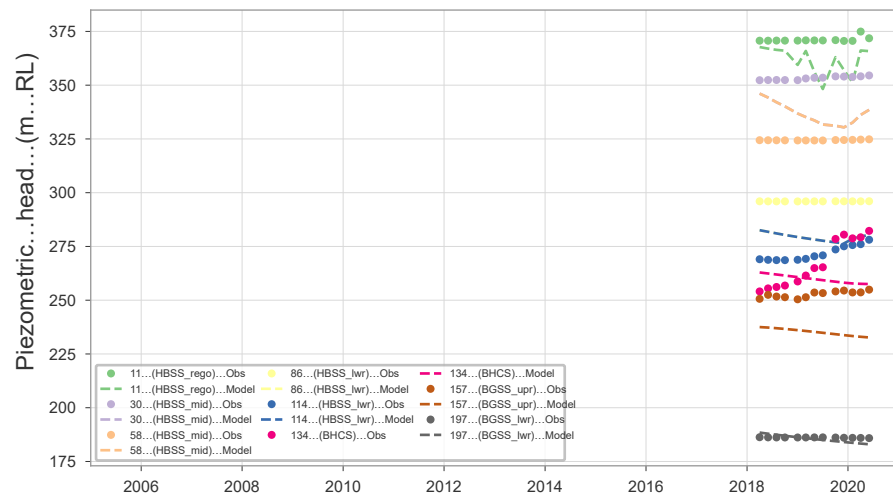
Dendrobium...S2412B



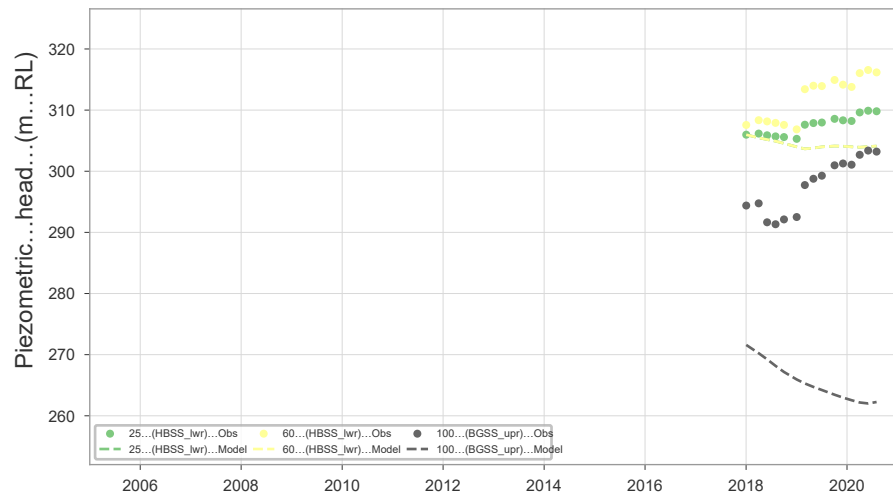
Dendrobium...S2420



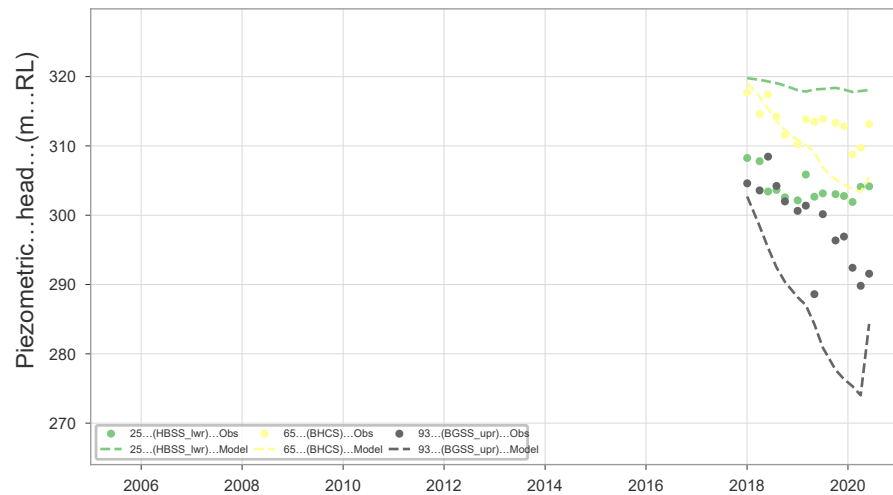
Dendrobium...S2421



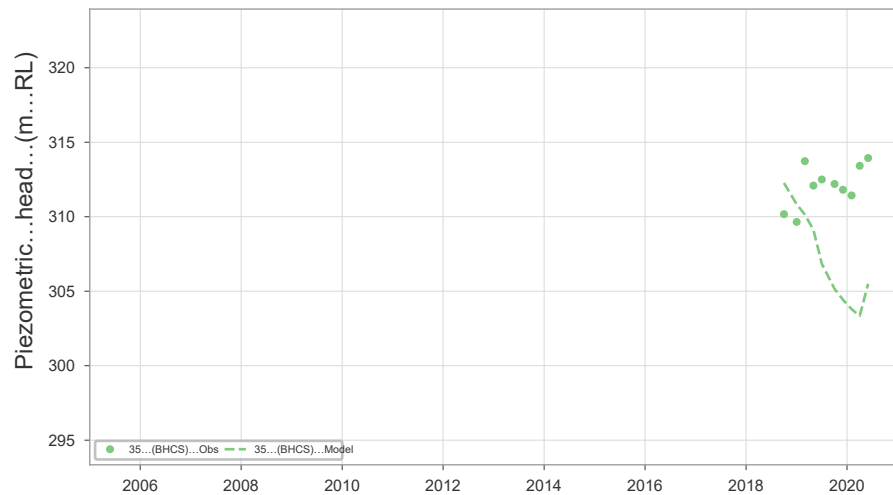
Dendrobium...S2435



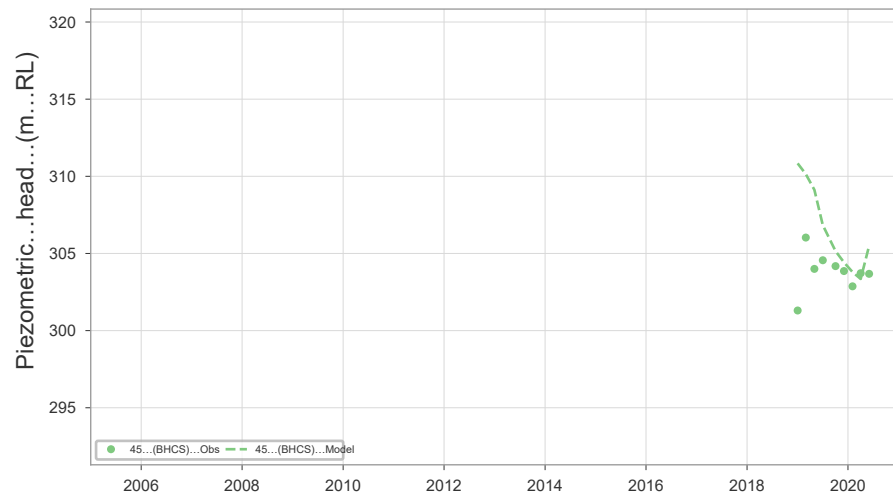
Dendrobium...S2436



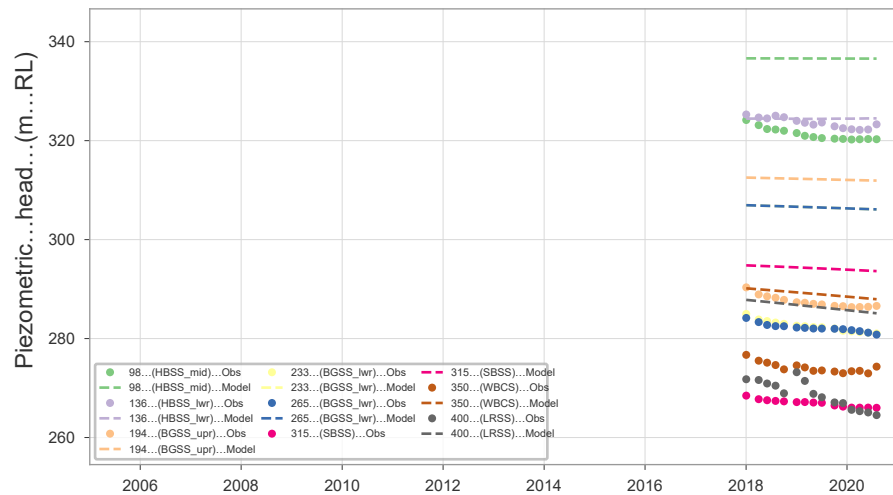
Dendrobium...S2436B



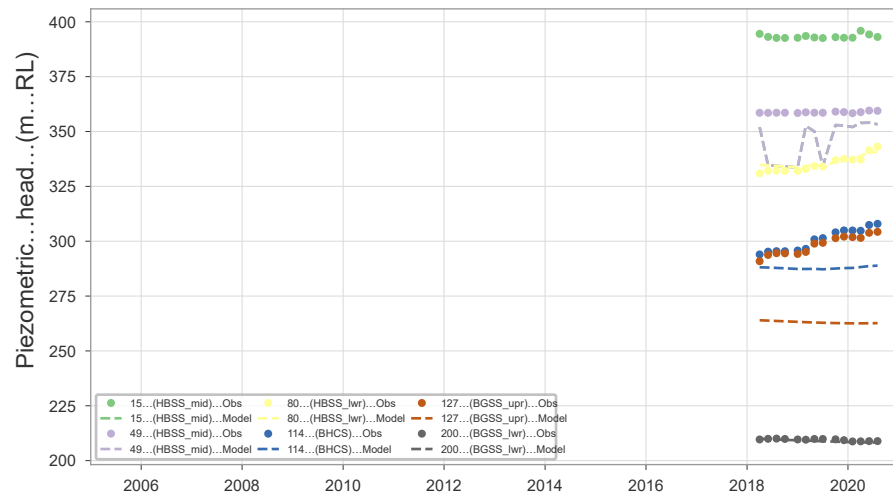
Dendrobium...S2436C



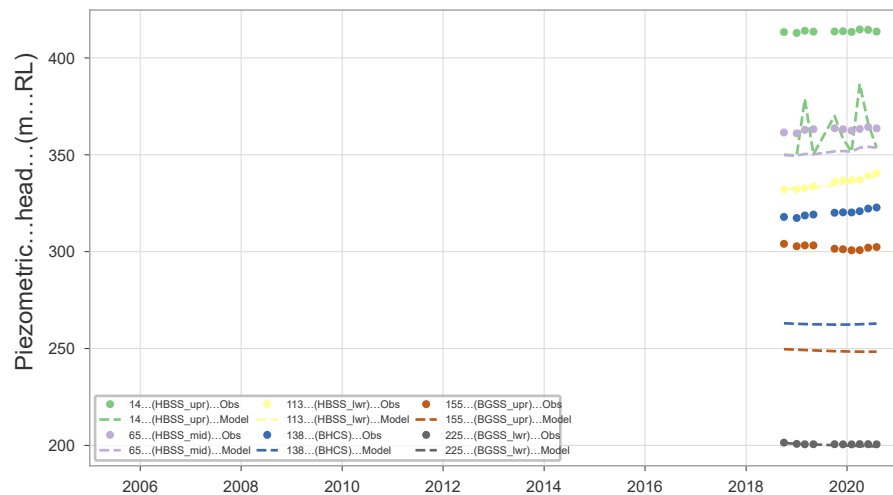
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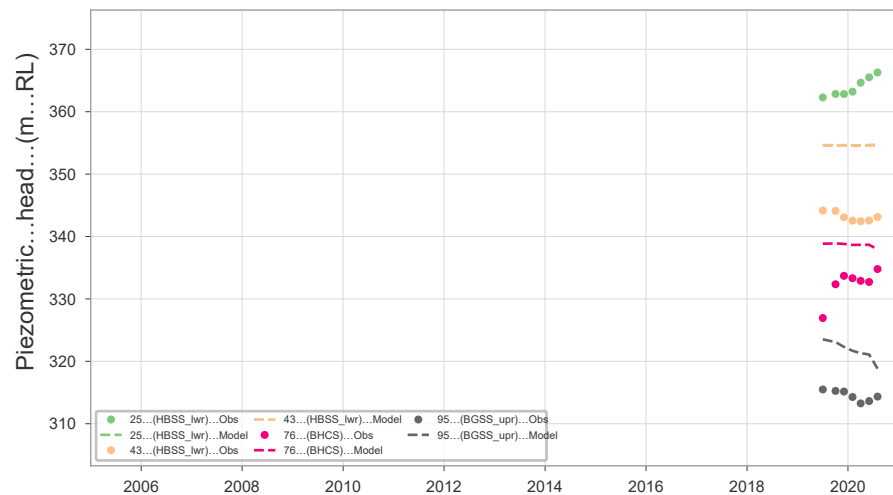
Dendrobium...S2442A



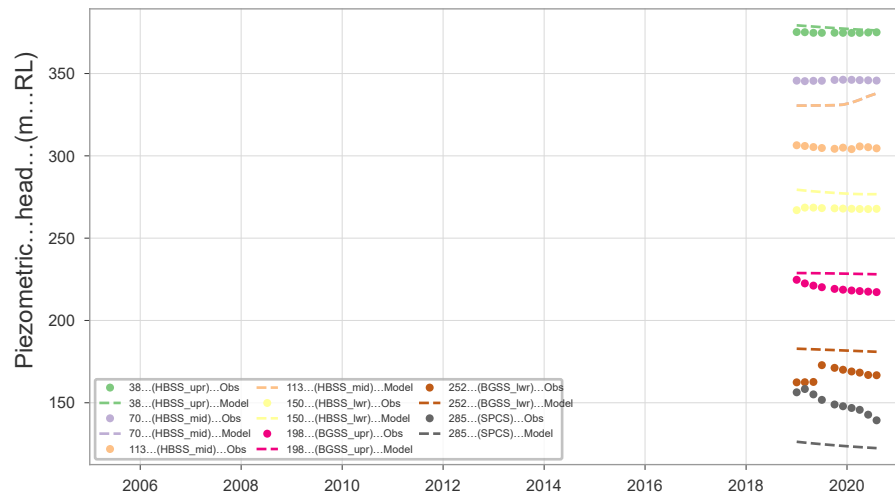
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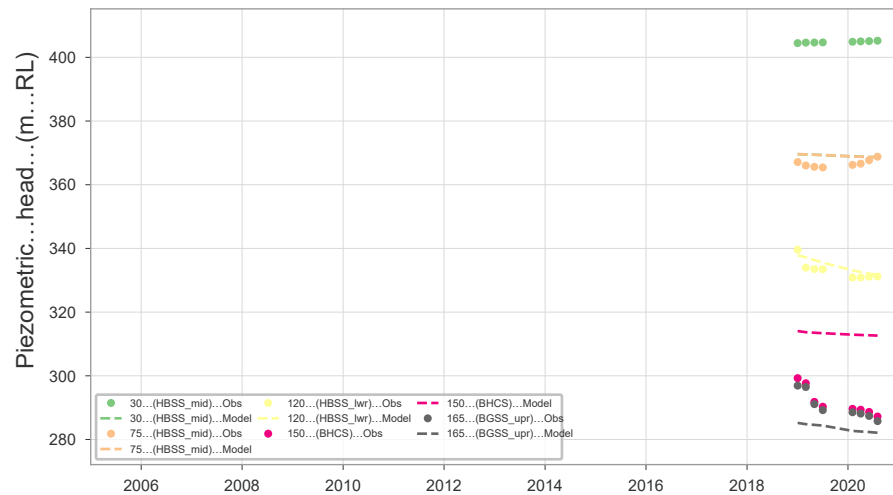
Dendrobium...S2478B



Dendrobium...S2486



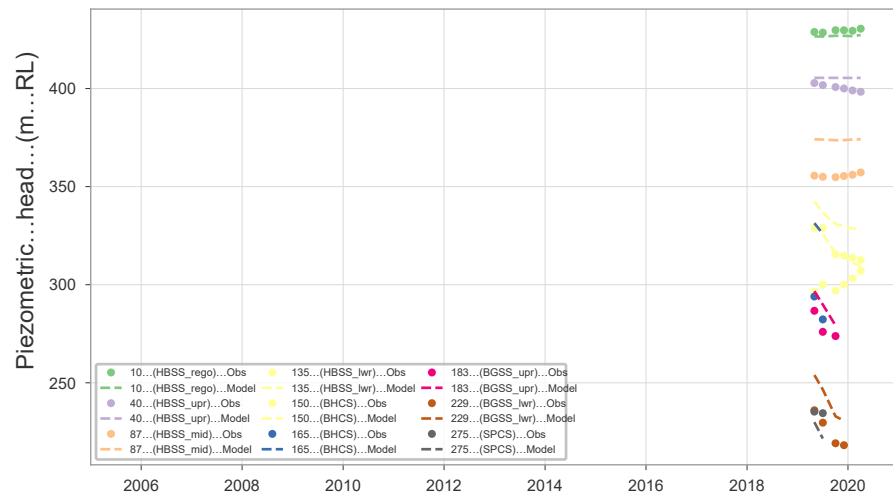
Dendrobium...S2487



Dendrobium...S2490

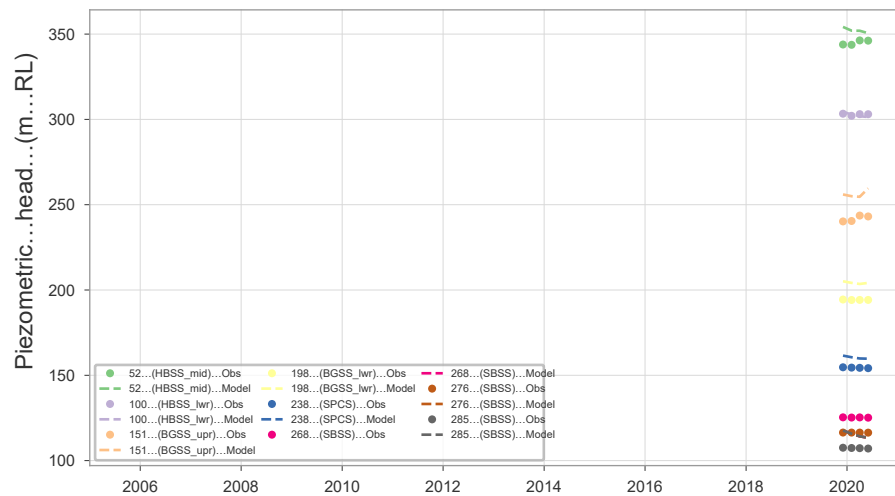


Dendrobium...S2493

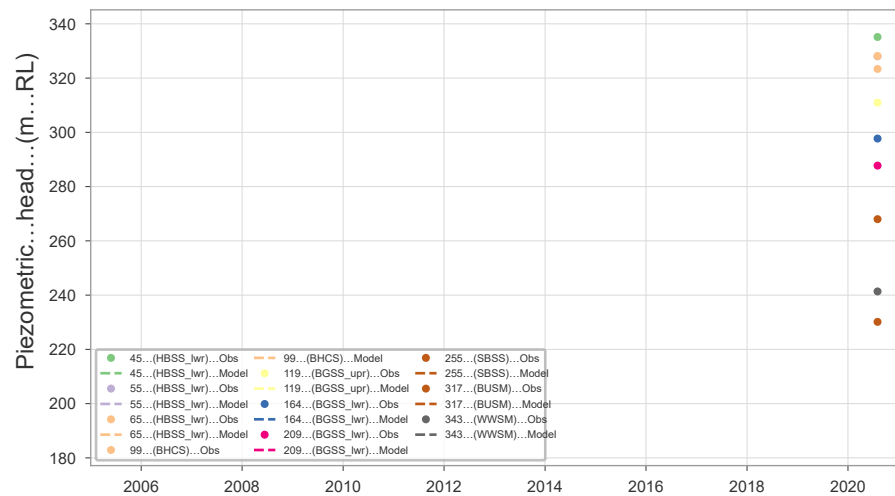




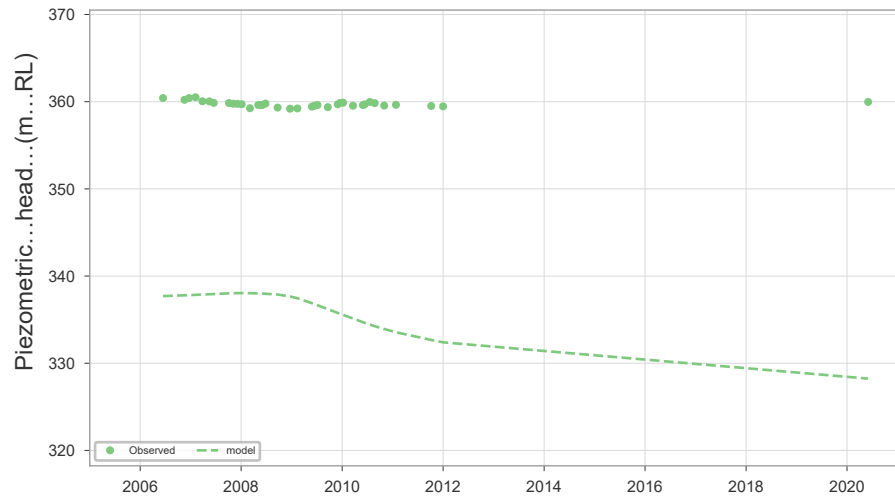
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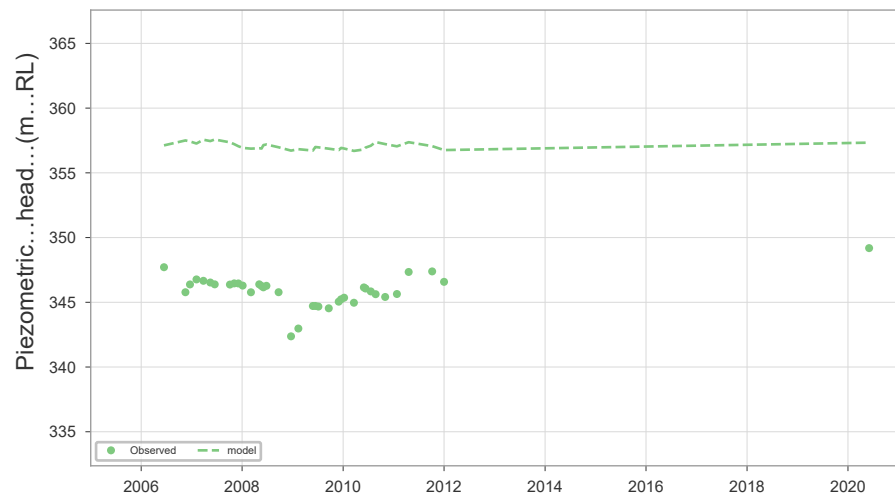
Dendrobium...S2526



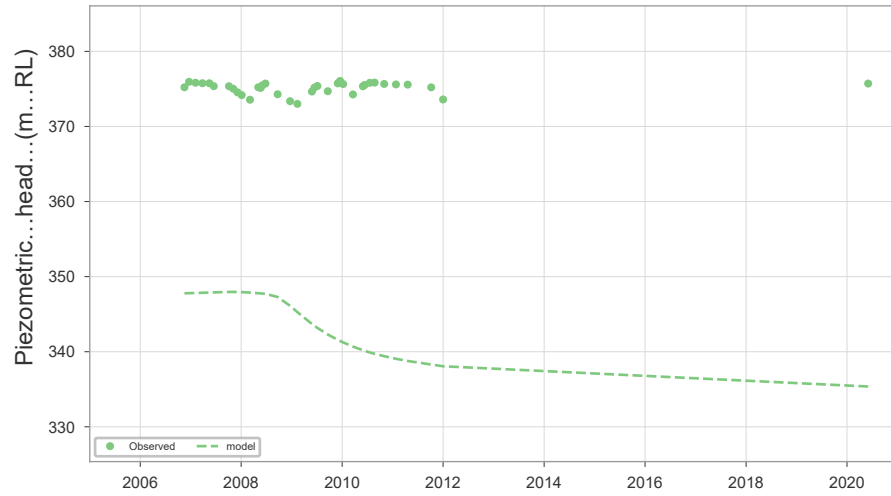
Dendrobium...EDEN87a



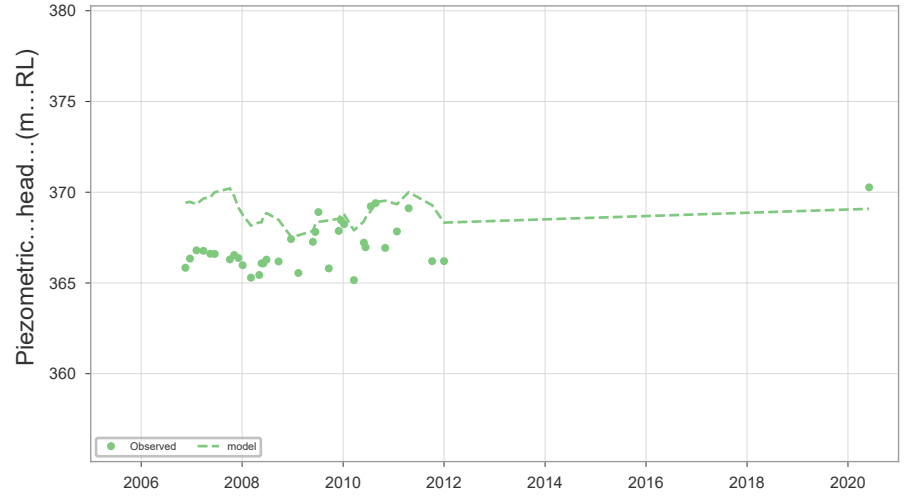
Dendrobium...EDEN87b



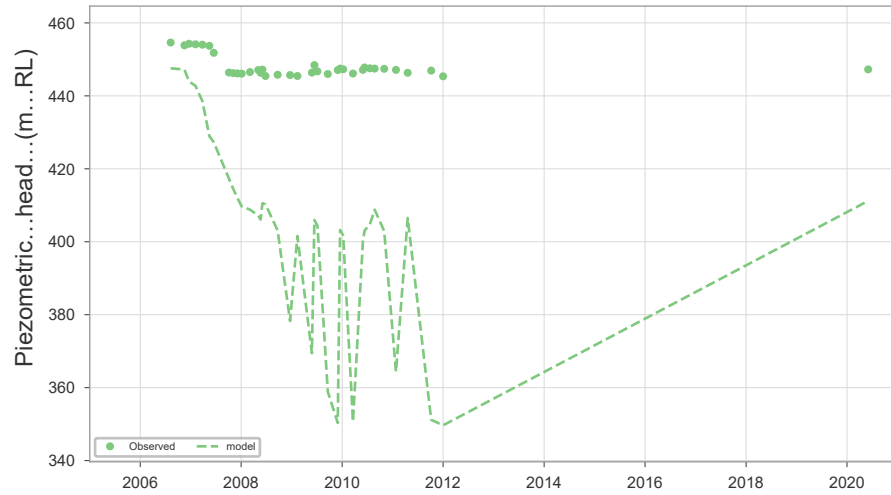
Dendrobium...EDEN88a



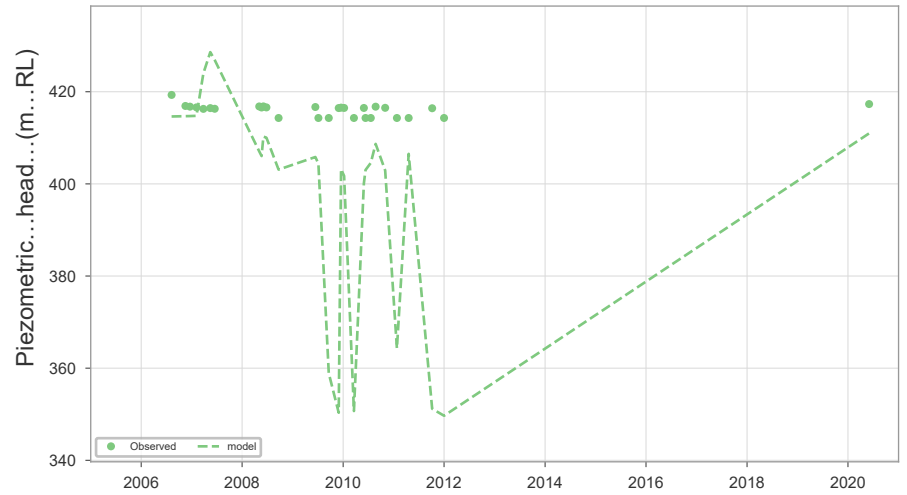
Dendrobium...EDEN88b



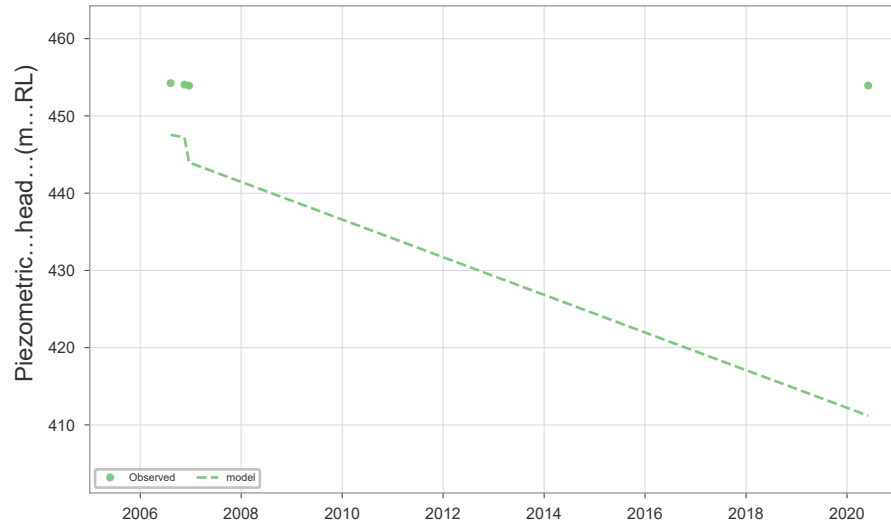
Dendrobium...EDEN89a



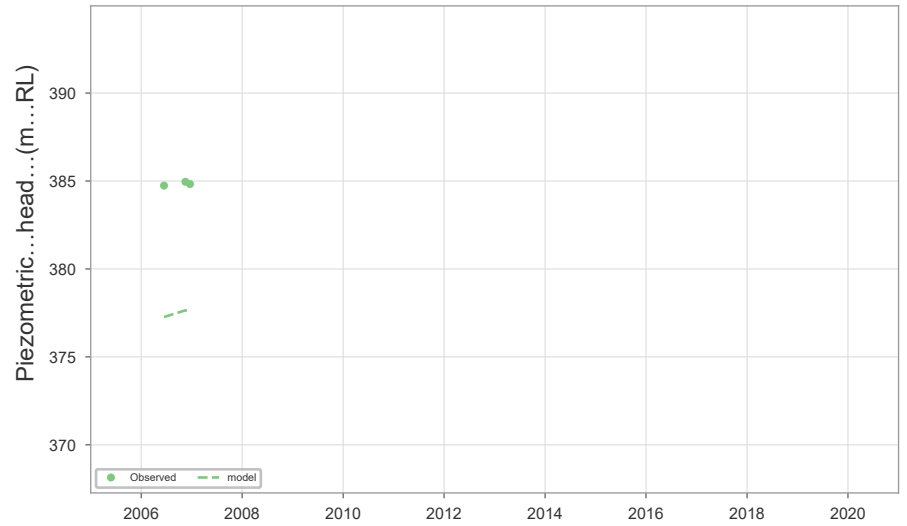
Dendrobium...EDEN89b



Dendrobium...EDEN89c

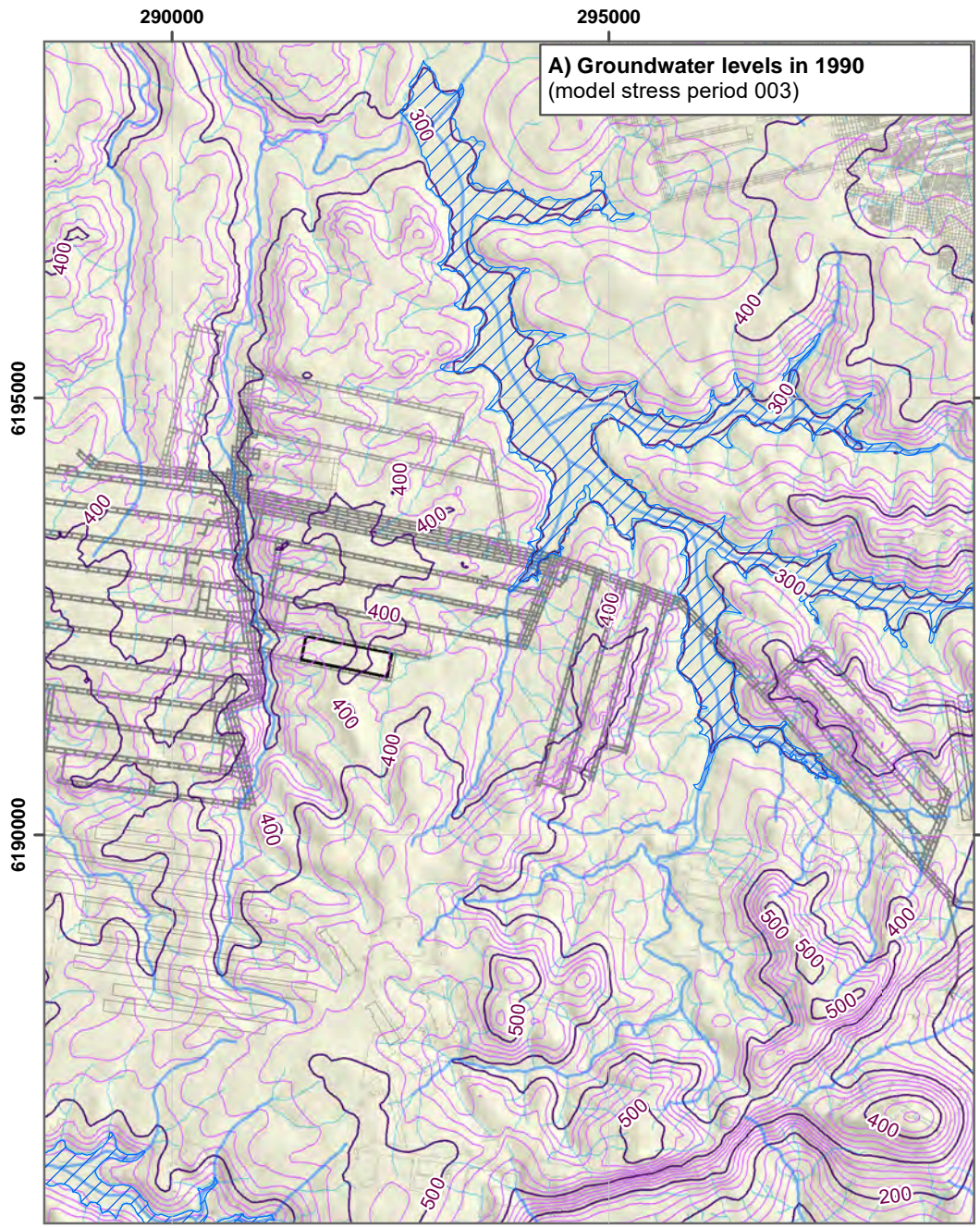


Dendrobium...EDEN90a

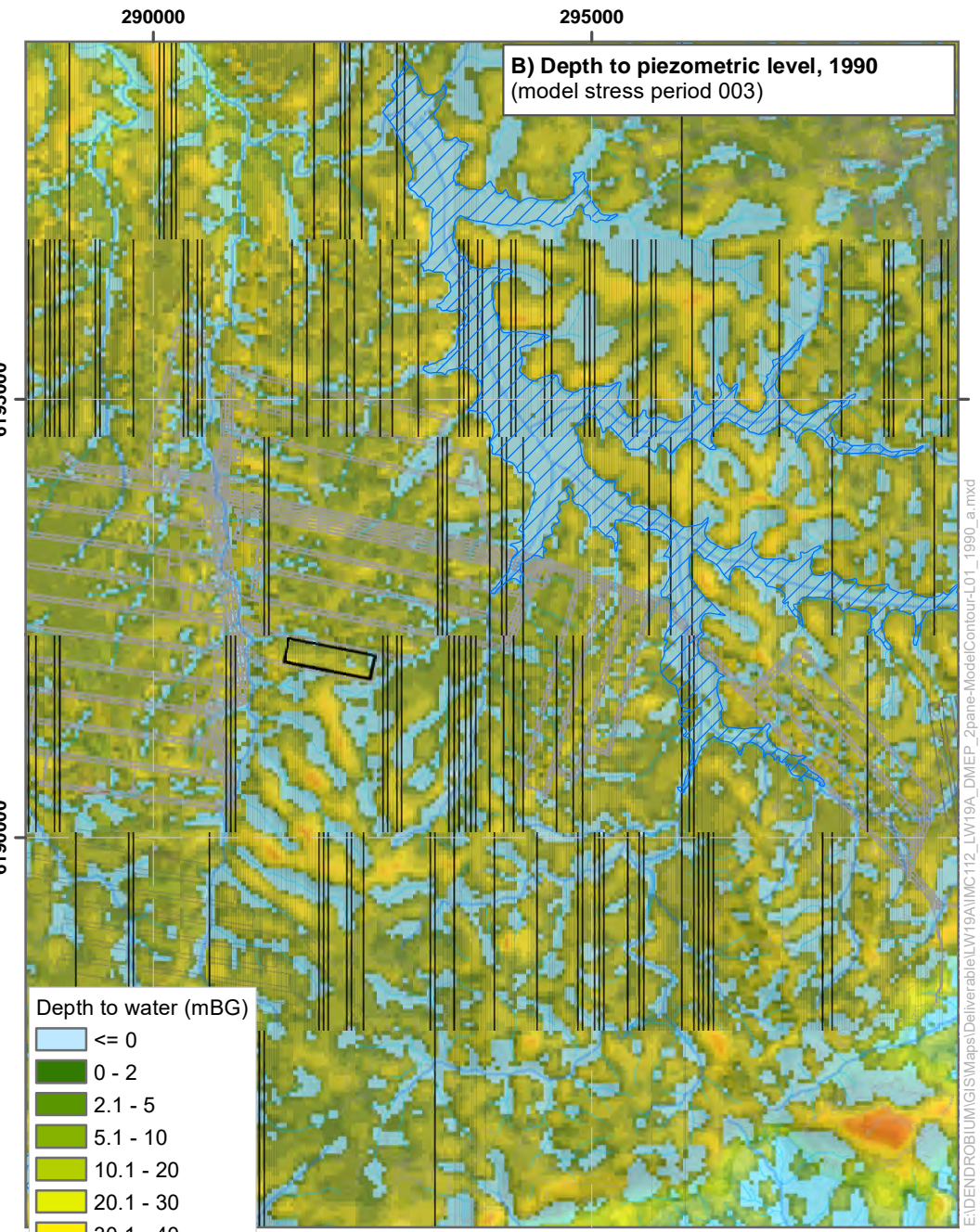


## Appendix G: Modelled groundwater level maps

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**A) Groundwater levels in 1990**  
(model stress period 003)



**B) Depth to piezometric level, 1990**  
(model stress period 003)

Rev: A | W Minchin | 23/06/2022

- Lake
- Watercourse
- Tribs
- LW19A void
- Mine workings
- Modelled groundwater level (100m interval)
- Modelled groundwater level (20m interval)
- Groundwater Model extent

- Depth to water (mBG)**
- <= 0
  - 0 - 2
  - 2.1 - 5
  - 5.1 - 10
  - 10.1 - 20
  - 20.1 - 30
  - 30.1 - 40
  - 40.1 - 50
  - 50.1 - 75
  - 75.1 - 100
  - 100.1 - 200
  - > 200m

0 0.5 1 1.5 km  
 Scale: 80,000 @A4  
 GDA 1994 MGA Zone 56

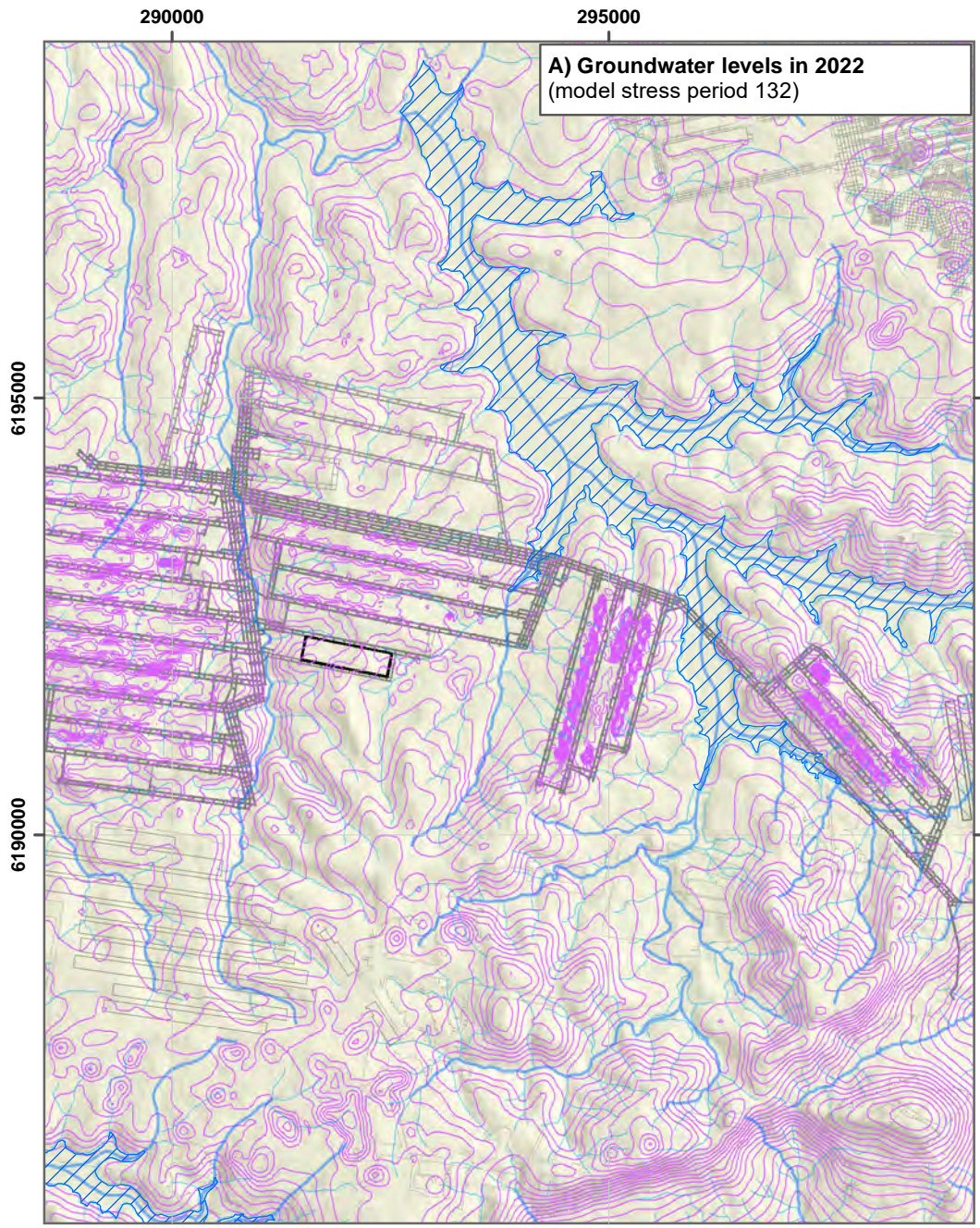


IMC | Dendrobium Mine

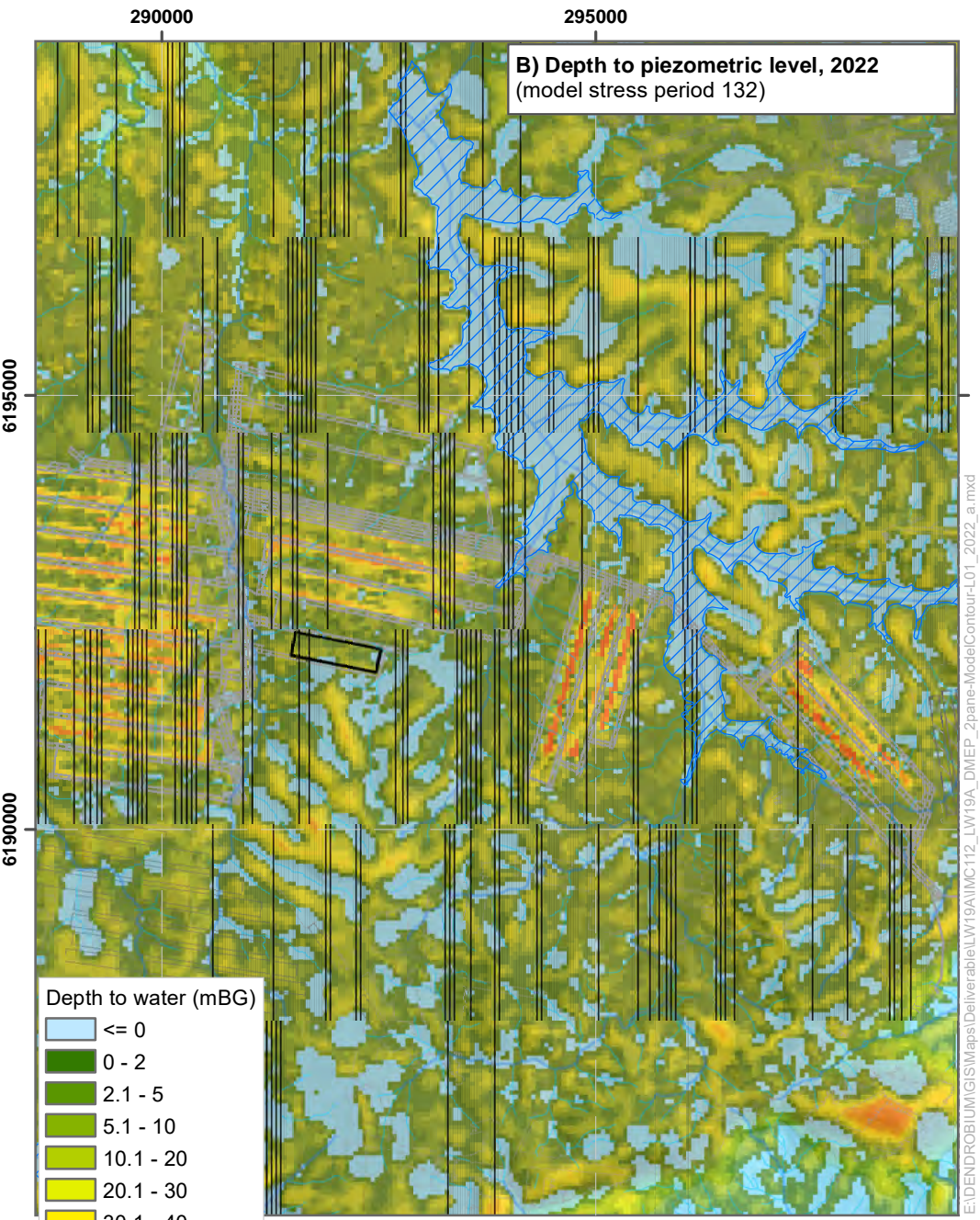
Modelled groundwater levels - water table in 1990: a) mAHD, and b) depth to water (mBG)

**Figure G1**

E:\DENDROBIUM\GIS\Maps\Deliverable\LW19A\IMC112\_LW19A\_DMEP\_2plane-Model\Contour-L01\_1990\_a.mxd



**A) Groundwater levels in 2022**  
(model stress period 132)



**B) Depth to piezometric level, 2022**  
(model stress period 132)

Rev: A | W Minchin | 23/06/2022

- Lake
- Watercourse
- Tribes
- LW19A void
- Mine workings
- Modelled groundwater level (100m interval)
- Modelled groundwater level (20m interval)
- Groundwater Model extent

- Depth to water (mBG)**
- <= 0
  - 0 - 2
  - 2.1 - 5
  - 5.1 - 10
  - 10.1 - 20
  - 20.1 - 30
  - 30.1 - 40
  - 40.1 - 50
  - 50.1 - 75
  - 75.1 - 100
  - 100.1 - 200
  - > 200m

Scale: 80,000 @A4  
 GDA 1994 MGA Zone 56

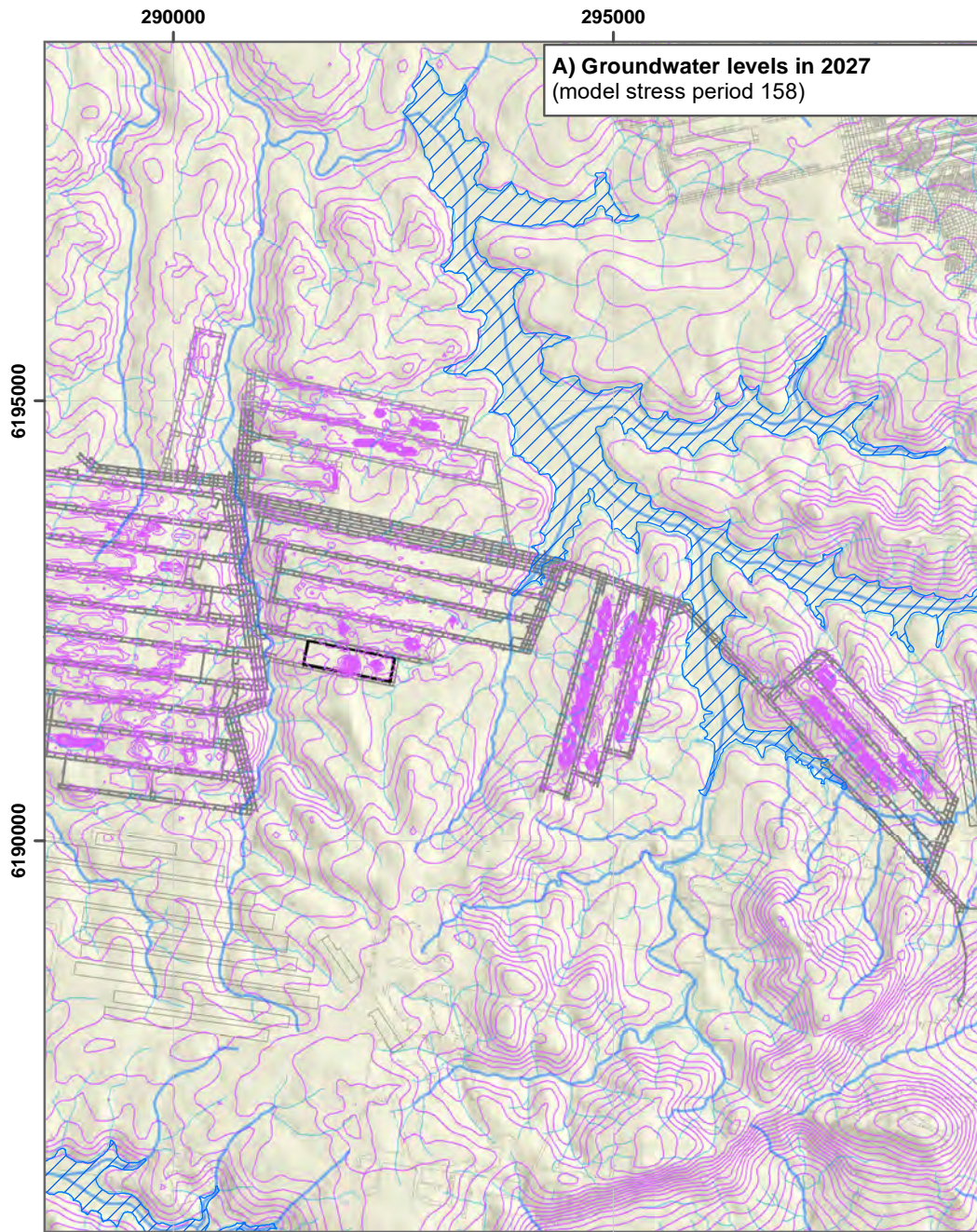


IMC | Dendrobium Mine

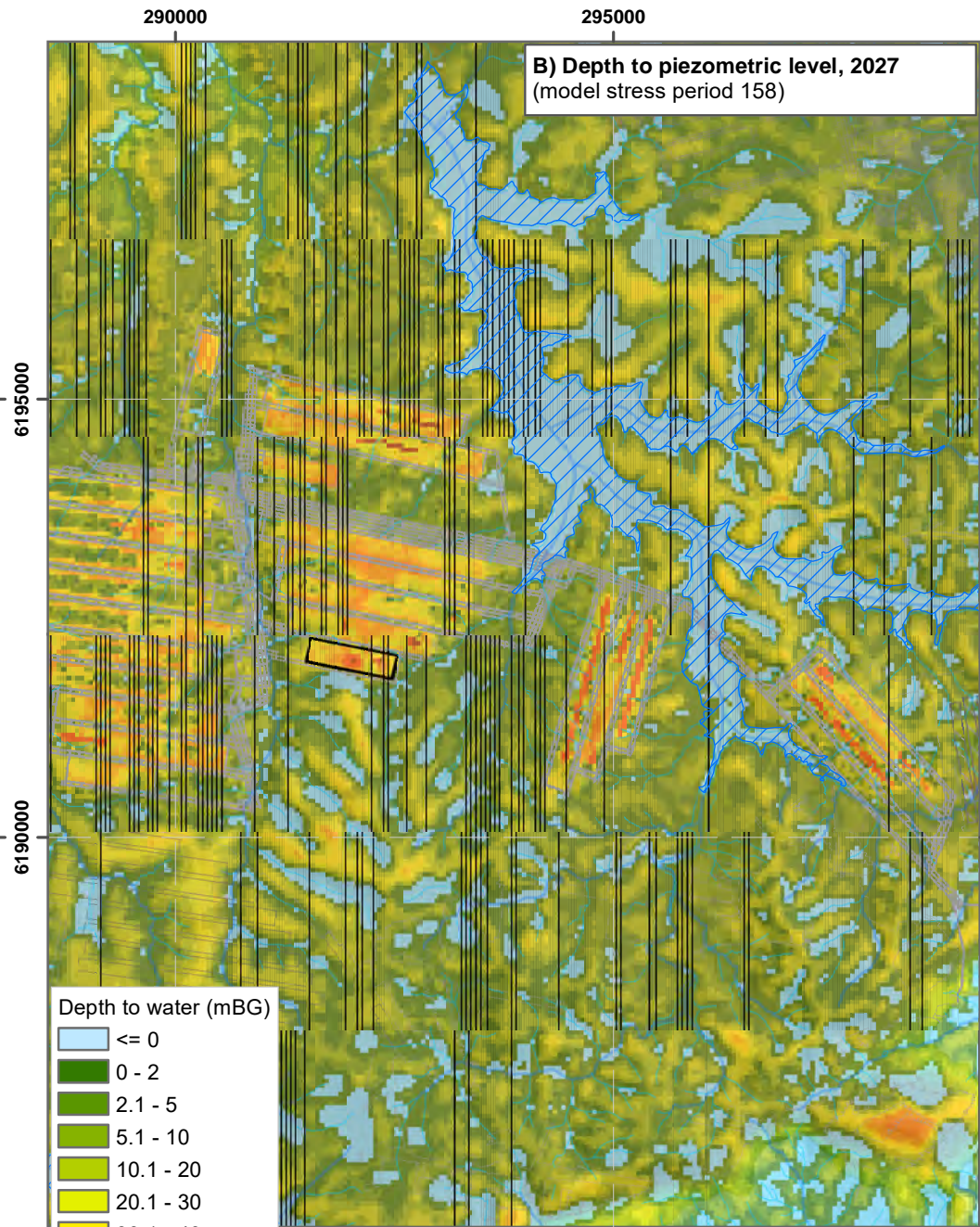
Modelled groundwater levels - water table in 2022: a) mAHD, and b) depth to water (mBG)

**Figure G2**

E:\DENDROBIUM\GIS\Maps\Deliverable\LW19A\IMC-112\_LW19A\_DMEP\_2plane-Model\Contour-L01\_2022\_a.mxd



**A) Groundwater levels in 2027**  
(model stress period 158)



**B) Depth to piezometric level, 2027**  
(model stress period 158)

Rev: A | W Minchin | 23/06/2022

- Lake
- Watercourse
- Tribs
- LW19A void
- Mine workings
- Modelled groundwater level (100m interval)
- Modelled groundwater level (20m interval)
- Groundwater Model extent

**Depth to water (mBG)**

- <= 0
- 0 - 2
- 2.1 - 5
- 5.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 75
- 75.1 - 100
- 100.1 - 200
- > 200m

Scale: 80,000 @A4  
 GDA 1994 MGA Zone 56

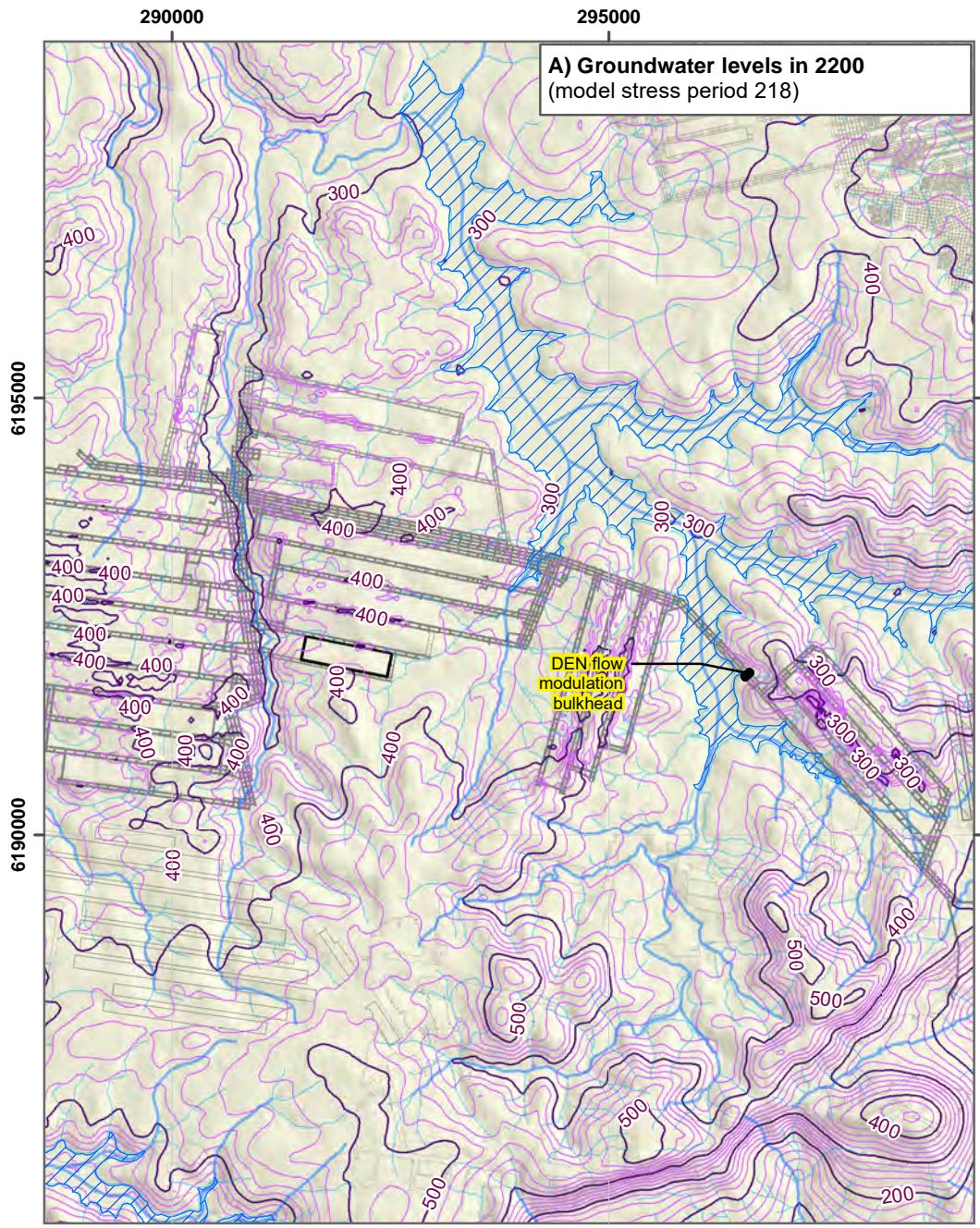


IMC | Dendrobium Mine

Modelled groundwater levels - water table in 2027: a) mAHD, and b) depth to water (mBG)

**Figure G3**









E:\DENDROBIUM\GIS\Maps\Deliverable\LW19A\IMC\112\_LW19A\_DM\EP\_2\pane-Model\Contour-L01\_2027\_a.mxd

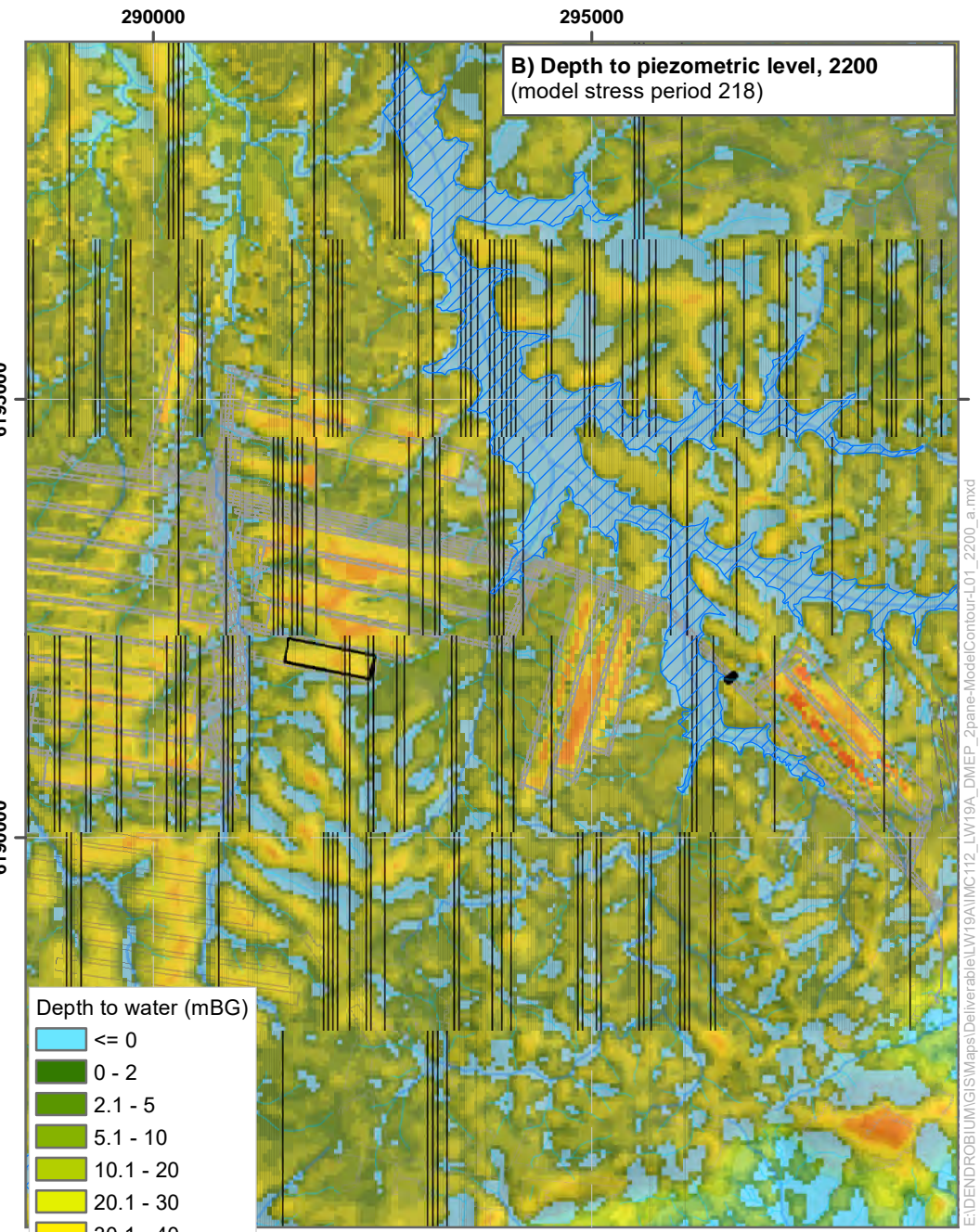


**A) Groundwater levels in 2200**  
(model stress period 218)













DEN flow modulation bulkhead

Rev: A | W Minchin | 23/06/2022

-  Lake
-  Watercourse
-  Tribes
-  LW19A void
-  Mine workings
-  Bulkheads (approx location)
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)



**B) Depth to piezometric level, 2200**  
(model stress period 218)

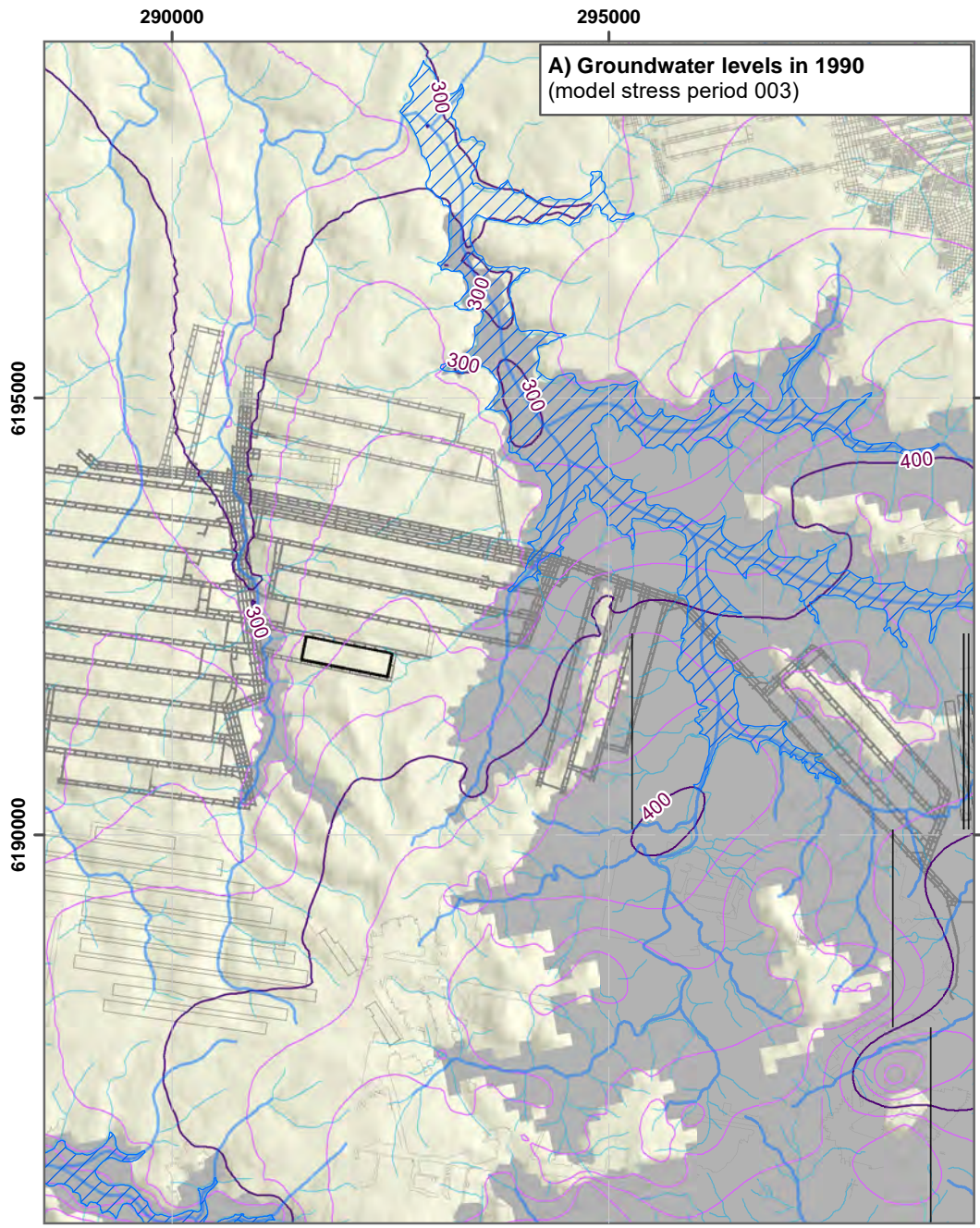
- Depth to water (mBG)
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m

0 0.5 1 1.5 km Scale: 80,000 @A4  
GDA 1994 MGA Zone 56

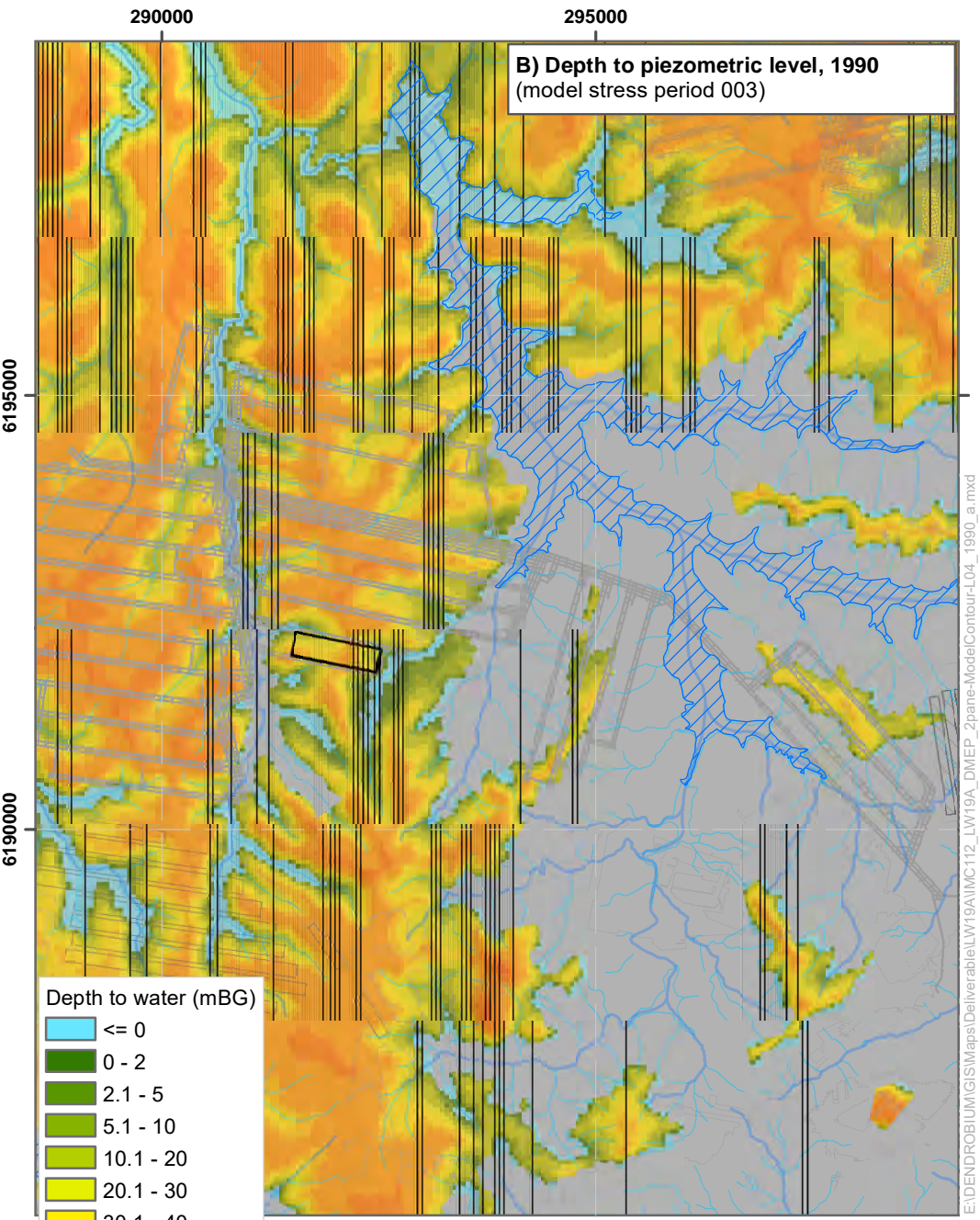
Modelled groundwater levels - water table in 2200: a) mAHD, and b) depth to water (mBG)

**Figure G4**





**A) Groundwater levels in 1990**  
(model stress period 003)



**B) Depth to piezometric level, 1990**  
(model stress period 003)

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- Lake
- Watercourse
- Tribs
- LW19A void
- Mine workings
- Modelled groundwater level (100m interval)
- Modelled groundwater level (20m interval)
- Inactive area (lower HBSS, L4)

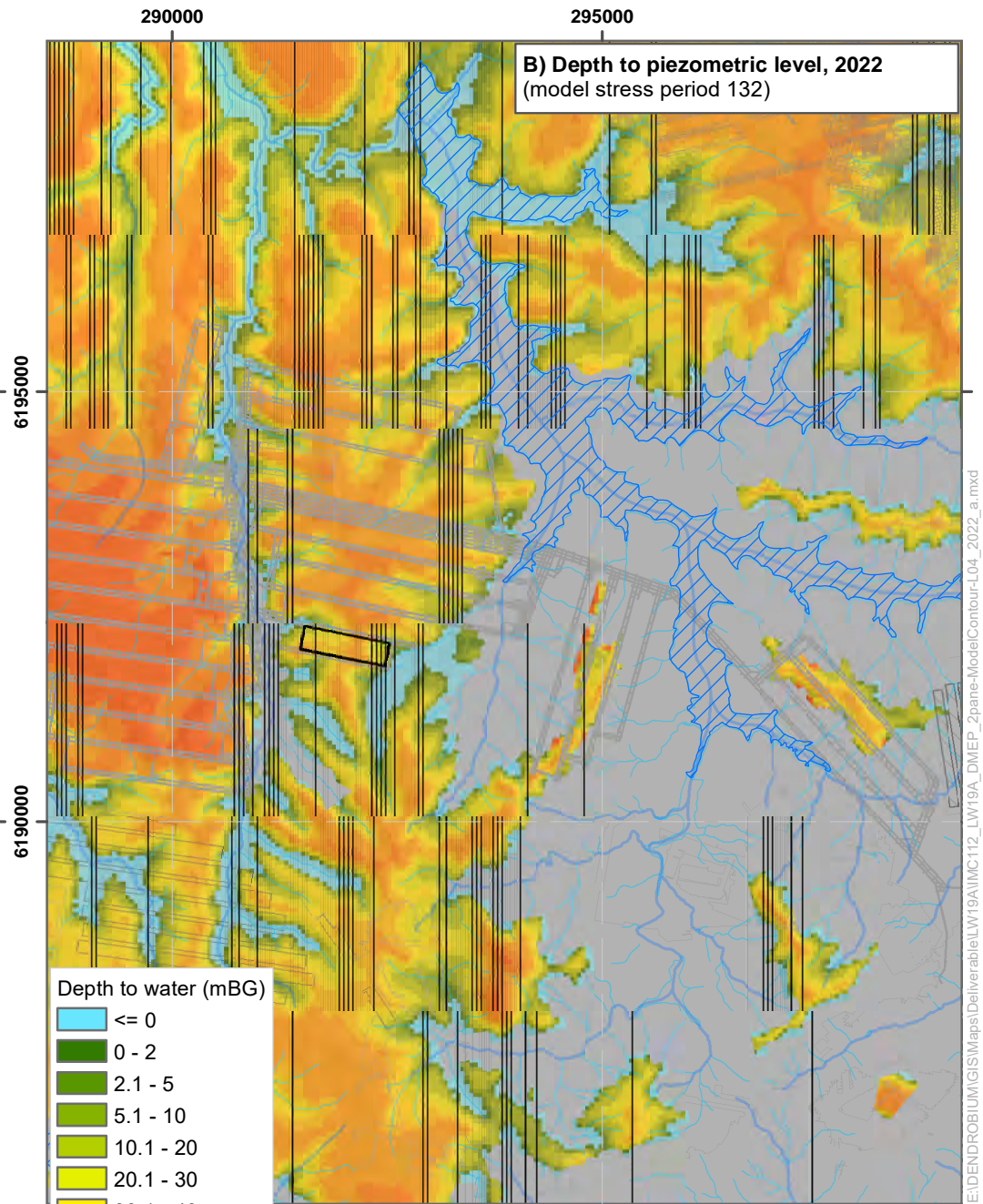
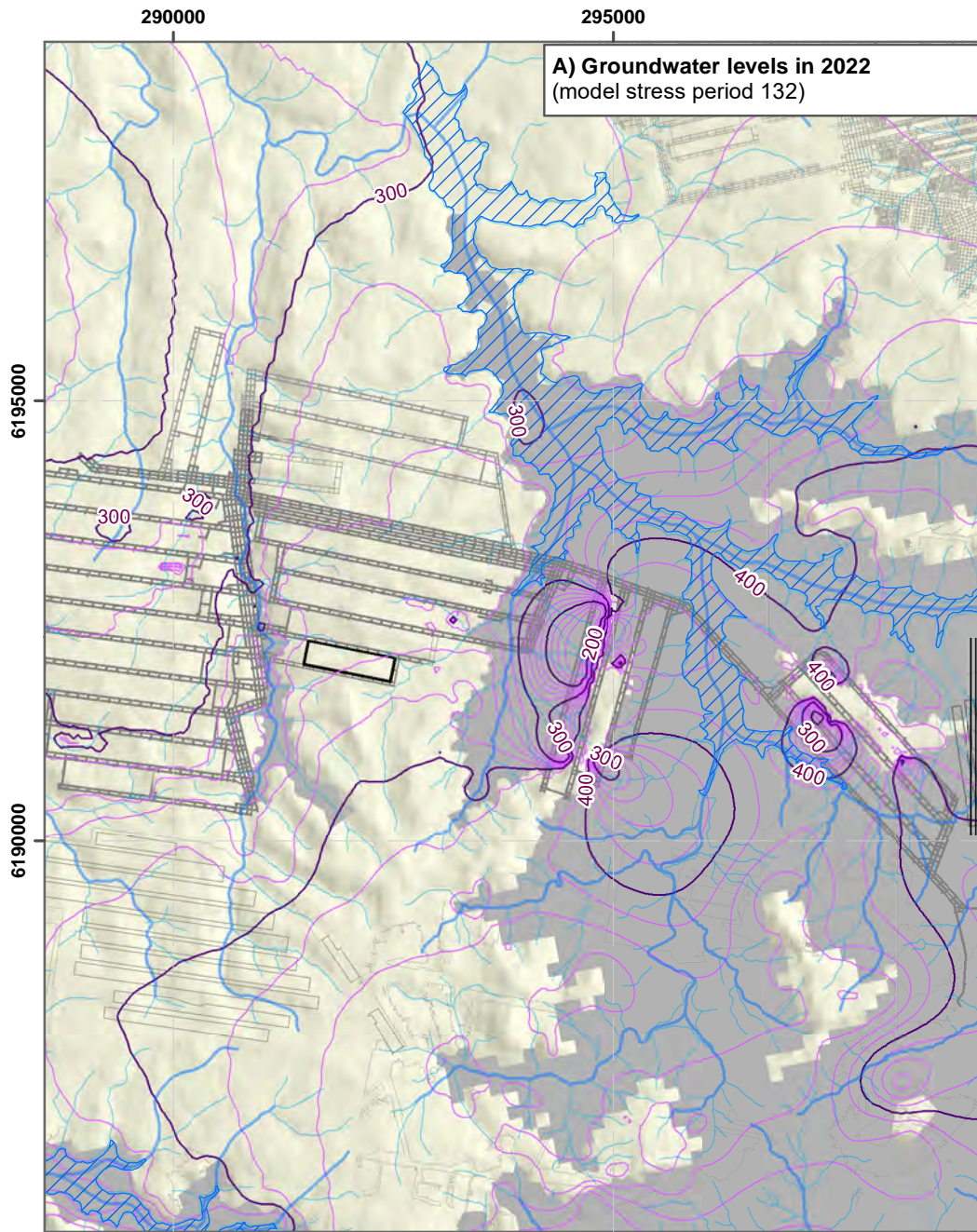
- Depth to water (mBG)**
- <= 0
  - 0 - 2
  - 2.1 - 5
  - 5.1 - 10
  - 10.1 - 20
  - 20.1 - 30
  - 30.1 - 40
  - 40.1 - 50
  - 50.1 - 75
  - 75.1 - 100
  - 100.1 - 200
  - > 200m

0 0.5 1 1.5 km Scale: 80,000 @A4  
GDA 1994 MGA Zone 56









Modelled groundwater levels - HBSS (lower) in 1990: a) mAGD, and b) depth to water (mBG)













**Figure G5**

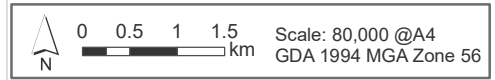
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-  Lake
-  Watercourse
-  Tribs
-  LW19A void
-  Mine workings
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (lower HBSS, L4)

- Depth to water (mBG)**
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m

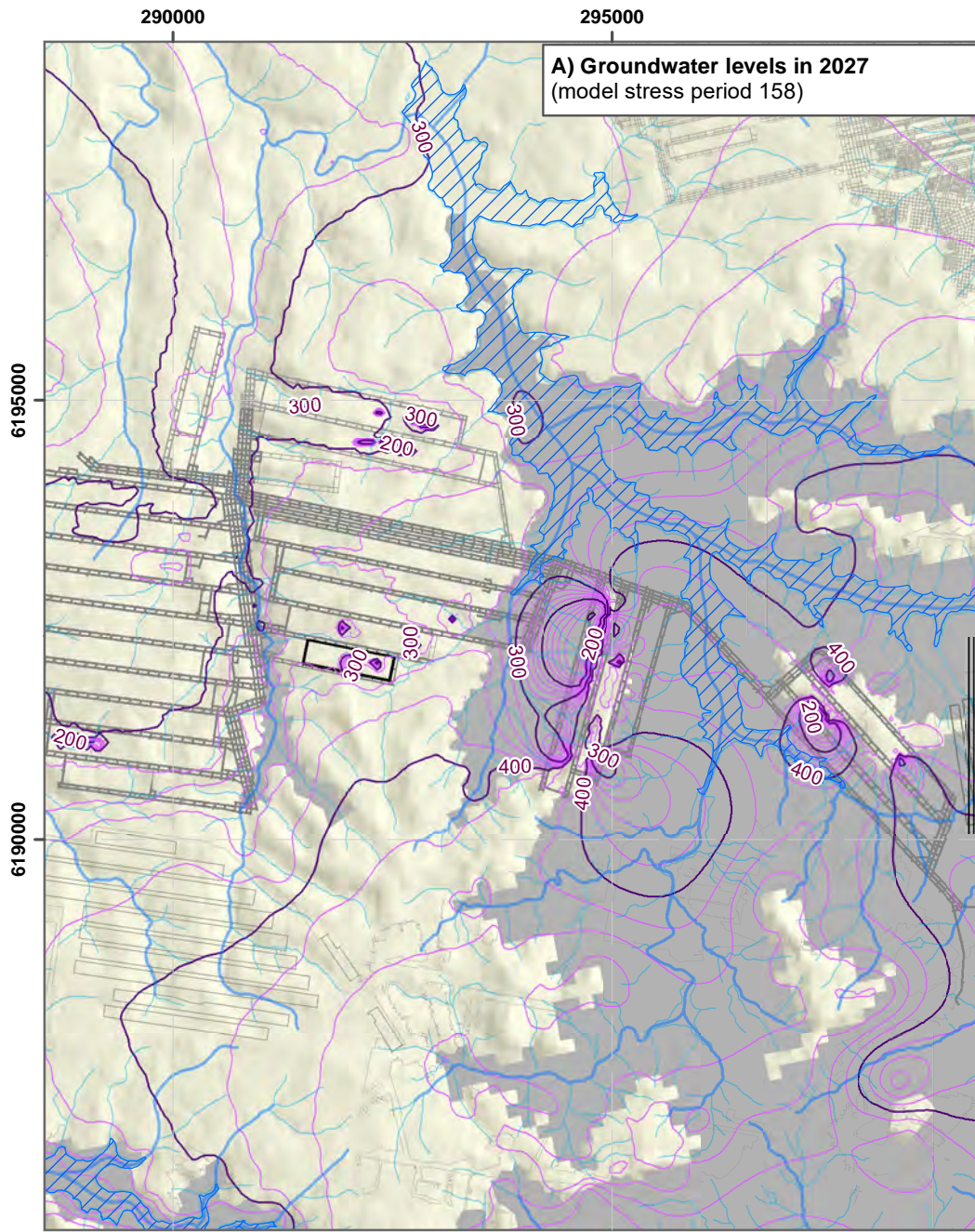


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Modelled groundwater levels - HBSS (lower) in 2022: a) mAHD, and b) depth to water (mBG)









**Figure G6**

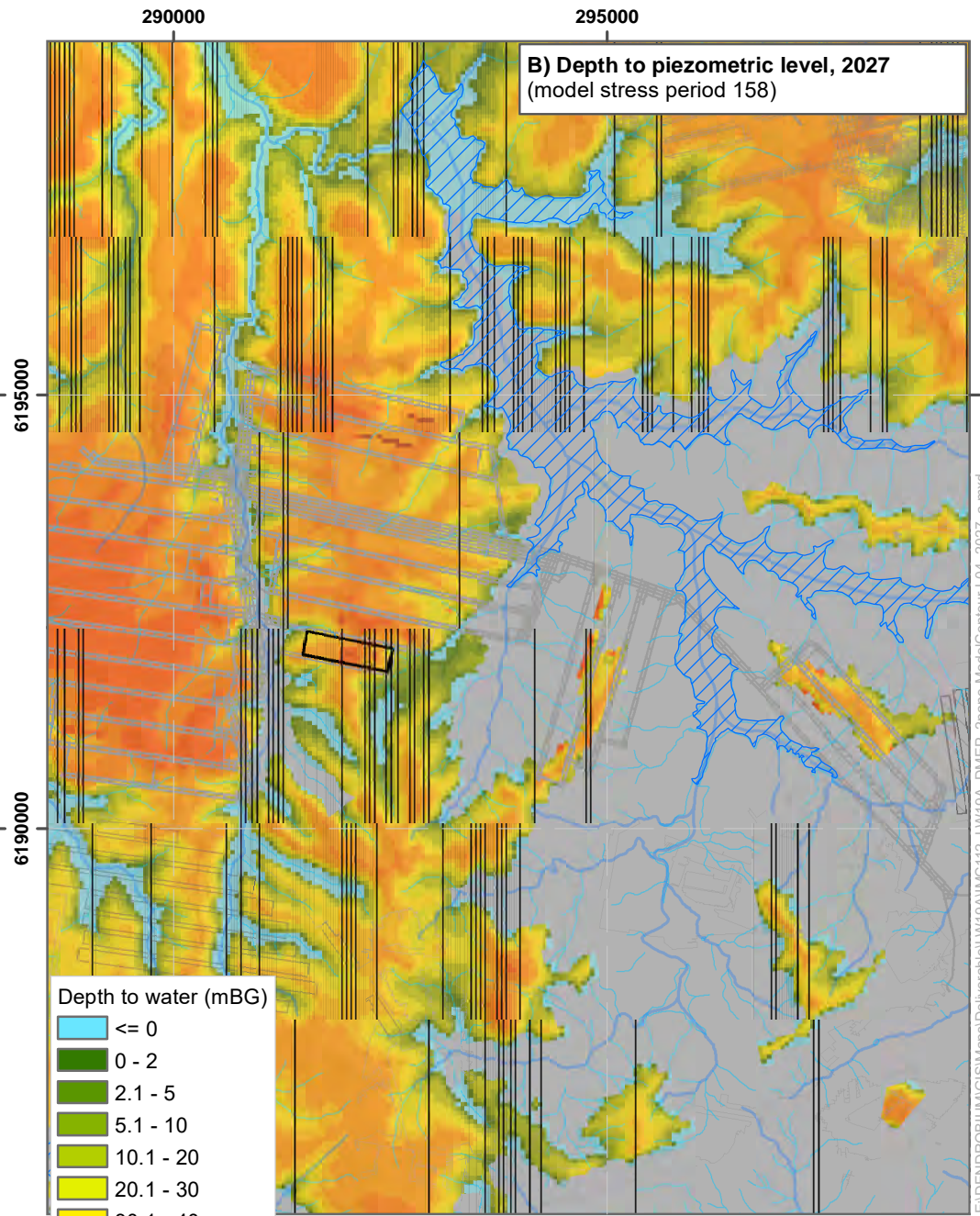
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**A) Groundwater levels in 2027**  
(model stress period 158)













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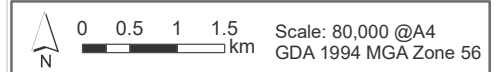
-  Lake
-  Watercourse
-  Tribs
-  LW19A void
-  Mine workings
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (lower HBSS, L4)



**B) Depth to piezometric level, 2027**  
(model stress period 158)

Depth to water (mBG)

-  <= 0
-  0 - 2
-  2.1 - 5
-  5.1 - 10
-  10.1 - 20
-  20.1 - 30
-  30.1 - 40
-  40.1 - 50
-  50.1 - 75
-  75.1 - 100
-  100.1 - 200
-  > 200m



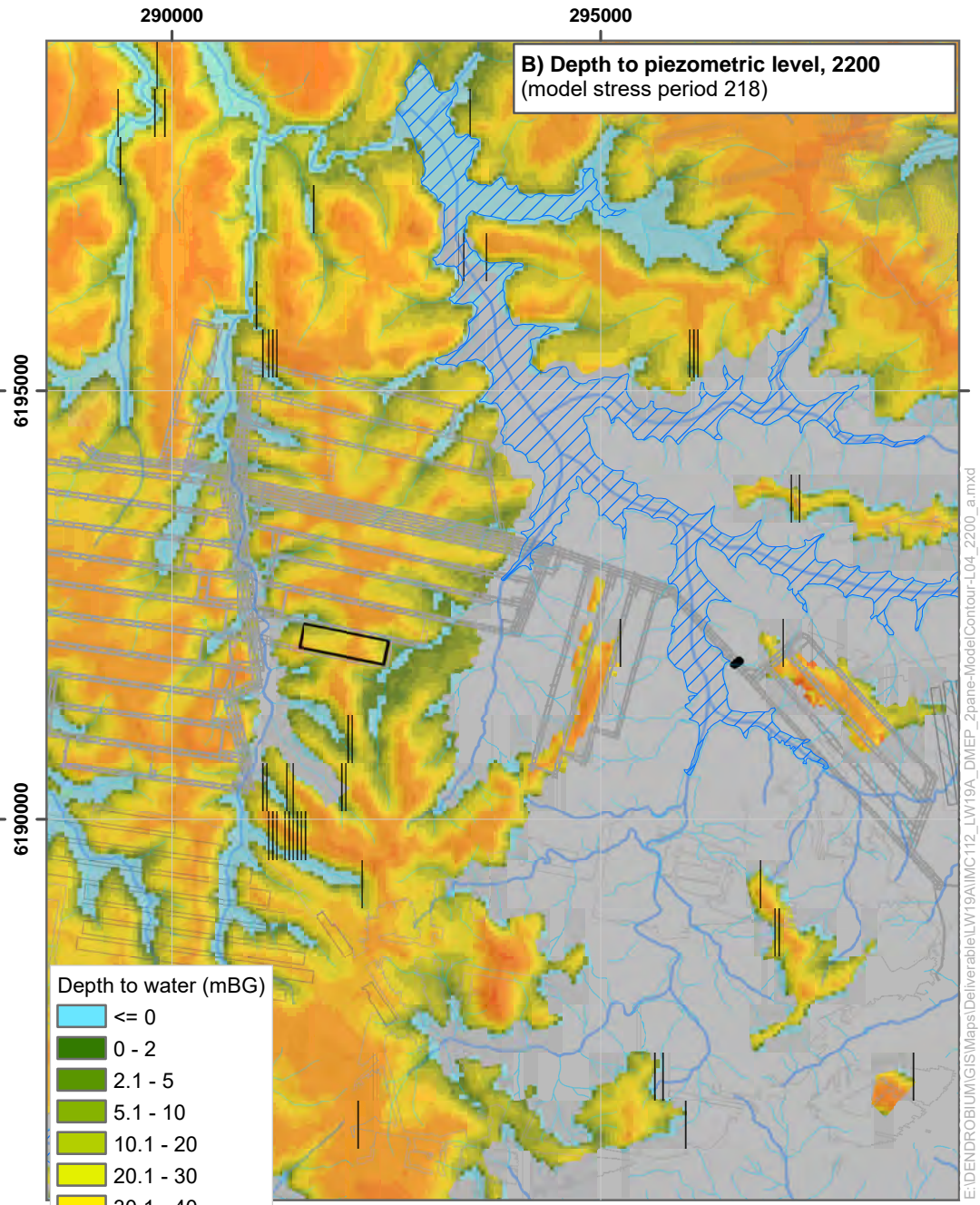
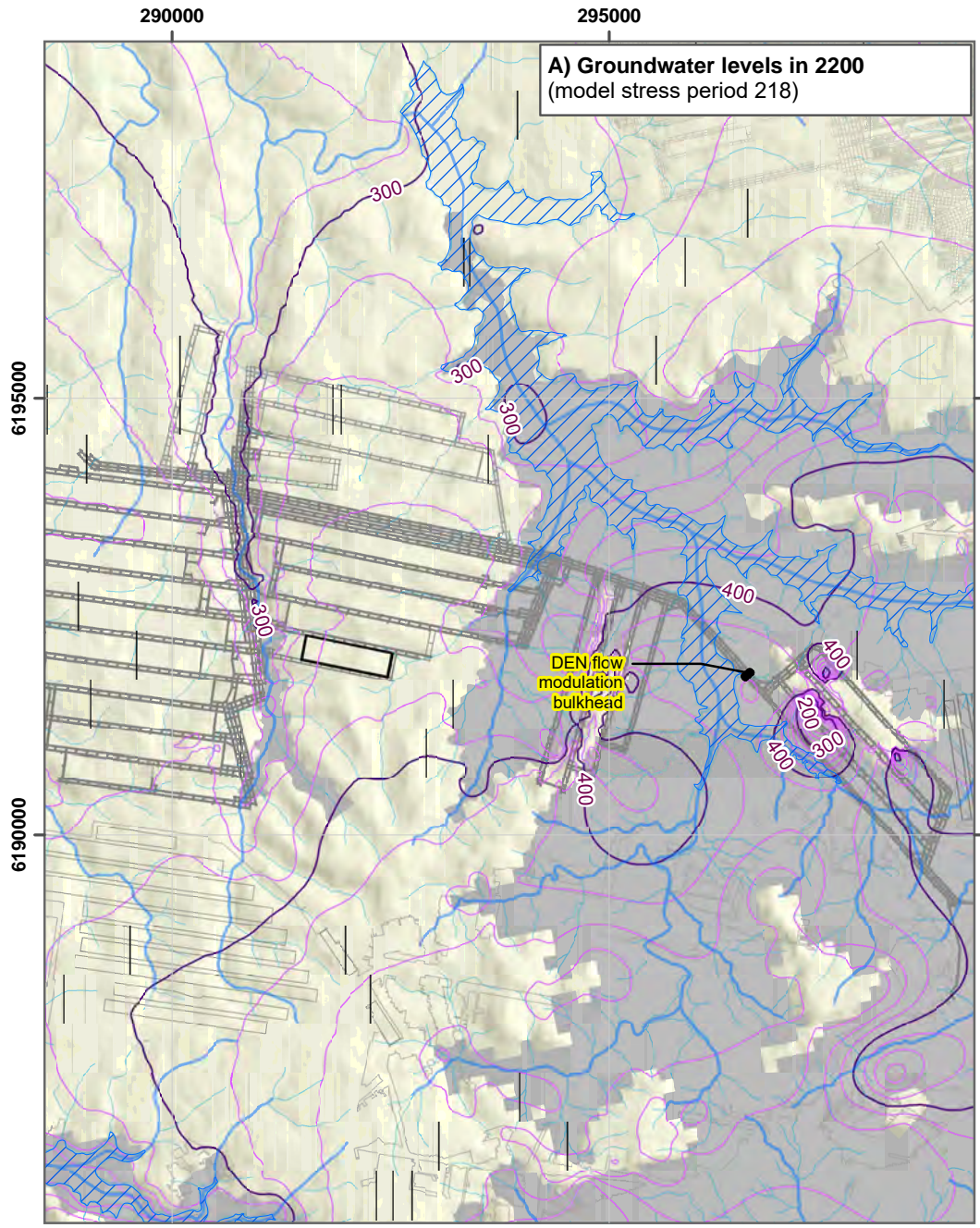
Modelled groundwater levels - HBSS (lower)  
in 2027: a) mAHD, and b) depth to water (mBG)

**Figure G7**
























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-  Lake
-  Watercourse
-  Tribes
-  LW19A void
-  Mine workings
-  Bulkheads (approx location)
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (lower HBSS, L4)

- Depth to water (mBG)
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m

0 0.5 1 1.5 km Scale: 80,000 @A4  
GDA 1994 MGA Zone 56

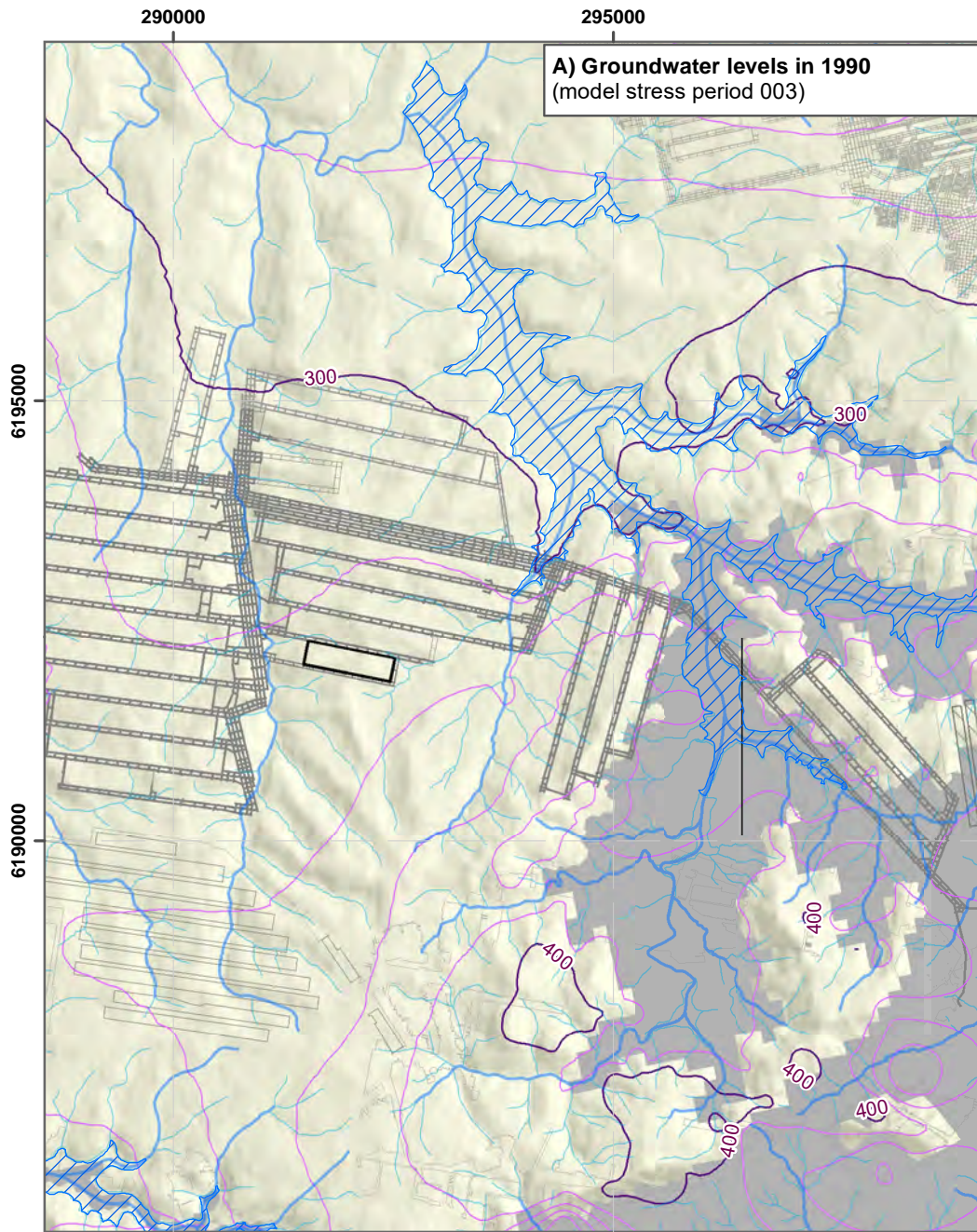


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Modelled groundwater levels - HBSS (lower) in 2200: a) mAHD, and b) depth to water (mBG)

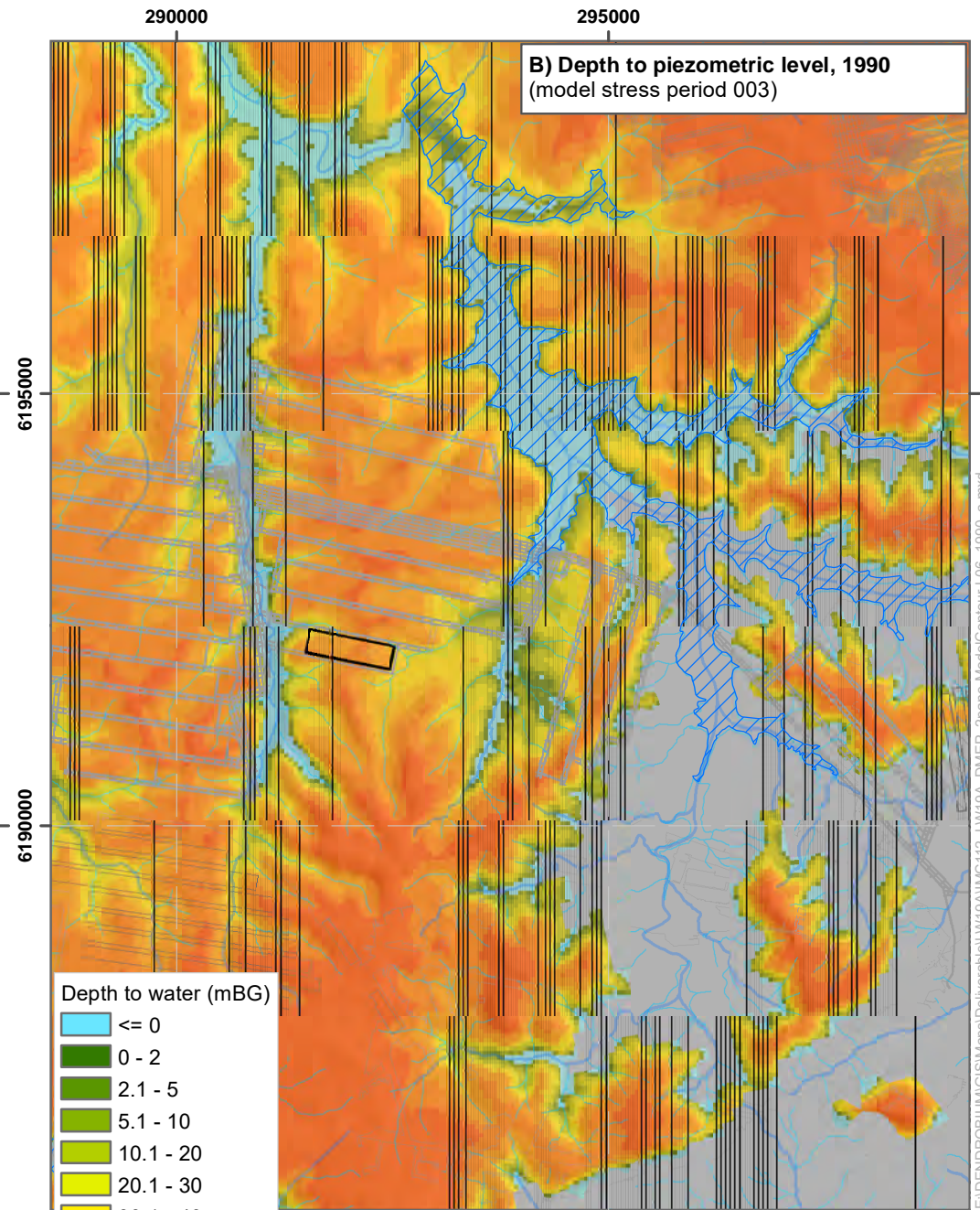
Figure G8












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-  Lake
-  Watercourse
-  Tribs
-  LW19A void
-  Mine workings
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (upper BGSS, L6)



- Depth to water (mBG)
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  > 200m

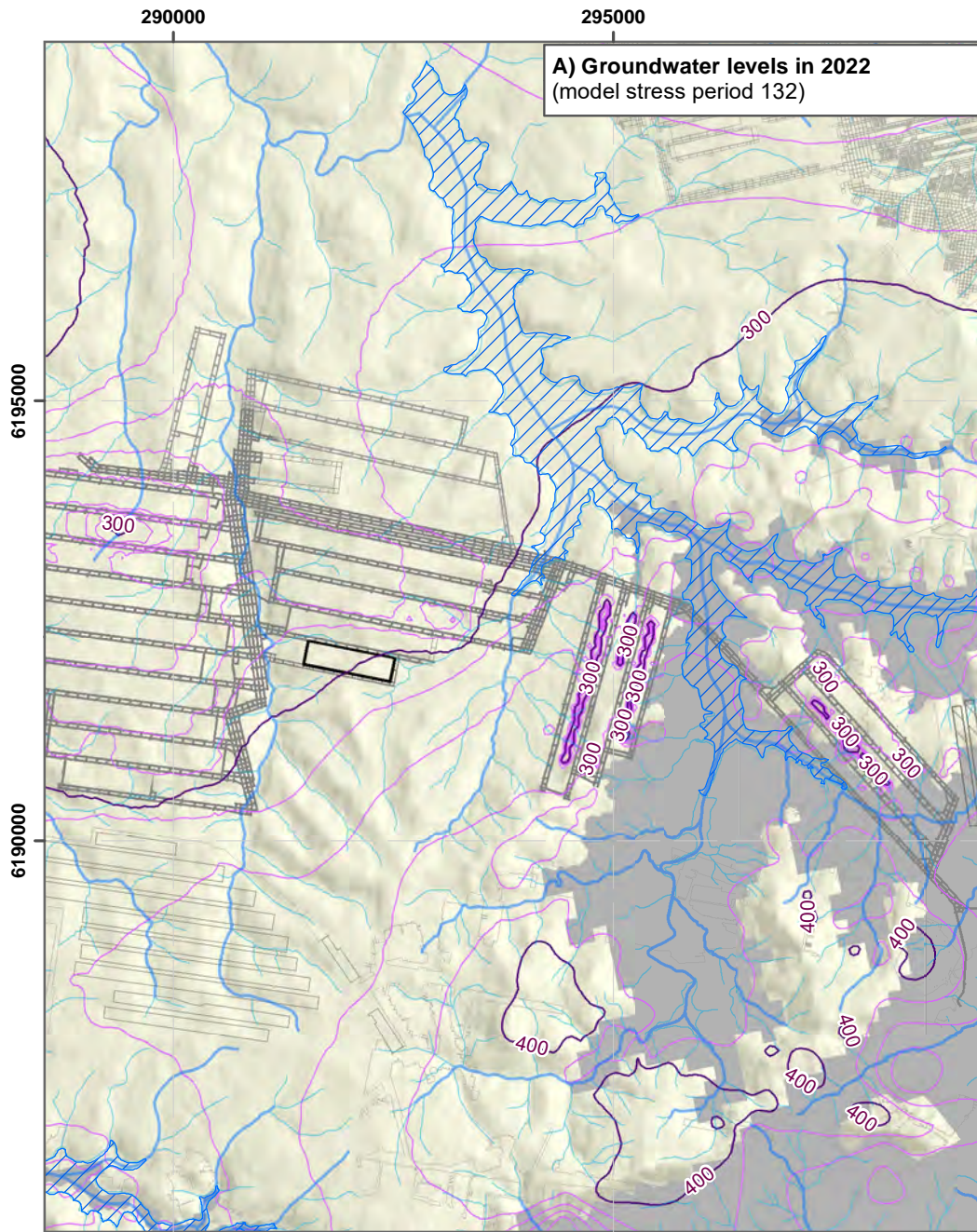
0 0.5 1 1.5 km Scale: 80,000 @A4  
GDA 1994 MGA Zone 56



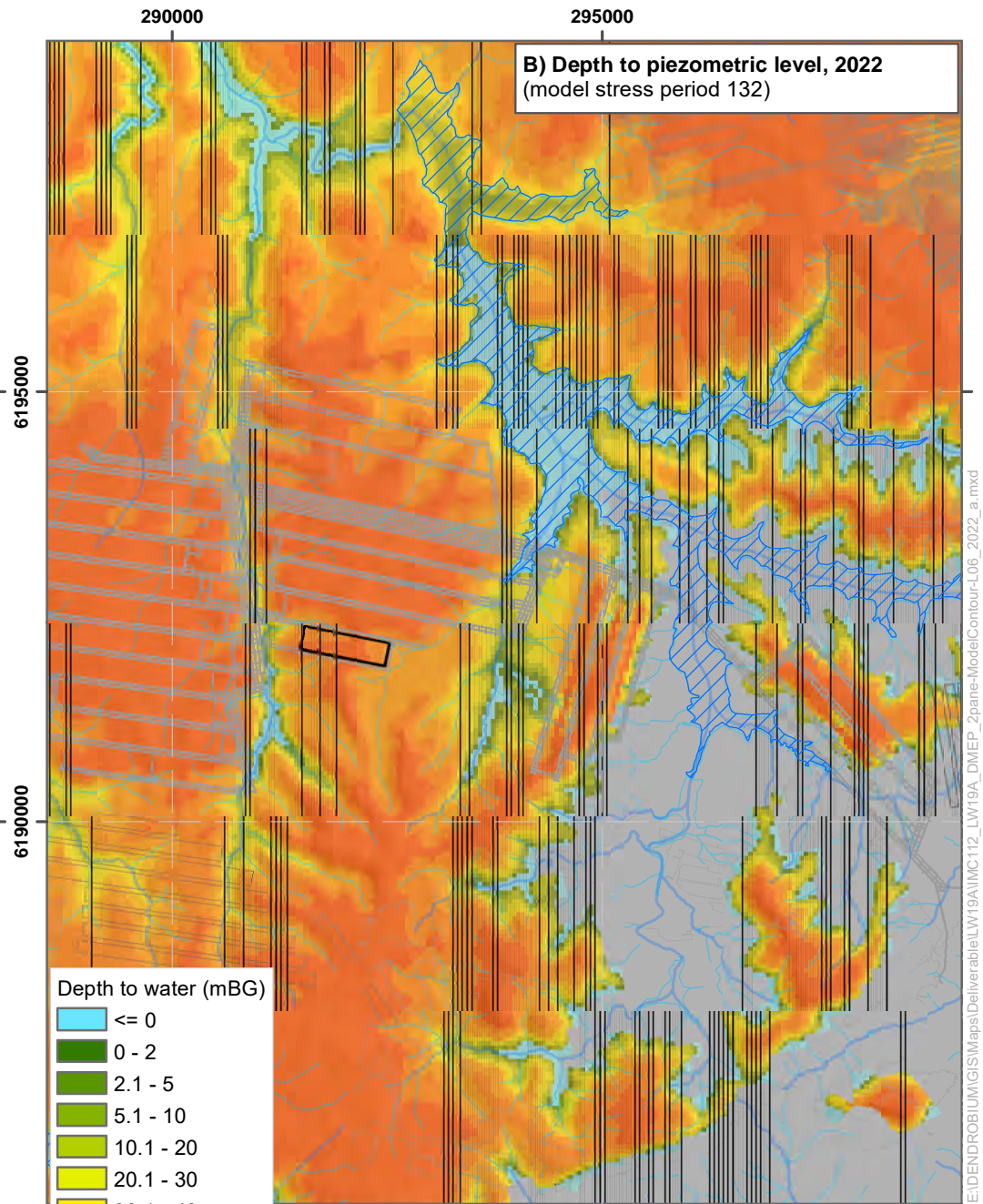
IMC | Dendrobium Mine

Modelled groundwater levels - BGSS (upper) in 1990: a) mAHD, and b) depth to water (mBG)

Figure G9























**A) Groundwater levels in 2022**  
(model stress period 132)



**B) Depth to piezometric level, 2022**  
(model stress period 132)

Rev: A | W Minchin | 23/06/2022

-  Lake
-  Watercourse
-  Tribes
-  LW19A void
-  Mine workings
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (upper BGSS, L6)

- Depth to water (mBG)**
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m

0 0.5 1 1.5 km Scale: 80,000 @A4  
GDA 1994 MGA Zone 56

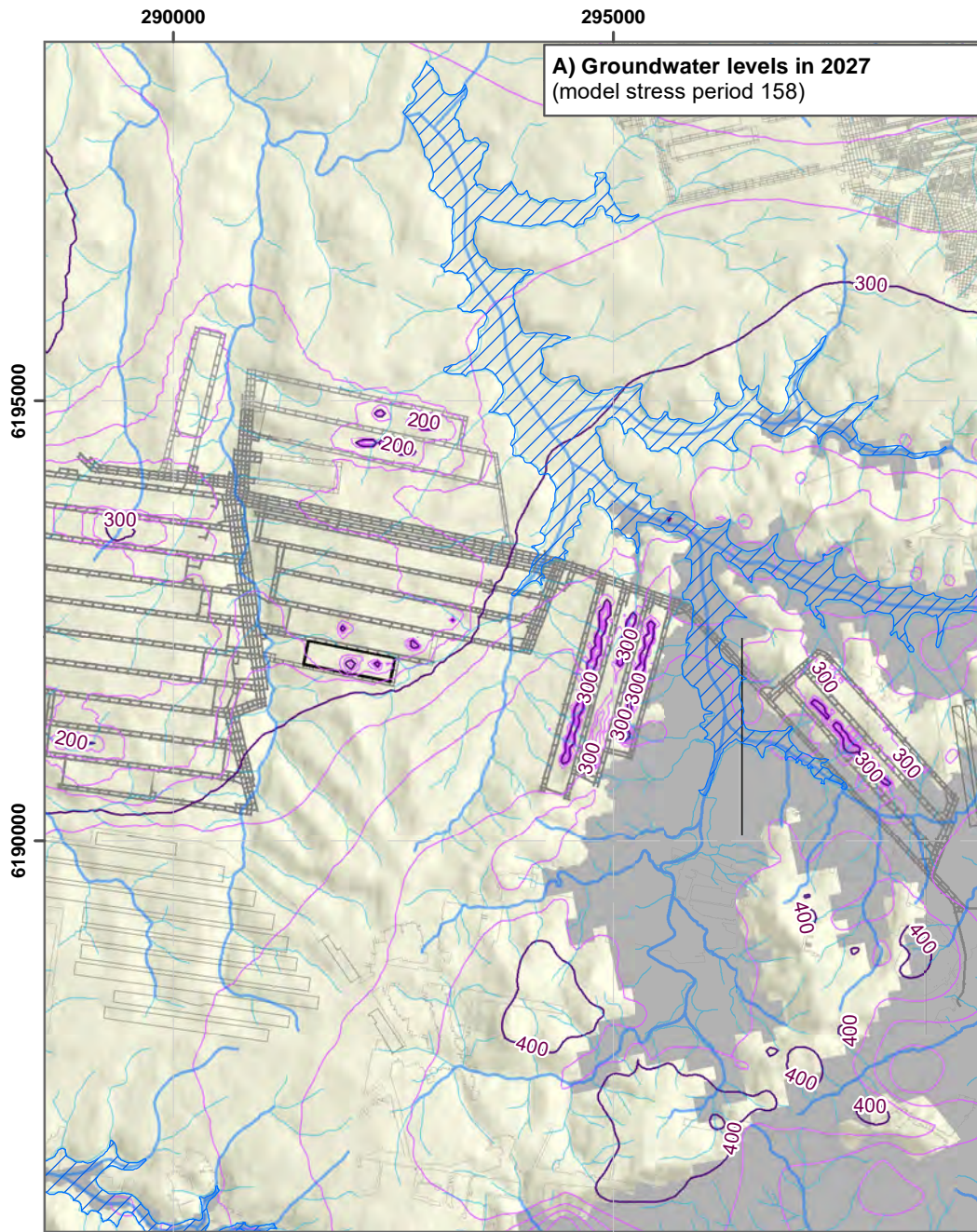


IMC | Dendrobium Mine

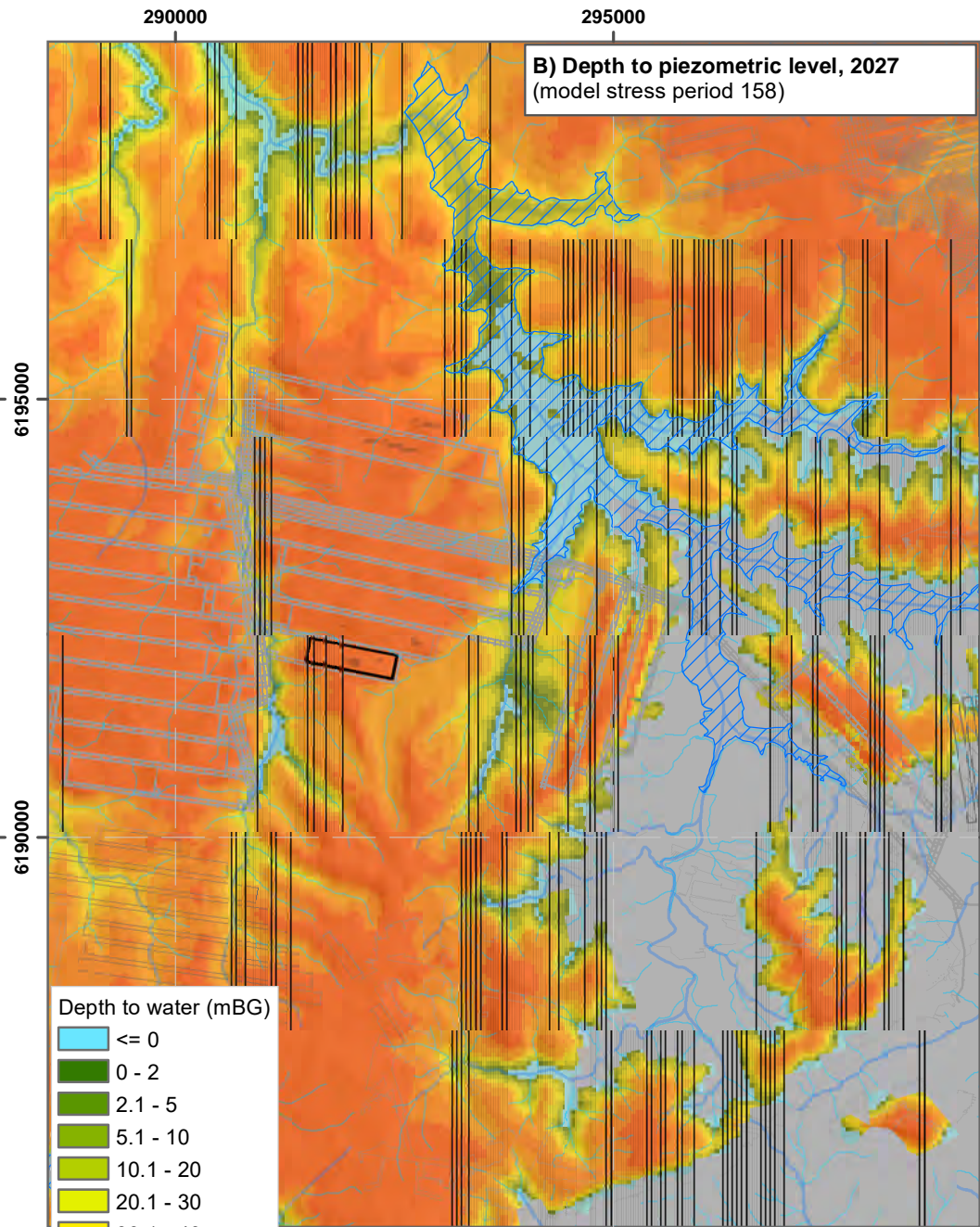
Modelled groundwater levels - BGSS (upper) in 2022: a) mAHD, and b) depth to water (mBG)

**Figure G10**

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**A) Groundwater levels in 2027**  
(model stress period 158)

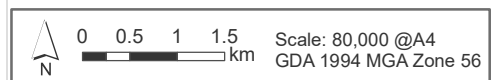


**B) Depth to piezometric level, 2027**  
(model stress period 158)

Rev: A | W Minchin | 23/06/2022

-  Lake
-  Watercourse
-  Tribes
-  LW19A void
-  Mine workings
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (upper BGSS, L6)

- Depth to water (mBG)**
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m

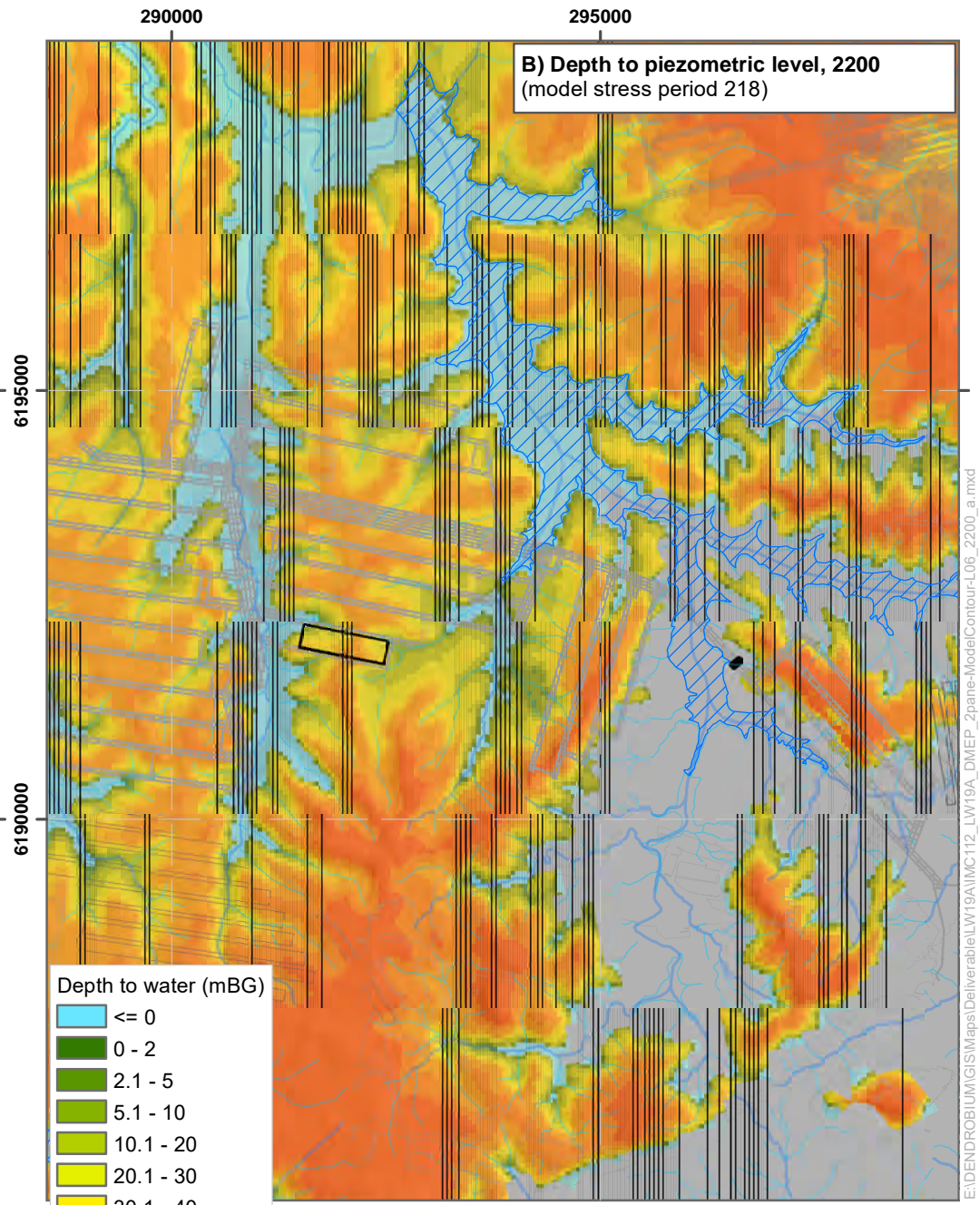
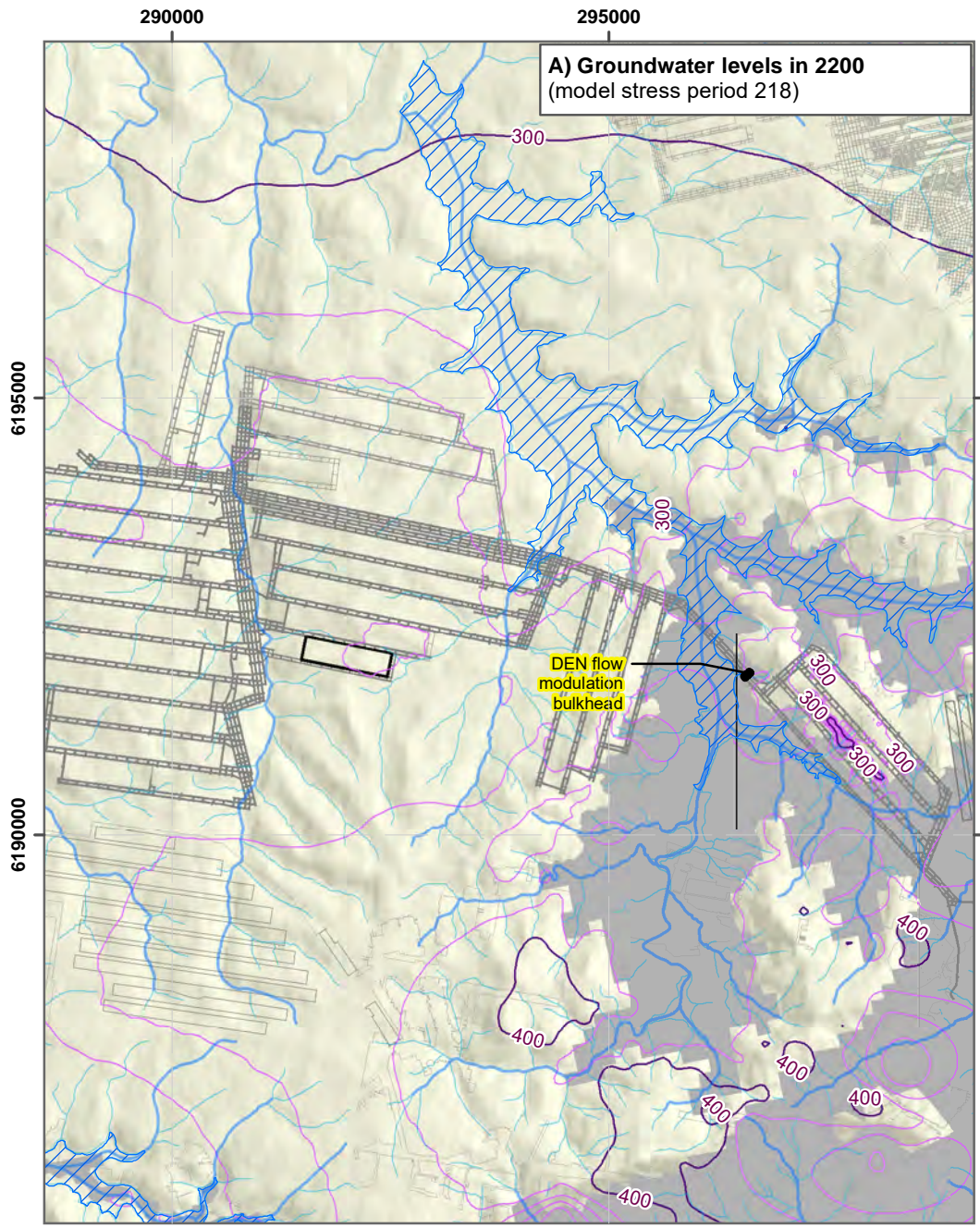


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





Modelled groundwater levels - BGSS (upper) in 2027: a) mASL, and b) depth to water (mBG)













**Figure G11**

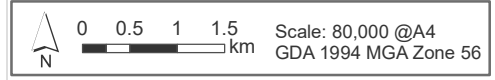
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-  Lake
-  Watercourse
-  Tribes
-  LW19A void
-  Mine workings
-  Bulkheads (approx location)
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (upper BGSS, L6)

- Depth to water (mBG)
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m

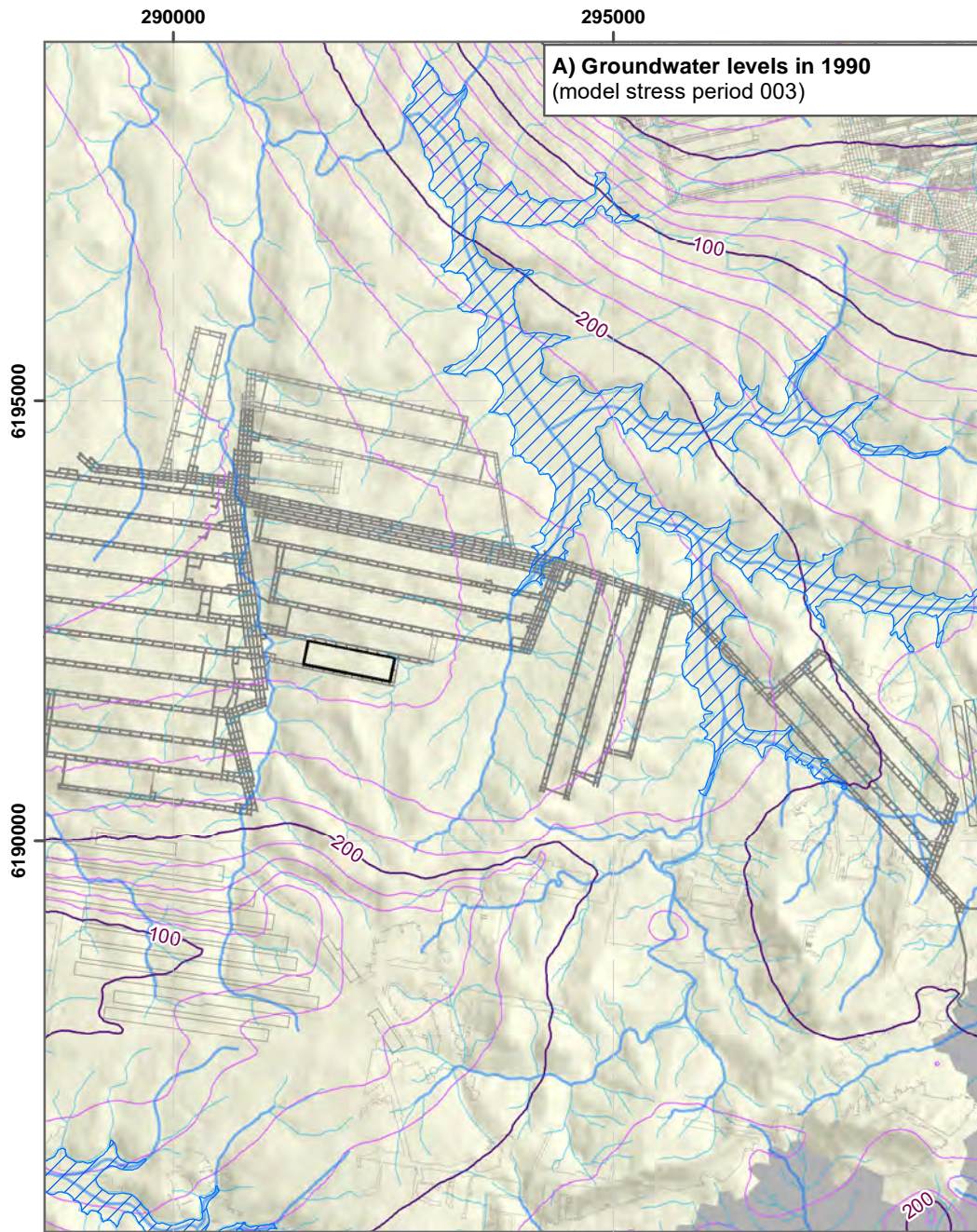


Modelled groundwater levels - BGSS (upper) in 2200: a) mAGD, and b) depth to water (mBG)










Figure G12

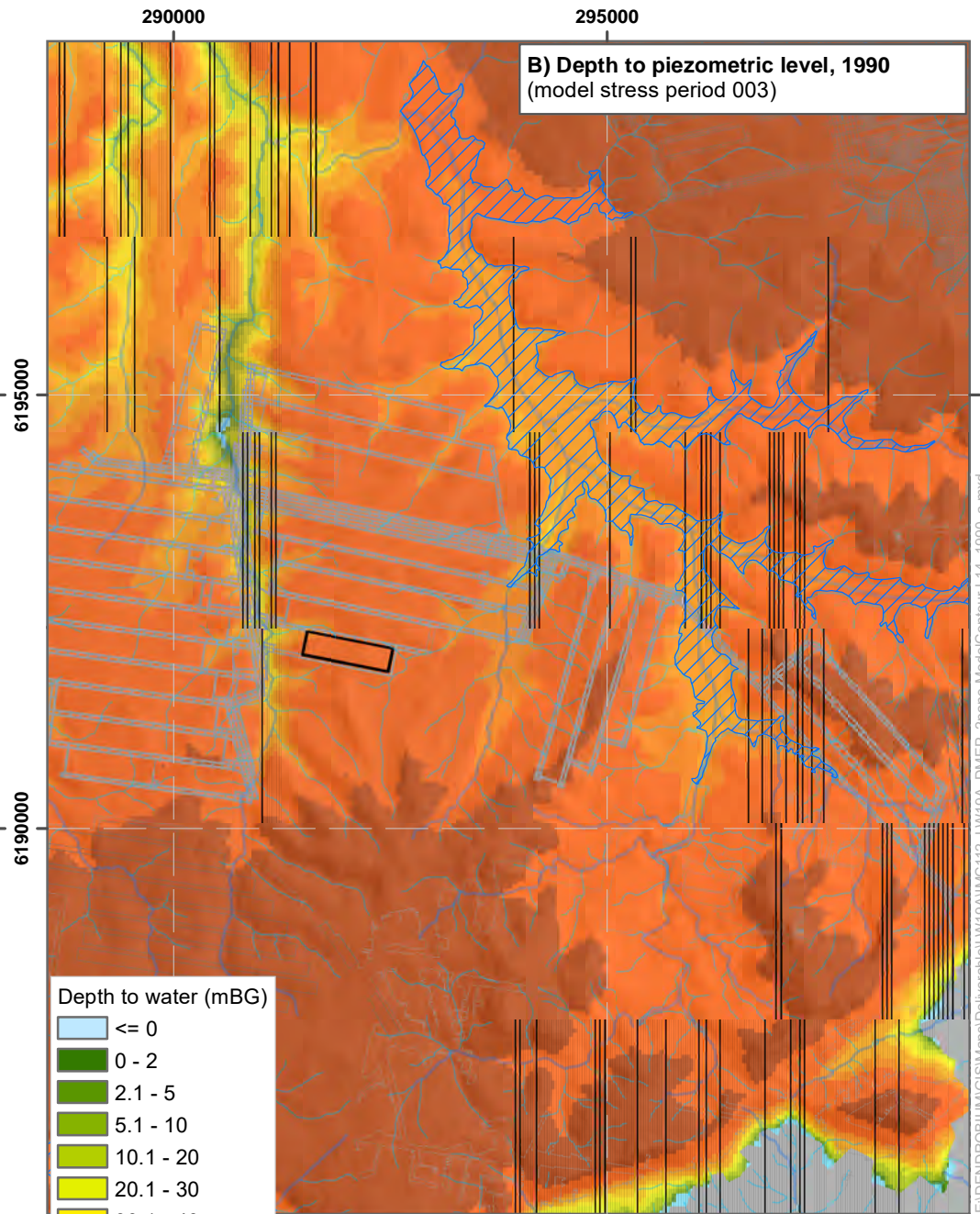
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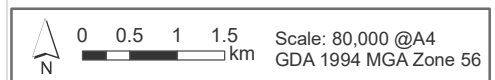


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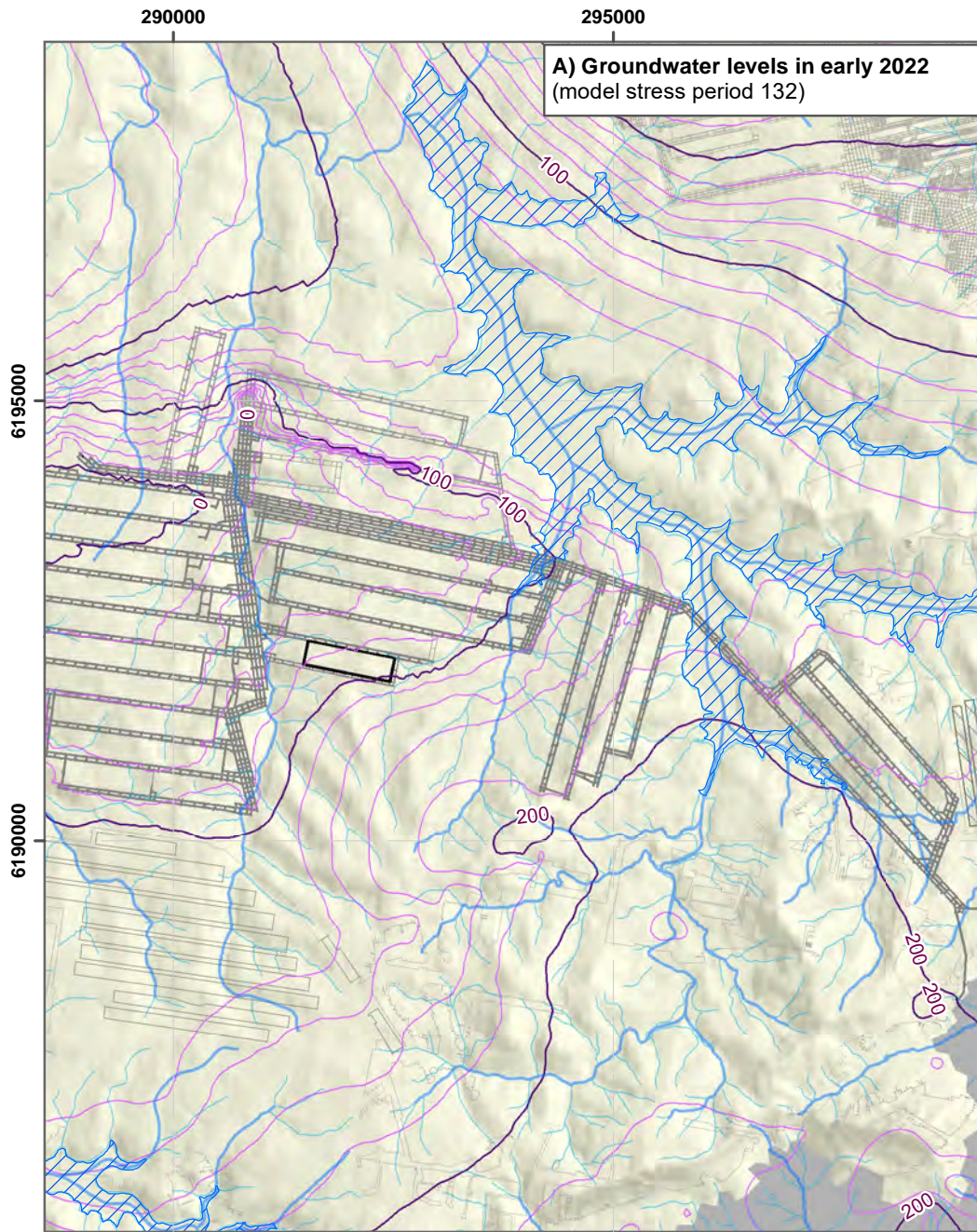
-  Lake
-  Watercourse
-  Tribes
-  LW19A void
-  Mine workings
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Groundwater Model extent
-  Inactive area (Wongawilli Seam, L14)



- Depth to water (mBG)
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m

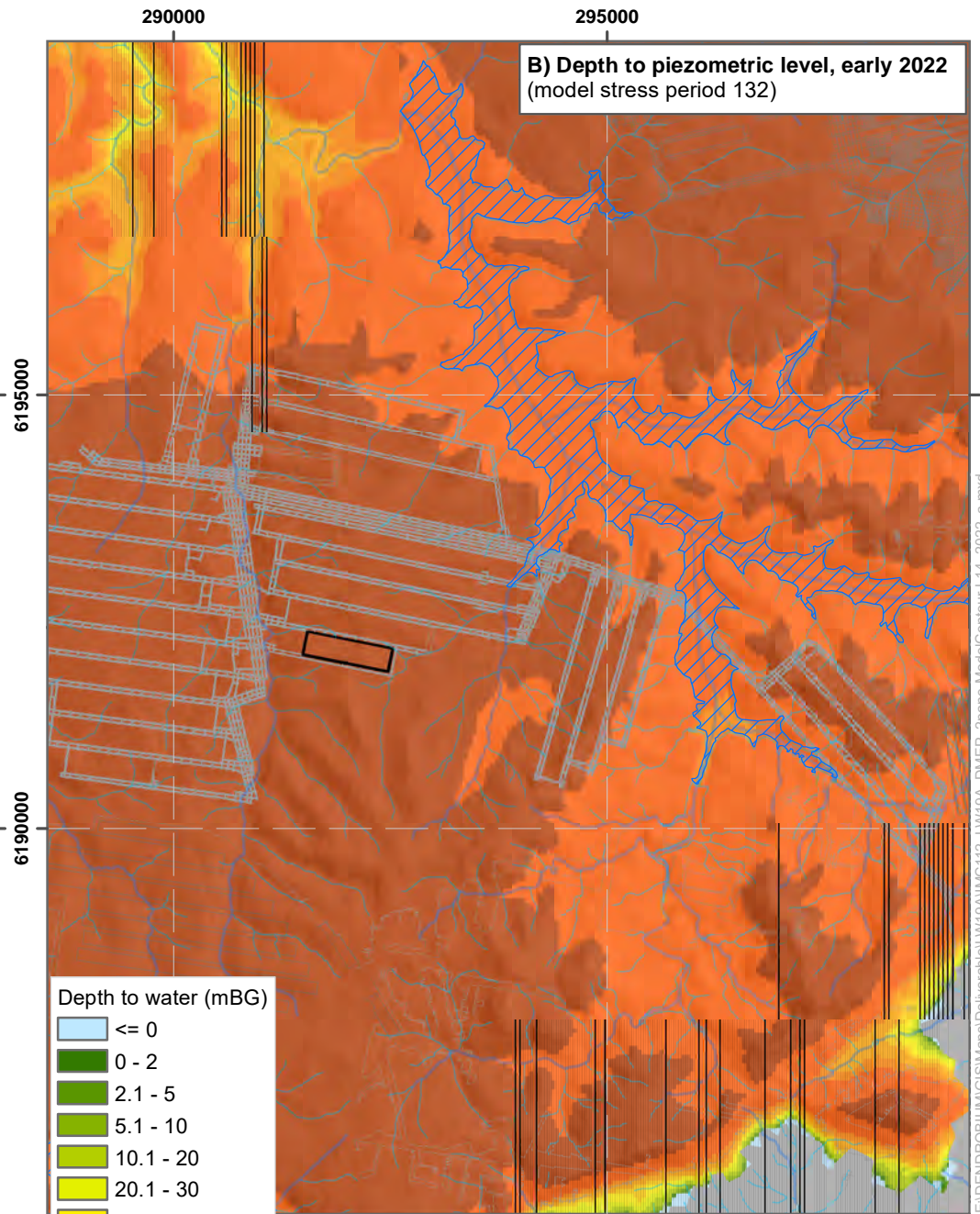


Modelled groundwater levels - Wongawilli Seam in 1990: a) mAHD, and b) depth to water (mBG) **Figure G13**



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- Lake
- Watercourse
- Tribes
- LW19A void
- Mine workings
- Modelled groundwater level (100m interval)
- Modelled groundwater level (20m interval)
- Groundwater Model extent
- Inactive area (Wongawilli Seam, L14)



Depth to water (mBG)

- ≤ 0
- 0 - 2
- 2.1 - 5
- 5.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 75
- 75.1 - 100
- 100.1 - 200
- > 200m

0 0.5 1 1.5 km Scale: 80,000 @A4  
GDA 1994 MGA Zone 56

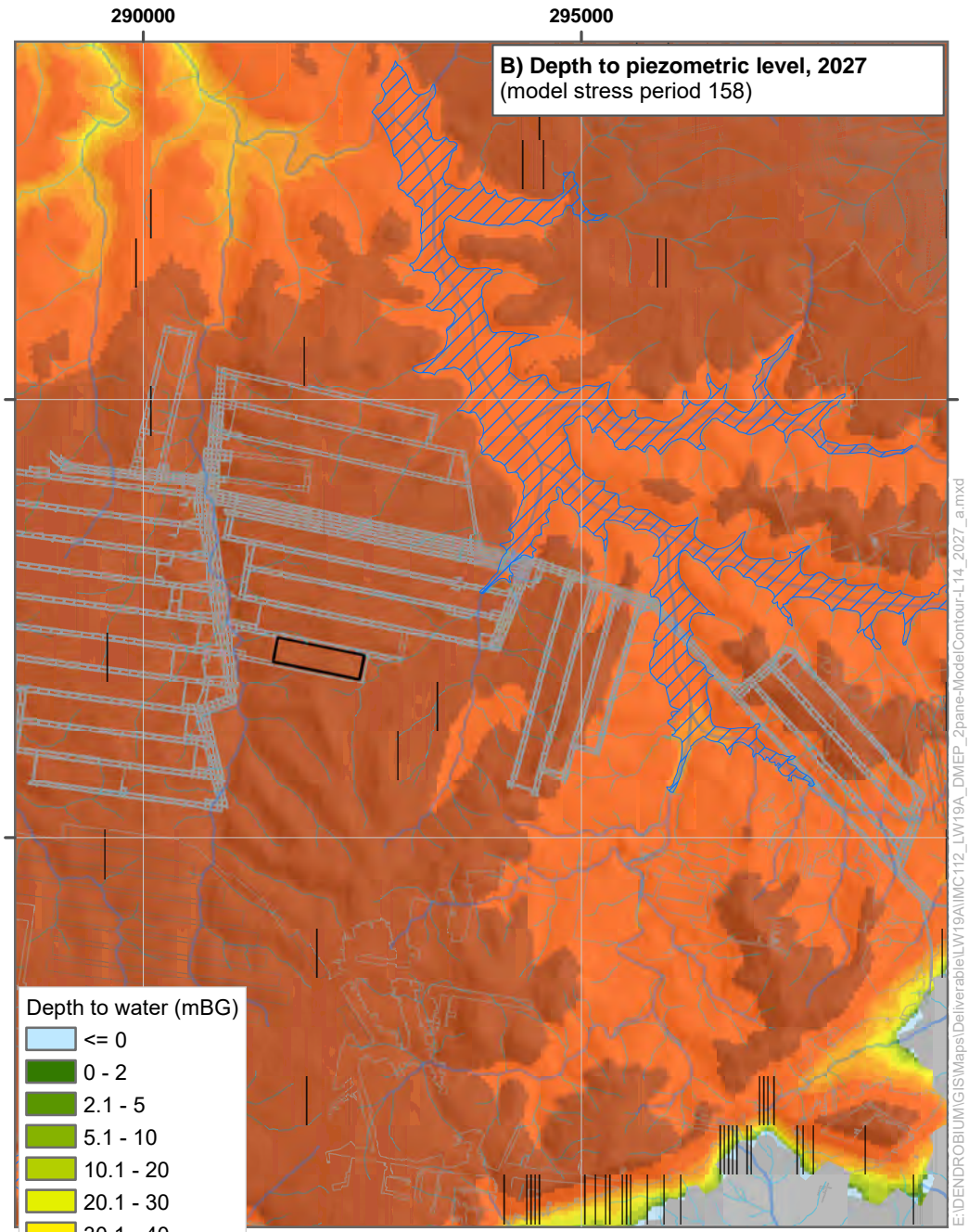
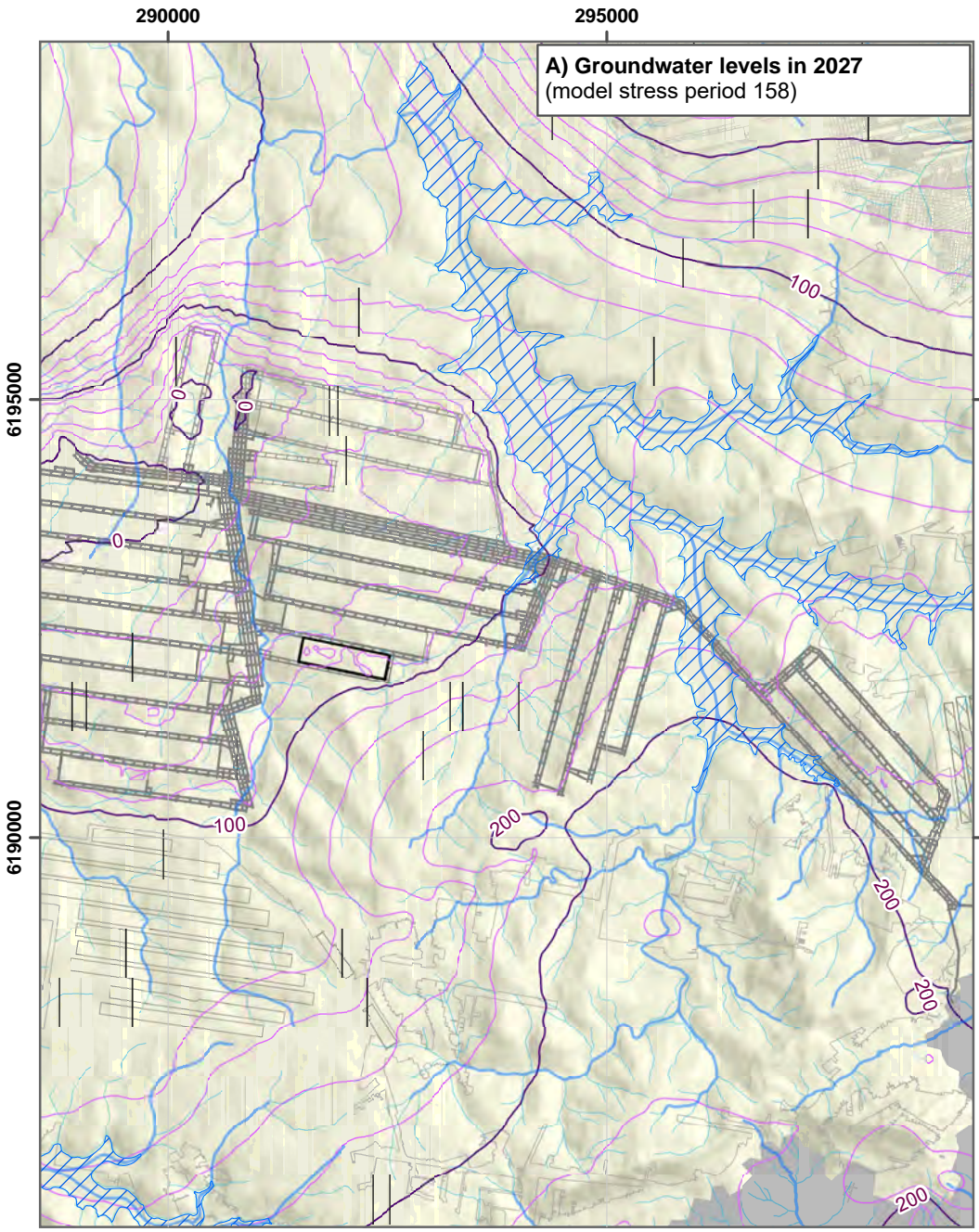


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Modelled groundwater levels - Wongawilli Seam in 2022: a) mAGD, and b) depth to water (mBG)

Figure G14

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- Lake
- Watercourse
- Tribs
- LW19A void
- Mine workings
- Modelled groundwater level (100m interval)
- Modelled groundwater level (20m interval)
- Groundwater Model extent
- Inactive area (Wongawilli Seam, L14)

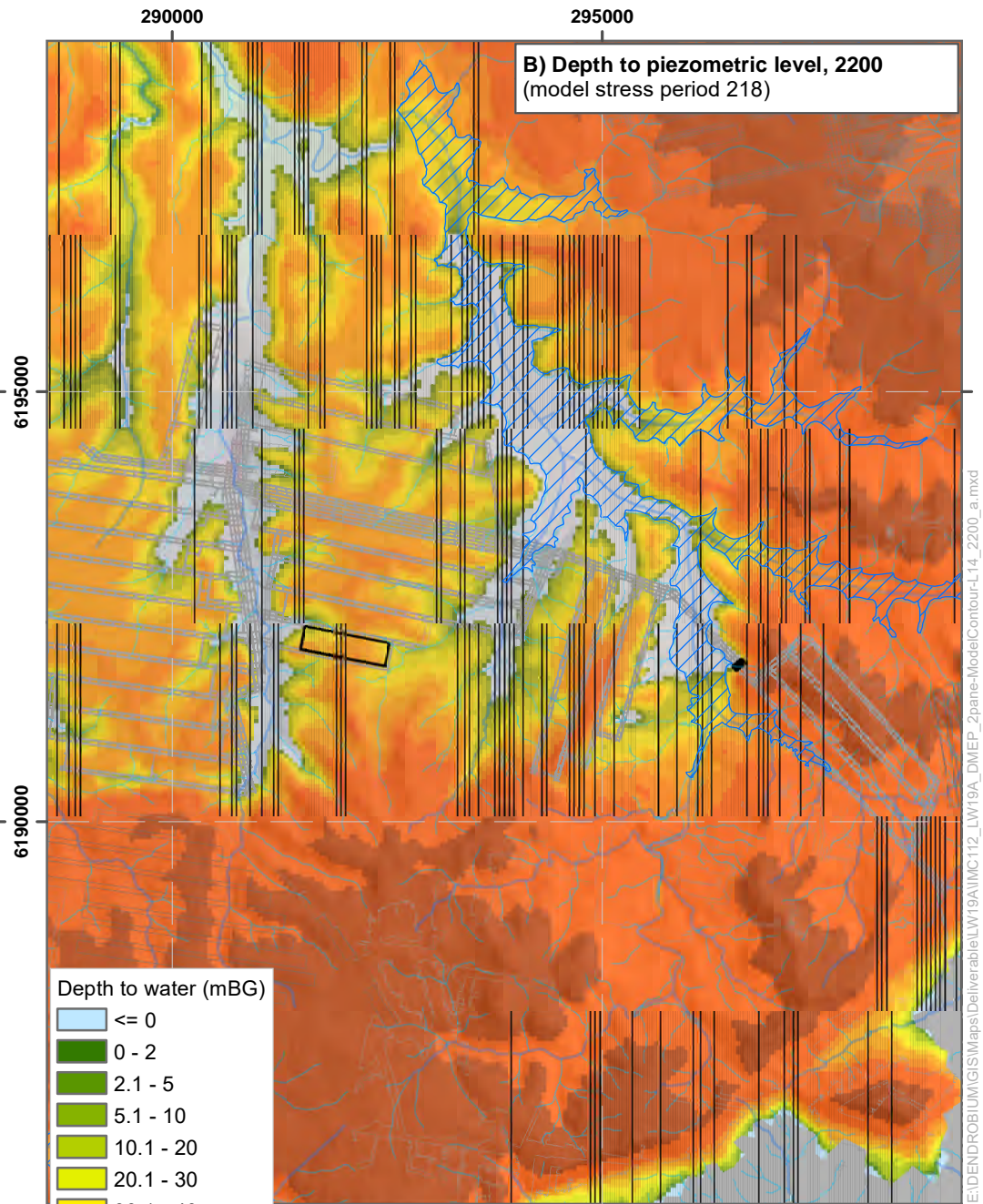
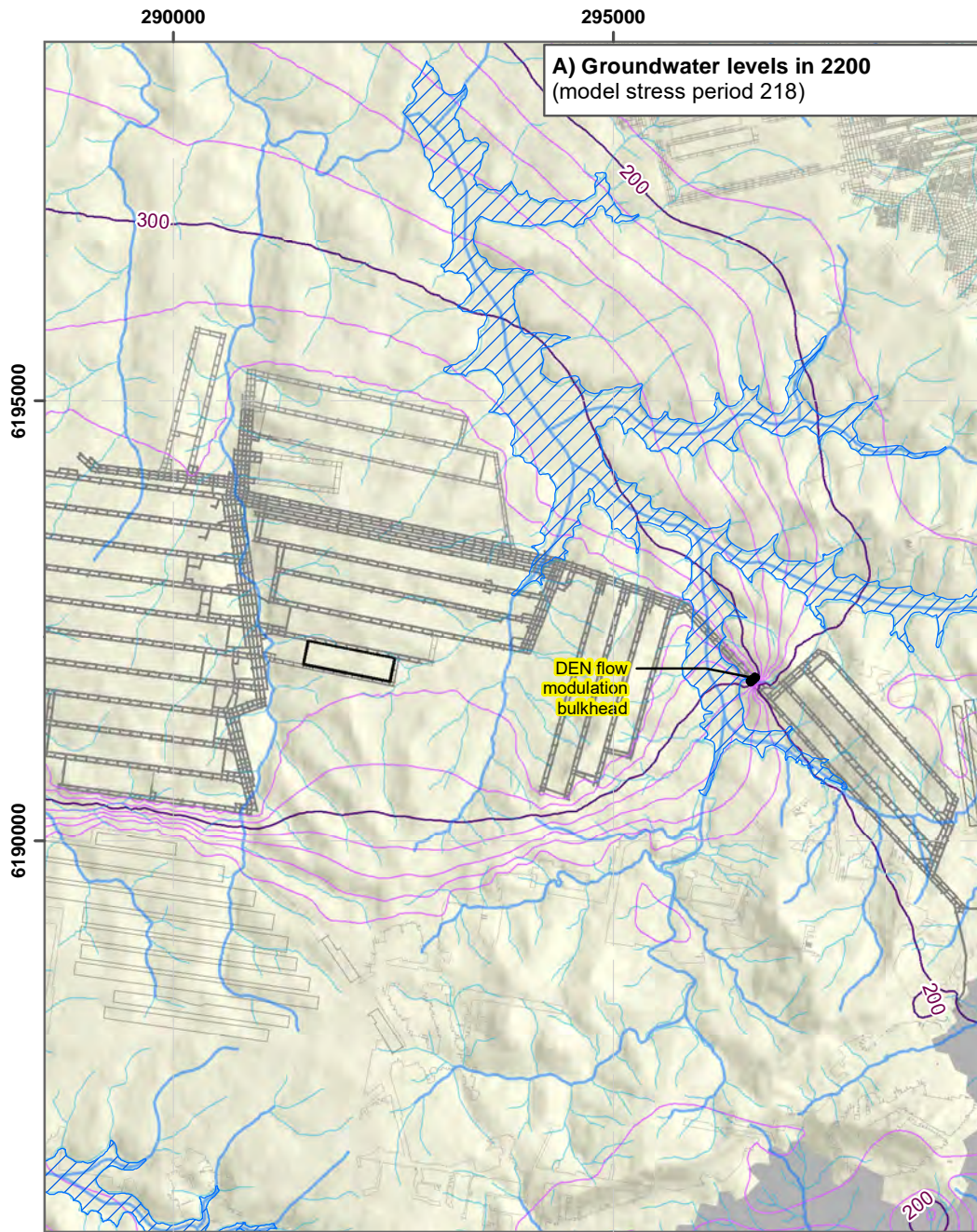
- Depth to water (mBG)
- <= 0
  - 0 - 2
  - 2.1 - 5
  - 5.1 - 10
  - 10.1 - 20
  - 20.1 - 30
  - 30.1 - 40
  - 40.1 - 50
  - 50.1 - 75
  - 75.1 - 100
  - 100.1 - 200
  - > 200m

0 0.5 1 1.5 km Scale: 80,000 @A4  
GDA 1994 MGA Zone 56
























IMC | Dendrobium Mine

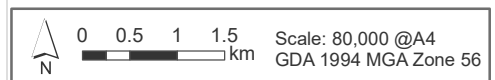
Modelled groundwater levels - Wongawilli Seam in 2027: a) mAHD, and b) depth to water (mBG) **Figure G15**



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-  Lake
-  Watercourse
-  Tribes
-  LW19A void
-  Mine workings
-  Modelled groundwater level (100m interval)
-  Modelled groundwater level (20m interval)
-  Inactive area (Wongawilli Seam, L14)
-  Bulkheads (approx location)

- Depth to water (mBG)
-  <= 0
  -  0 - 2
  -  2.1 - 5
  -  5.1 - 10
  -  10.1 - 20
  -  20.1 - 30
  -  30.1 - 40
  -  40.1 - 50
  -  50.1 - 75
  -  75.1 - 100
  -  100.1 - 200
  -  > 200m



Modelled groundwater levels - Wongawilli Seam in 2200: a) mAHD, and b) depth to water (mBG) **Figure G16**

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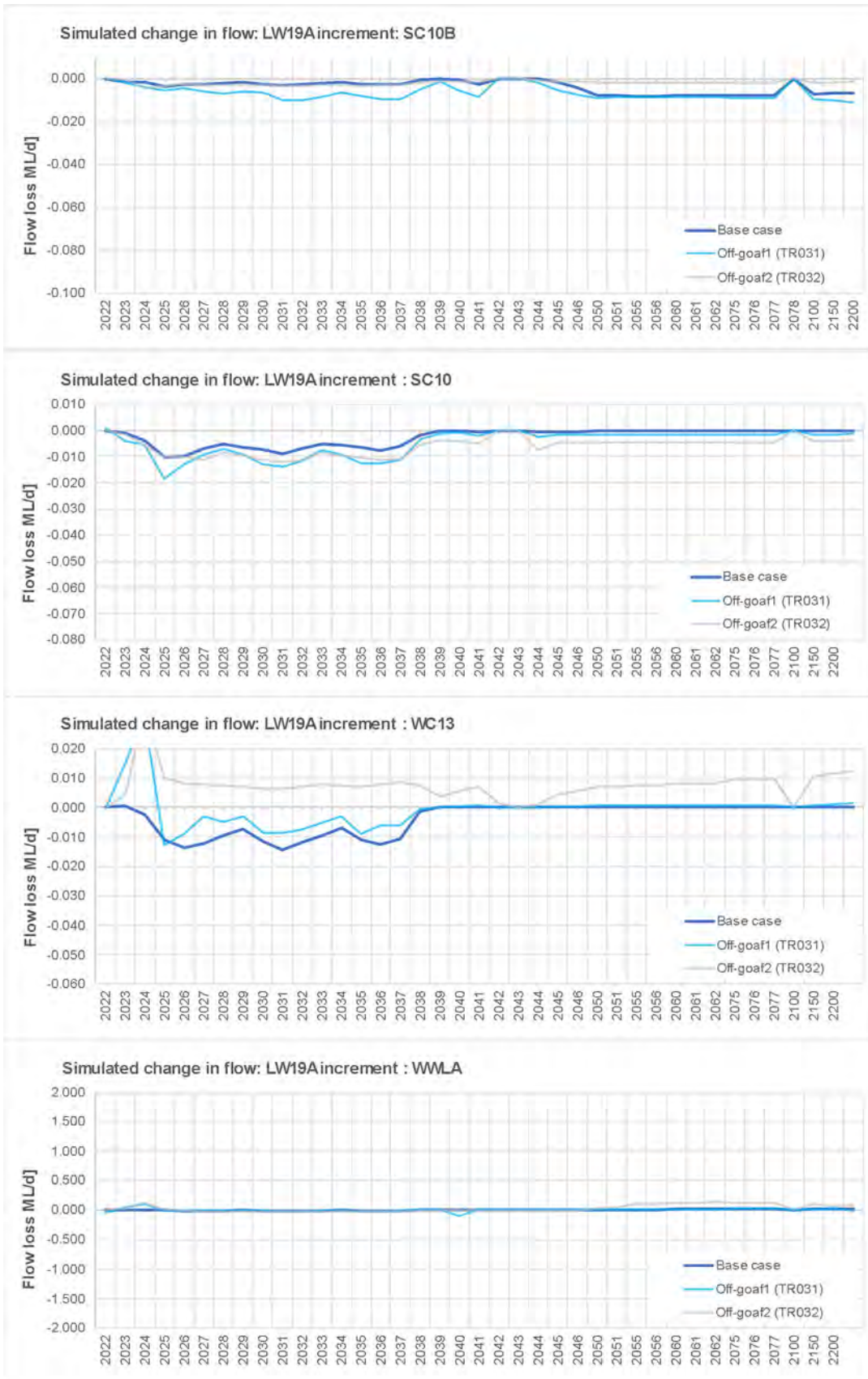
## Appendix H: Predicted surface water losses

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Hydrographs of modelled losses (annualised) are present for selected sites relevant to Longwall 19A



**Figure H1 Simulated surface water flow loss timeseries: Dendrobium effect**



**Figure H2 Simulated surface water flow loss timeseries: Longwall 19A increment**