An attempt to find the missing HP on the 2011 ProR 800 vs the 2010 Dragon 800

Three Seas Polaris technoid Casey Mulkins measured the ProR 800 cylinder port height compared to the more powerful Dragon 800. It appears that the Pro R exhaust ports are 1 mm lower, and transfer ports .5mm lower than the Dragon 800, which would surely explain at least part of the loss in HP from 2010 to 2011. Yes, the pipes and mufflers are different, but it's unlikely that Polaris engineers would reconfigure the D8 pipe to fit into the Pro ride chassis and lose HP. So to try to get the ProR 800 port timing closer to the D8, Casey had a shim created to lift the ProR 800 cylinder high enough to replicate the D8 engine he made so much power with last season. That cylinder lift would be offset by cutting the head flat sealing surface an equal amount, to maintain static uncorrected compression ratio (the most important) and squish clearance.

For comparison, here is a test of Casey's ProR 800 bone stock at 28 degrees F air intake temp thanks to the dyno cold air system:

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	AirInT	Air_1s	FulPrA
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	degF	SCFM	psig
5500	75.8	72.4	0.558	42.1	15.1	31.5	138	62.8
5600	77.3	72.5	0.542	41.7	15.3	31.4	139	62.9
5700	78.8	72.6	0.543	42.6	15.1	31.2	140	62.9
5800	80.7	73.1	0.527	42.4	15.3	31.1	141	62.9
5900	83.3	74.2	0.516	42.8	15.4	31.0	144	62.8
6000	86.5	75.7	0.522	44.9	14.9	30.8	146	62.8
6100	89.0	76.6	0.526	46.6	14.5	30.7	148	62.7
6200	91.8	77.7	0.519	47.4	14.6	30.5	151	62.7
6300	93.5	78.0	0.564	52.5	13.5	30.4	154	62.6
6400	95.6	78.4	0.553	52.6	13.6	30.3	157	62.5
6500	97.7	79.0	0.568	55.3	13.3	30.2	160	62.4
6600	99.6	79.3	0.558	55.3	13.5	30.1	163	62.4
6700	101.8	79.8	0.606	61.4	12.5	30.0	168	62.3
6800	105.4	81.4	0.619	65.0	12.2	29.8	174	62.3
6900	109.7	83.5	0.604	66.1	12.4	29.7	179	62.3
7000	113.5	85.1	0.622	70.4	11.9	29.5	183	62.2
7100	116.7	86.3	0.629	73.2	11.6	29.4	186	62.1
7200	119.5	87.2	0.630	75.2	11.6	29.2	190	62.0
7300	123.0	88.5	0.619	75.9	11.7	29.1	194	62.0
7400	127.6	90.6	0.621	79.1	11.4	28.9	197	61.8
7500	131.5	92.1	0.610	80.1	11.5	28.8	201	61.7
7600	135.4	93.6	0.605	81.7	11.5	28.7	205	61.8
7700	138.1	94.2	0.603	83.1	11.4	28.6	207	61.7
7800	140.2	94.4	0.581	81.3	11.7	28.5	208	61.8
7900	141.5	94.1	0.559	79.0	12.1	28.4	208	61.8
8000	142.7	93.7	0.562	80.2	11.9	28.2	209	61.9
8100	143.5	93.1	0.550	78.9	12.1	28.1	209	62.0
8200	143.8	92.1	0.542	77.9	12.3	28.0	209	62.0
8300	142.9	90.4	0.548	78.3	12.2	27.8	209	61.9

Casey took this stocker and had the cylinder shimmed up with custom base gasket spacers, and head cut to match. This would come close to the port timing of his trail ported D8 that made 170HP with Dynoport exhaust least season. Shimming cylinders is a great way to increase HP if port timing is insufficient like it was with the early Cat F8—inexpensive and having no effect on possible warranty issues (if there are mechanical problems). But with the stock exhaust we gained zero HP even though airflow SCFM increased 10%! As you young internet savvy people would ask, WTF?

Now on Casey's first dyno test we had stock fuel flow, and the added 10% airflow created lean mixture, severe deto and timing retarded in the protect-me mode. So we installed our prototype Power Commander PCV and added sufficient fuel flow (10% more fuel at HP peak to match the added 10% airflow SCFM). Unbelievably, we simply matched the stock ProR 800 HP curve! Here it is—lots more airflow SCFM but zero horsepower added. We are all heartbroken, but sometimes the DTR dyno breaks hearts.

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	AirInT	Air_1s	FulPrA
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	degF	SCFM	psig
6100	86.3	74.3	0.533	45.7	15.9	27.6	159	62.5
6200	87.4	74.0	0.554	48.2	15.2	27.5	160	62.4
6300	89.8	74.9	0.580	51.9	14.4	27.3	163	62.3
6400	92.5	75.9	0.616	56.7	13.4	27.3	167	62.1
6500	94.7	76.6	0.639	60.3	12.9	27.2	170	62.1
6600	96.6	76.9	0.628	60.4	13.1	27.1	172	62.0
6700	98.4	77.1	0.656	64.3	12.5	27.0	176	61.9
6800	102.5	79.2	0.649	66.3	12.7	26.9	183	61.7
6900	105.2	80.1	0.648	67.9	12.6	26.8	186	61.6
7000	107.6	80.8	0.656	70.3	12.4	26.8	190	61.6
7100	110.7	81.9	0.644	71.0	12.6	26.7	195	61.6
7200	116.9	85.3	0.613	71.4	12.9	26.6	202	61.6
7300	121.4	87.4	0.593	71.8	13.1	26.5	206	61.5
7400	125.9	89.3	0.587	73.7	13.1	26.4	210	61.5
7500	129.6	90.8	0.568	73.5	13.3	26.4	214	61.5
7600	134.4	92.9	0.574	76.9	12.9	26.3	218	61.4
7700	137.8	94.0	0.578	79.5	12.7	26.2	220	61.4
7800	140.1	94.3	0.581	81.1	12.5	26.2	222	61.3
7900	141.7	94.2	0.578	81.7	12.5	26.1	224	61.3
8000	142.3	93.4	0.576	81.6	12.6	26.1	225	61.3
8100	141.9	92.0	0.593	83.8	12.3	26.0	226	61.2
8200	140.2	89.8	0.606	84.8	12.2	25.9	226	61.2
8300	137.0	86.7	0.634	86.6	11.9	25.9	226	61.1
8400	132.4	82.8	0.648	85.6	12.0	25.8	225	61.1

Where did that extra airflow go? Surely, out the exhaust pipe without adding anything to HP. But is this failure the result of short circuiting of mixture because transfer ports are now higher than the Dragon 800? Or is the ProR 800 exhaust system the culprit here? SLP is telling us 14 HP more than stock with their prototype pipe and muffler, and BMP

is suggesting 8-9 HP more with their infamous low buck pipe mod. Since this test was done well before BMP did their pipe mod, and nothing available yet from SLP or others we only had stock exhaust to test with.

For now, this sled will be ridden as it is—10% more airflow, 10% fuel added at 100% throttle with PCV, and no extra HP. We will wait for the BMP pipe mod and SLP or other exhaust to see if we can trap some of that extra airflow, and hopefully, make the big HP that we deserve.