Supplementary Table S1. Genetic correlation for grain yield between different datasets for a winter wheat diversity association mapping panel.

Dataset	LND15	LND17	LND18	LND_Com	PUL15	PUL16	PUL17	PUL18
LND17	0.26							
LND18	0.14	0.28						
LND_Com	0.56	0.64	0.64					
PUL15	0.29	0.14	0.02	0.25				
PUL16	0.04	0.01	0.09	0.13	0.05			
PUL17	-0.04	-0.08	-0.04	-0.005	0.24	0.14		
PUL18	-0.14	0.02	0.01	0.01	0.21	0.36	0.23	
PUL_Com	0.17	0.12	0.08	0.21	0.65	0.64	0.24	0.69

Supplementary Table S2. Genetic correlation for grain yield between different datasets for a winter wheat diversity association mapping panel and F5 and DH wheat breeding lines.

Dataset	Diversity association mapping panel								
	LND15	LND177	LND18_	LND_Com	PUL15	PUL16	PUL17_	PUL18	PUL_Com
LND17_F5	-0.15	-0.14	0.07	-0.06	-0.18	0.21	-0.16	0.02	-0.009
LND18_DH	0.08	0.05	0.03	0.03	-0.04	0.04	-0.05	0.02	0.05
PUL17_F5	-0.1	-0.11	0.05	-0.04	-0.02	0.07	-0.02	-0.006	0.009
PUL18_DH	-0.01	-0.07	0.007	-0.02	-0.004	0.03	0.07	0.06	0.02

Supplementary Table S3. Genetic correlation for grain yield between different datasets for the F5 and DH winter wheat breeding lines.

Dataset	LND17_F5	LND18_DH	PUL17_F5
LND18_DH	-0.06		
PUL17_F5	0.30	-0.07	
PUL18_DH	-0.13	-0.07	0.02

Supplementary Table S4. Additive and total genetic variances observed for grain yield across different US Pacific Northwest soft winter wheat populations.

Population	Dataset	$\sigma^2_{Additive}$	$\sigma^2_{Total\ (Additive\ +\ Non-additive)}$	Proportion of $\sigma^2_{Additive}$
DAP [a]	LND15	0.044	0.0754	0.59
	LND17	0.124	0.171	0.63
	LND18	0.139	0.162	0.86
	LND_Com	0.010	0.020	0.53
	PUL15	0.097	0.270	0.36
	PUL16	0.108	0.222	0.49
	PUL17	0.045	0.103	0.43
	PUL18	0.038	0.227	0.17
	PUL_Com	0.016	0.033	0.33
F5	LND17	0.668	1.126	0.59
	PUL17	0.366	0.591	0.62
DH	LND18	0.252	0.722	0.35
	PUL18	1.613	2.356	0.68

[a] Diversity association mapping panel