

Exempt Wells, Water Planning, and Growth Data Comprehensive Water Review Stakeholder Working Group Working Document

Last update: 10.26.2023

These data are preliminary for SWG discussion purposes. The Stakeholder Working Group will further refine these data requests with input from the public. This is a working document and information compiled was with time limitations. Data from the Water Rights Information System (WRIS) is often limited by the information provided by water right holders.

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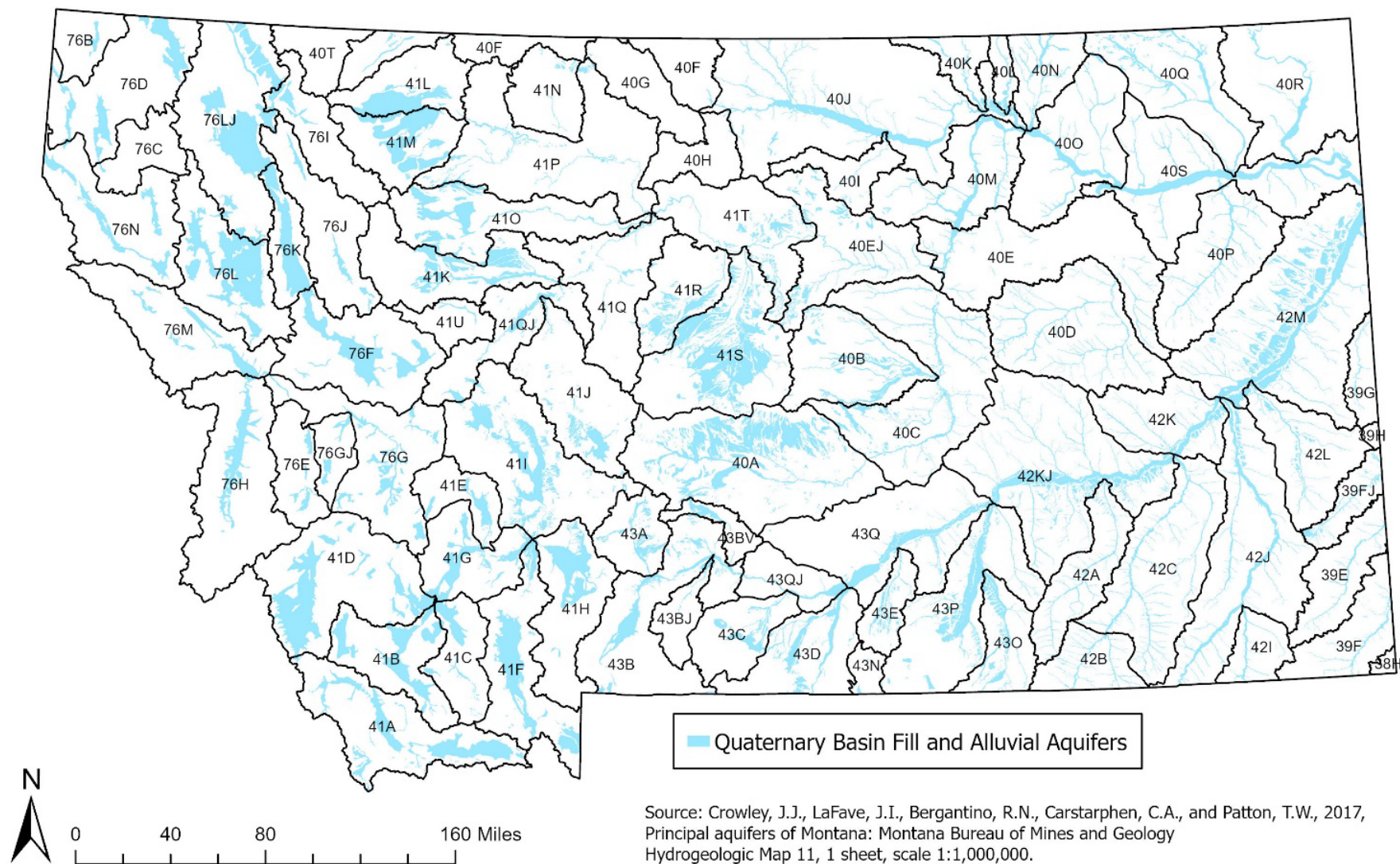
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1. Montana Administrative Basins look-up (table)

Basin #	Basin Name	Basin #	Basin Name
38H	Belle Fourche River, Above Cheyene River	39FJ	Little Beaver Creek
39E	Box Elder Creek	39G	Beaver Creek, Tributary of Little Missouri River
39F	Little Missouri River, Above Little Beaver Creek	39H	Little Missouri, Below Little Beaver Creek
40A	Musselshell River, Above Roundup	40J	Milk River, Between Fresno Reservoir and Whitewater Creek
40C	Musselshell River, Below Roundup	40K	Whitewater Creek
40D	Big Dry Creek	40L	Frenchman Creek
40E	Missouri River, Between Musselshell River and Fort Peck Dam	40M	Beaver Creek, Tributary of Milk River
40EJ	Missouri River, Between Bullwhacker Creek and Musselshell Rivers	40N	Rock Creek, Tributary of Milk River
40F	Milk River, Above Fresno Reservoir	40O	Milk River, Below Whitewater Including Porcupine Creek
40G	Sage Creek	40P	Redwater River
40H	Big Sandy Creek	40Q	Poplar River
41A	Red Rock River	40R	Big Muddy Creek
41B	Beaverhead River	41M	Two Medicine River
41C	Ruby River	41N	Willow Creek
41D	Big Hole River	41O	Teton River
41E	Boulder River, Tributary of Jefferson River	41P	Marias River
41F	Madison River	41Q	Missouri River, From Sun to Marias River
41G	Jefferson River	41QJ	Missouri River, From Holter Dam to Sun River
41H	Gallatin River	41R	Arrow Creek
41I	Missouri River, Above Holter Dam	41S	Judith River
41J	Smith River	41T	Missouri River, From Marias River to and Including Bullwhacker Creek
41K	Sun River	41U	Dearborn River
41L	Cut Bank Creek	42J	Powder River, Below Clear Creek
42A	Rosebud Creek	42K	Yellowstone River, Between Tongue and Powder Rivers
42B	Tongue River, Above and Including Hanging Woman Creek	42KJ	Yellowstone River, Between Bighorn and Tongue Rivers
42C	Tongue River, Below Hanging Woman Creek	42L	O'Fallon Creek
42I	Little Powder River	42M	Yellowstone River, Below Powder River
43A	Shields River	43E	Pryor Creek
43B	Yellowstone River, Above and Including Bridger Creek	43N	Shoshone River
43BJ	Boulder River, Tributary of Yellowstone River	43O	Little Bighorn River
43BV	Sweet Grass Creek	43P	Bighorn River, Below Greybull River
43C	Stillwater River	43Q	Yellowstone River, Between Clarks Fork Yellowstone and Bighorn River

43D	Clarks Fork Yellowstone River	43QJ	Yellowstone River, From Bridger Creek to Clarks Fork Yellowstone River
76B	Yaak River	76I	Flathead River, Middle Fork
76C	Fisher River	76J	Flathead River, South Fork
76D	Kootenai River	76K	Swan River
76E	Rock Creek, Tributary of Clark Fork River	76L	Flathead River, Below Flathead Lake
76F	Blackfoot River	76LJ	Flathead River, to and Including Flathead Lake
76G	Clark Fork, Above Blackfoot River	76M	Clark Fork, Between Blackfoot and Flathead Rivers
76GJ	Flint Creek	76N	Clark Fork, Below Flathead River
76H	Bitterroot River		

2. Montana surficial aquifers overlaid with administrative basin- MBMG (map)



Description:

- Date derived from Montana Bureau of Mines & Geology (MBMG) [publication](#)
- Surficial aquifers are alluvial aquifers comprised of deposited sediments.
- Generally, alluvial aquifers have a more immediate connection to surface water than bedrock aquifers. Information on bedrock aquifers can be found [here](#).

Timeframe: 2017

Summary: n/a

Limitations:

- Not all source aquifers including principal aquifers in Montana are surficial aquifers.
- This data shows the extent of basin-fill and alluvial aquifers but does not consider specific hydraulic connectivity to surface water bodies.
- This data does not show the connection between bedrock aquifers and basin-fill and alluvial aquifers and therefore potential adverse effects to surface water bodies.

Description:

- MBMG Groundwater Information Center
- MBMG Well Logs - 314,908 entries (Montana State Library download, January 2023)
- MBMG Well Logs with Proposed Use of Water not including monitoring, unused, test well or research – 280,869 entries (includes blanks)

Timeframe: 1882 – 2023

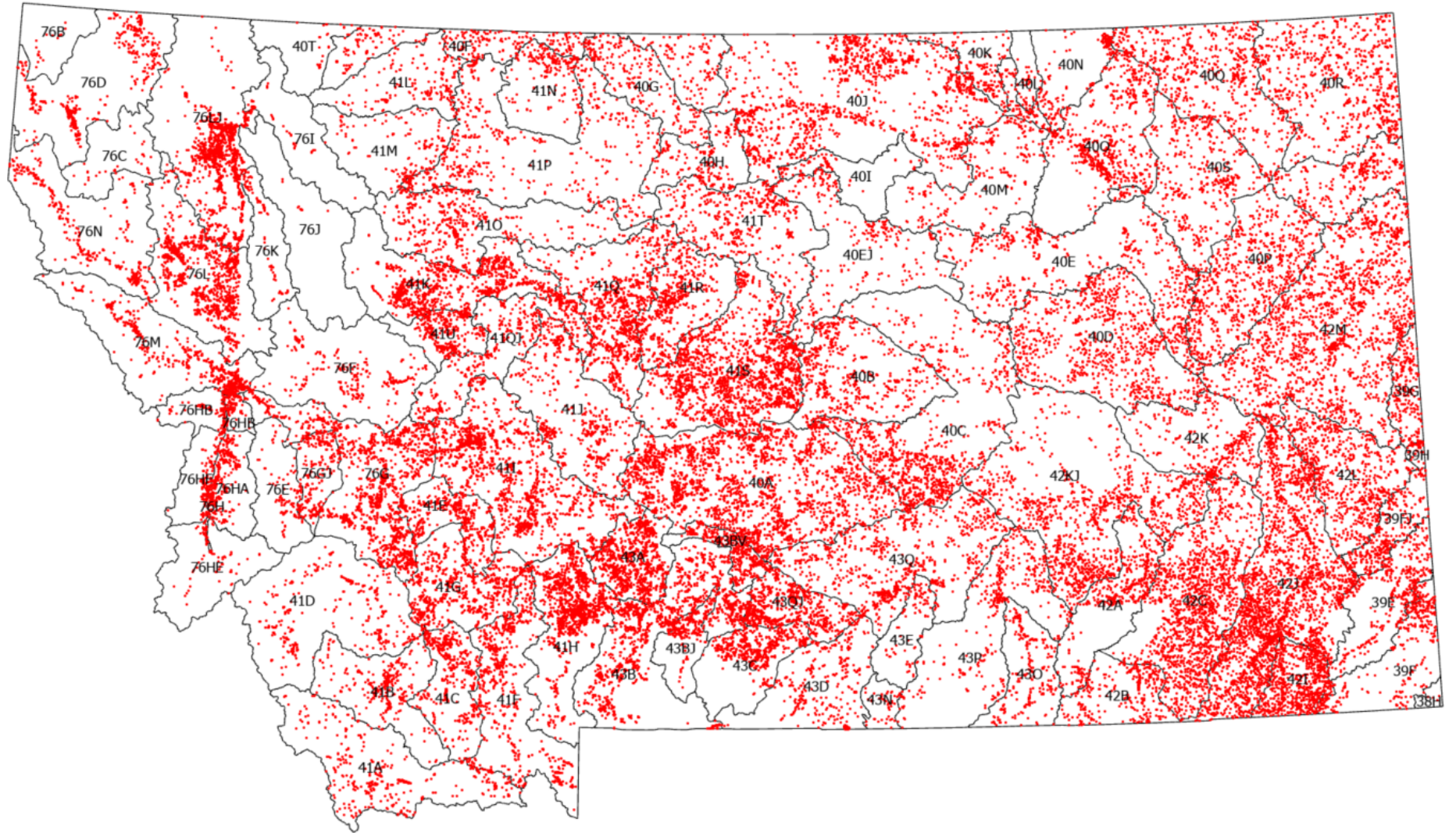
Summary:

- The locations of higher density reflect the same areas as DNRC water right data.

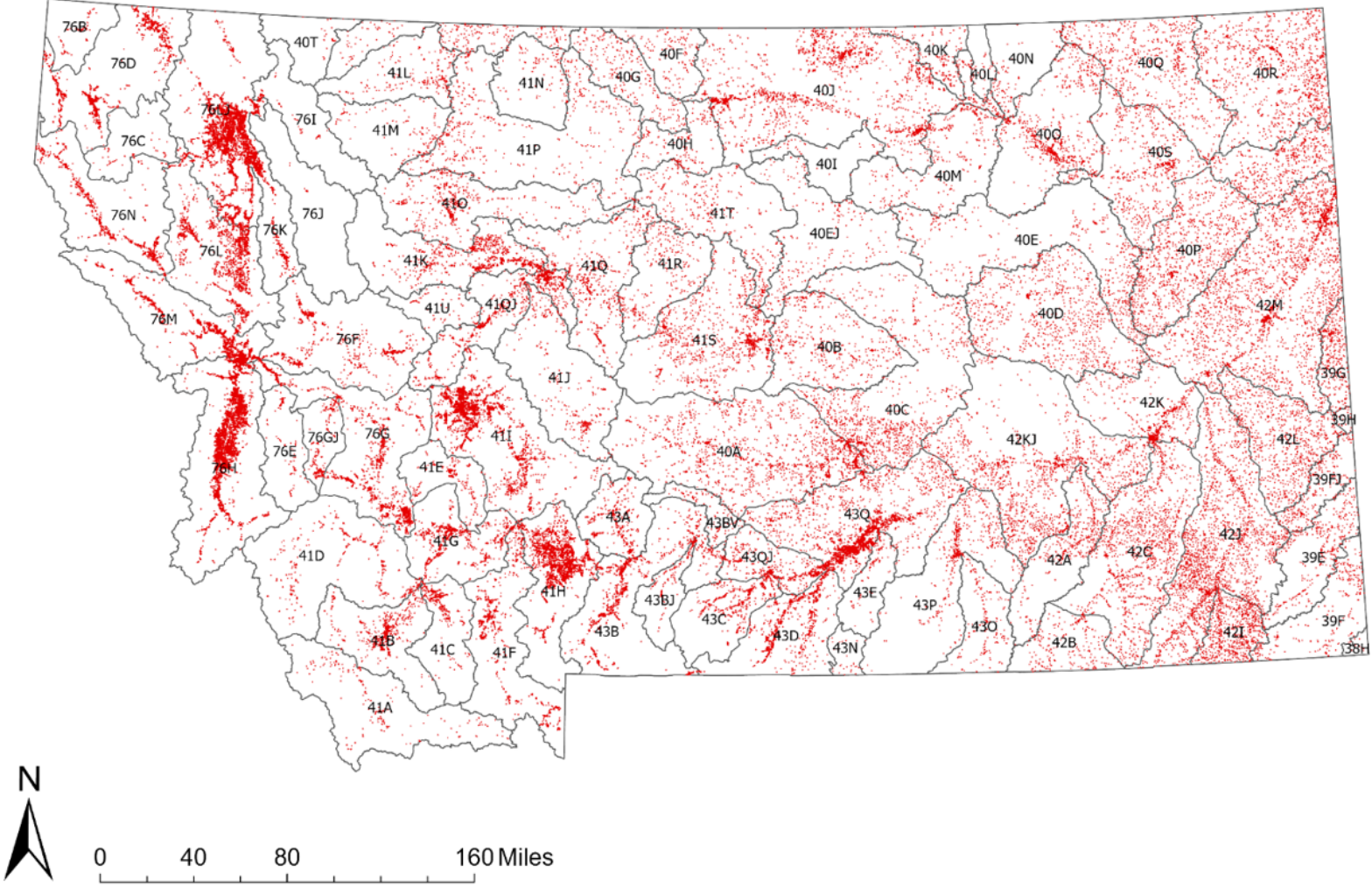
Limitations:

- During 2022, DNRC attempted to match datasets and can confidently match 93,760 records.
- Records will not match because not all drilled wells require water rights, e.g., pre-1973 wells exempt from claim filing, monitoring wells, dry wells, injection wells, wells not put to beneficial use and non-compliant wells etc.
- Approximately 10 percent of wells in the GWIC database have monitoring, unused, test well or research as a purpose. The distribution of these wells that do not have an assigned beneficial use have no apparent trends throughout the state.
- 39,956 entries (~13% of total entries) in the GWIC database do not have an assigned purpose.

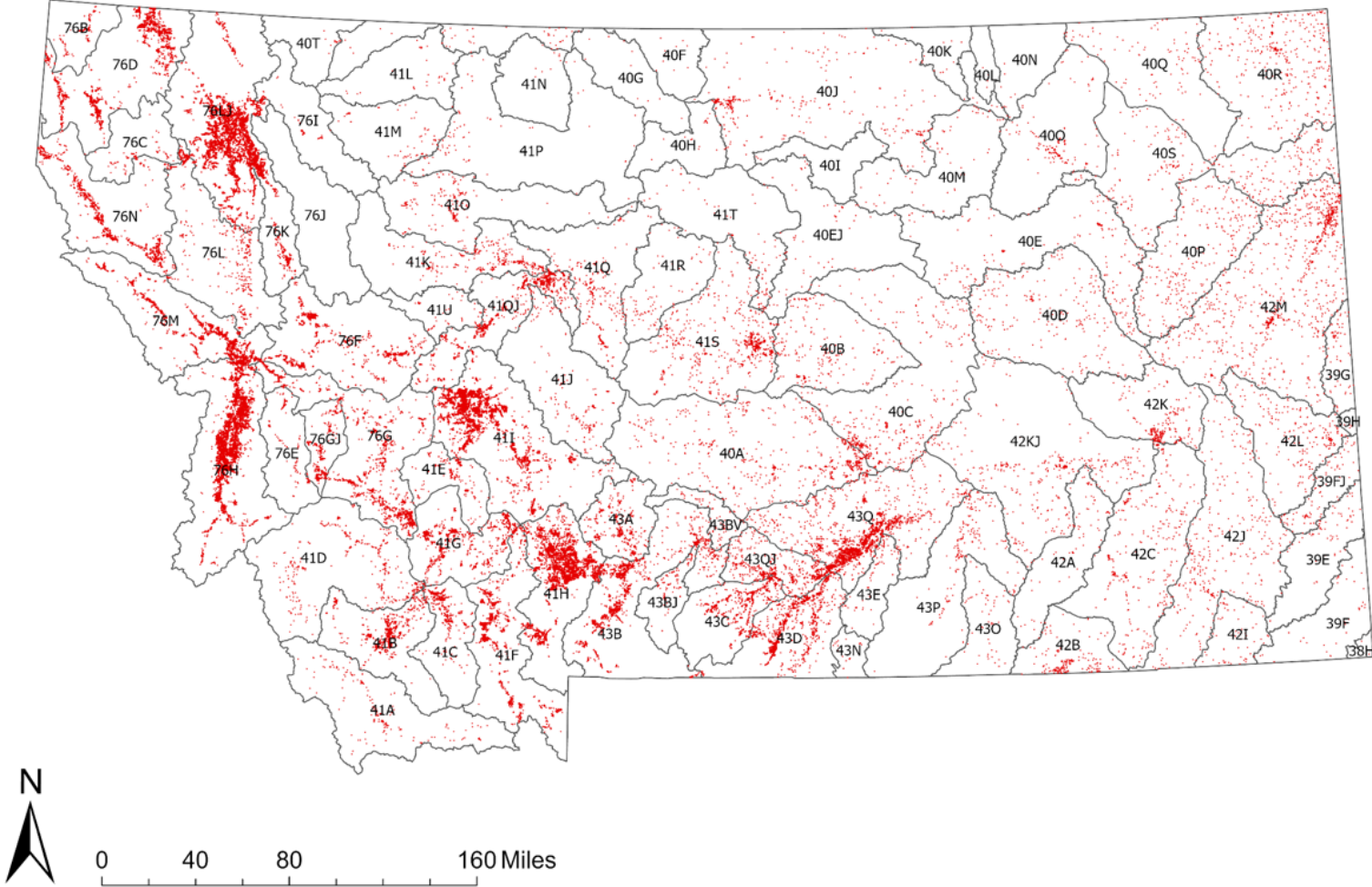
4. All wells (permits, exceptions, claims) to date – DNRC records (map)



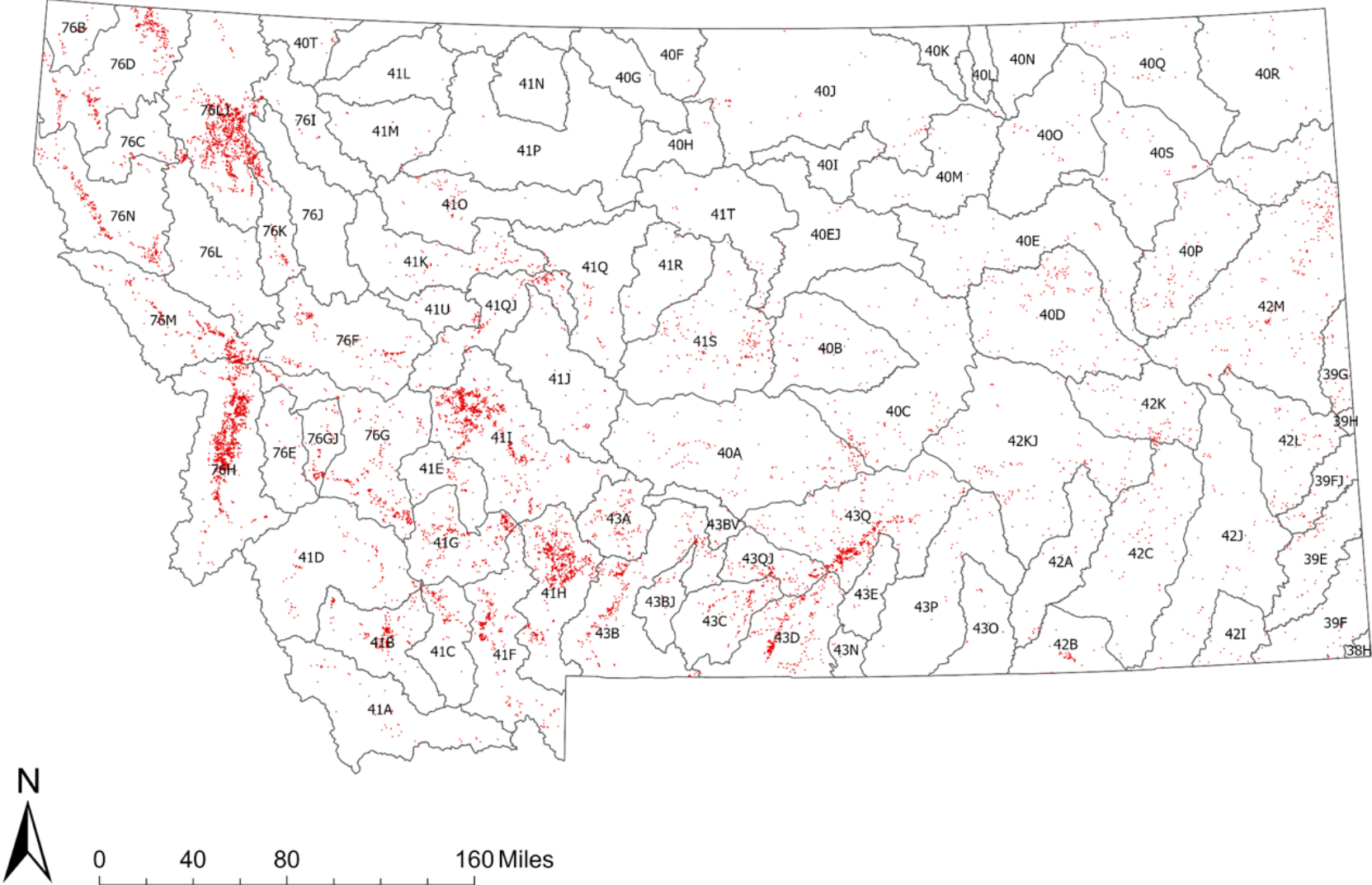
5. All wells (permits, exceptions, claims) up to 1992 (new definition of combined appropriation was in 1993)– DNRC records (map)



6. All wells (permits, exceptions, claims) 1993 to 2014 (CFC decision on combined appropriation) – DNRC records (map)



7. All wells (permits, exceptions, claims) 2015 to current– DNRC records (map)



Description:

- DNRC water right entries for wells, 215,167 water rights
- Water right types include claims, permits & certificates
- 1993- Definition of combined appropriation was changed to only consider combined appropriation if groundwater developments are physically manifold
- 2014- CFC decision reinstated the 1987 rule of combined appropriation- Does not require developments to be physically manifold, identifies that groundwater developments which the DNRC judges could be accomplished by a single appropriation would constitute a combined appropriation

Timeframe:

- Priority dates range between 1847 and 2022

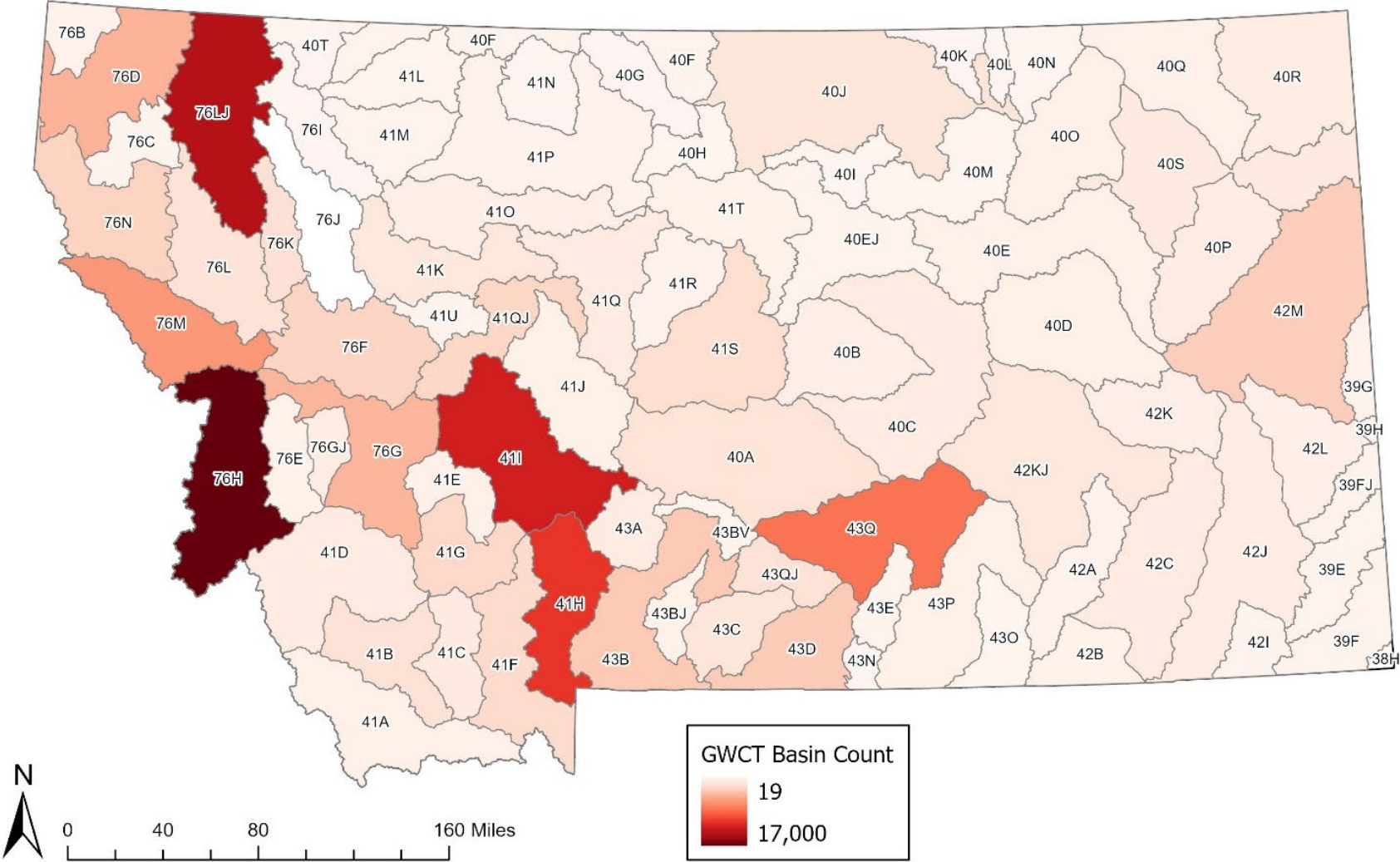
Summary:

- The locations of higher density reflect the same areas as MBMG GWIC data.

Limitations:

- During 2022, DNRC attempted to match MBMG well logs to DNRC water rights and can confidently match 93,760 records.
- Not all drilled wells require water rights, e.g., pre-1973 wells exempt from claim filing, monitoring wells, dry wells, injection wells, wells not put to beneficial use and non-compliant wells etc.
- DNRC has added a database record for the well log number to help further coordinate data between the two databases.
- There are 1,392 180-day registrations that were received (all in 76L and 76LJ) that are not reflected in this dataset.

8. Count of exempt wells per administrative basin (map)



Description:

- This list includes all groundwater rights filed under 85-2-306 MCA (includes other exemptions, e.g., geothermal rights, emergency fire protection rights, and other means of diversion, e.g., developed springs).
- This dataset includes other means of diversion, but the majority are wells.
 - 93% wells; 5% developed springs; 1% pit/ponds (not well filled); 1% other

Timeframe: 1973 - 2023

Summary:

- DNRC has received an average of 2,814 filings per year over the past 29 years.
- Since 2014, when the 1987 combined appropriation rule was reinstated, in every year except one (2015), the number of exempt wells received by DNRC has been greater than the number received in 2014, or any of the five years prior (Tabular Listing by Date below).
- There was a 10-year peak in filings in 2019 coinciding with an adjudication program filing deadline and corresponding statewide mailing; the adjudication notice educated water users and motivated many exempt well users to come into compliance with state law.

Limitations:

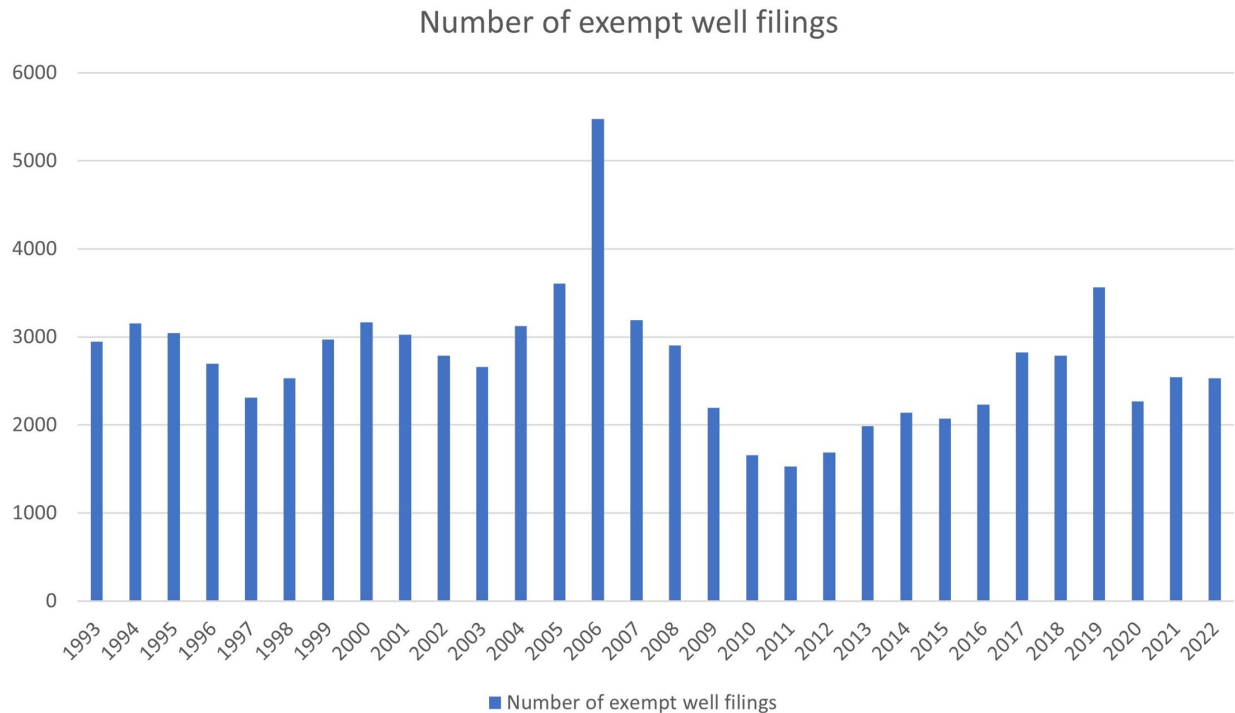
- As mentioned above, this includes other exemptions, such as geothermal heating and cooling and emergency fire protection.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).

9. Count of exempt wells per administrative basin (table)

<u>Clark Fork/Kootenai</u>		<u>Upper Missouri</u>		<u>Lower Missouri</u>		<u>Yellowstone</u>		<u>Little Missouri</u>	
Basin	Count	Basin	Count	Basin	Count	Basin	Count	Basin	Count
76B	262	41A	471	40A	1784	42A	276	38H	8
76C	209	41B	1903	40B	704	42B	368	39E	242
76D	4649	41C	1075	40C	992	42C	1000	39F	196
76E	325	41D	1011	40D	573	42I	218	39FJ	252
76F	2740	41E	463	40E	443	42J	890	39G	304
76G	4478	41F	2316	40EJ	237	42K	694	39H	19
76GJ	928	41G	2502	40F	187	42KJ	1244	Total	1,021
76H	16811	41H	10899	40G	87	42L	623		
76I	102	41I	12265	40H	164	42M	3092		
76J	6	41J	561	40I	45	43A	1000		
76K	1984	41K	1283	40J	1561	43B	3353		
76L	1882	41L	156	40K	70	43BJ	362		
76LJ	13828	41M	238	40L	26	43BV	167		
76M	6074	41N	37	40M	157	43C	1564		
76N	2769	41O	665	40N	49	43D	3224		
Total	57,047	41P	302	40O	520	43E	222		
		41Q	986	40P	873	43N	37		
		41QJ	2580	40Q	439	43O	145		
		41U	229	40R	964	43P	539		
		Total	39,942	40S	1086	43Q	7870		
				40T	87	43QJ	1926		
				41R	312	Total	28,814		
				41S	2215				
				41T	367				
				Total	13,942				
Total of all filed Groundwater Certificates = 140,766									

(See above for Description, Timeframe, Summary, and Limitations listed below map for this section)

10. Exempt well filings received by DNRC per year (chart)



Description:

- This list includes all Notice of Completion of Groundwater Development rights filed under 85-2-306 MCA.

Timeframe: 2012 - 2022

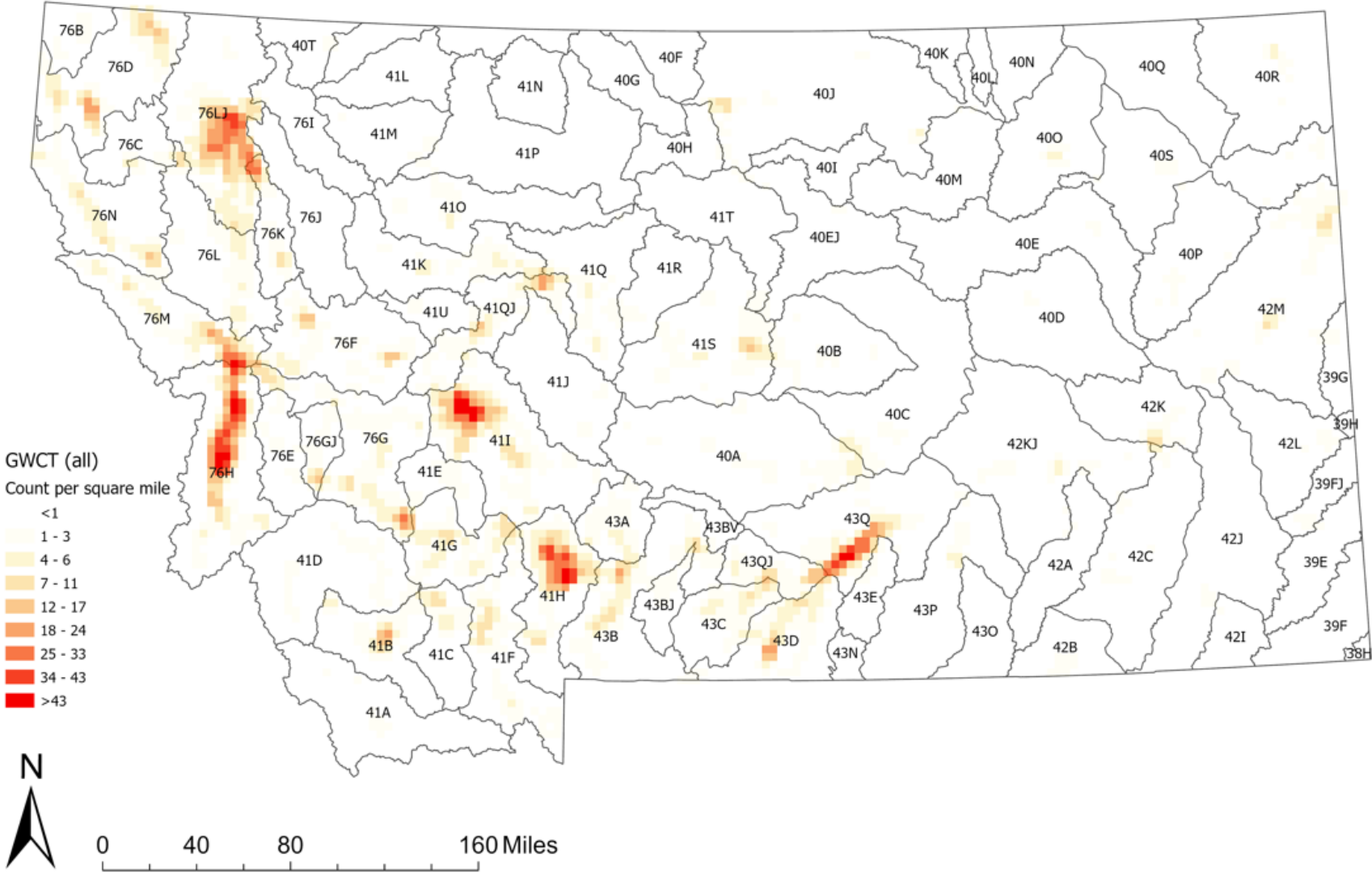
Summary:

- DNRC has received an average of 2,621 filings per year over the past 10 years.
- 2006 was anomalous due to a statewide mailing associated with HB22.
- Since 2014, when the 1987 combined appropriation rule was reinstated, in every year except one (2015), the number of exempt wells received by DNRC has been greater than the number received in 2014, or any of the five years prior.
- A peak in filings in 2019 coincided with an adjudication program filing deadline and corresponding statewide mailing; the adjudication notice educated water users and motivated many exempt well users to come into compliance with state law.

Limitations:

- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).

11. Count of exempt wells per square mile (map)



Description:

- GIS density analysis count of exempt wells.

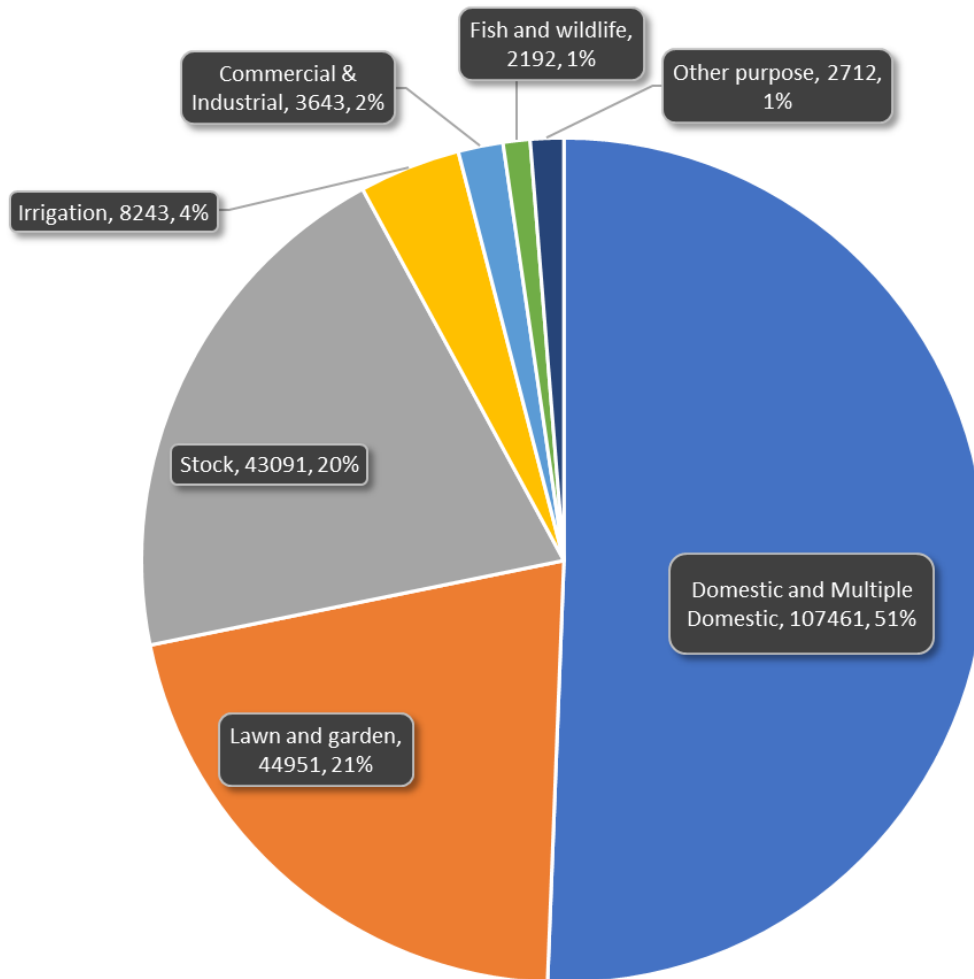
Timeframe: 1973-2023**Summary:**

- This graphic illustrates that there are five high well density areas across the state. These five areas include the Flathead Valley (76LJ), Missoula/Bitterroot Valleys (76H & 76M), Helena Valley (41I), Gallatin Valley (41H) and Billings area (43Q). Most of these wells are finished in surficial groundwater aquifers with connectivity to surface water.

Limitations:

- This includes other exemptions, such as geothermal heating and cooling and emergency fire protection.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).

12. Exempt wells by purposes statewide (chart)



Description:

- A count of unique purpose listings for exempt wells

Timeframe: 1973 – 2023

Summary:

- Domestic purpose is by far the most common, followed by lawn and garden purpose and stock purpose.
- The number on the pie chart is the number of water rights for that purpose. There is overlay between categories.
- 57,356 exempt wells have multiple purposes listed (41% of the total).

Limitations:

- This includes other exemptions, such as geothermal heating and cooling and emergency fire protection.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).
- Single water rights can have multiple purposes, so the total number of purposes is much larger than the total number of exempt well water rights.

13. Exempt wells by purposes statewide (table)

Purpose list	Counts by purpose	Purpose list	Counts by purpose
Domestic	104091	Geothermal heating	94
Lawn and garden	44951	Wildlife	91
Stock	43091	Wetland mitigation credit	71
Irrigation	8243	Pollution abatement	35
Multiple domestic	3370	Oil well flooding	29
Commercial	3221	Observation and testing	20
Fish and wildlife	1091	Unknown	13
Other purpose	1004	Power generation	12
Fishery	607	Water marketing	8
Recreation	427	Waterfowl	8
Industrial	422	Wetland	8
Wildlife/waterfowl	403	Erosion control	2
Institutional	245	Mitigation water	2
Fire protection	192	Sale	2
Agricultural spraying	180	Augmentation	1
Mining	139	Fish raceways	1
Municipal	122	Instream fishery	1
Geothermal	95	Storage	1
		Grand total	212,293

Description:

- A count of unique purpose listings for exempt wells

Timeframe: 1973 – 2023

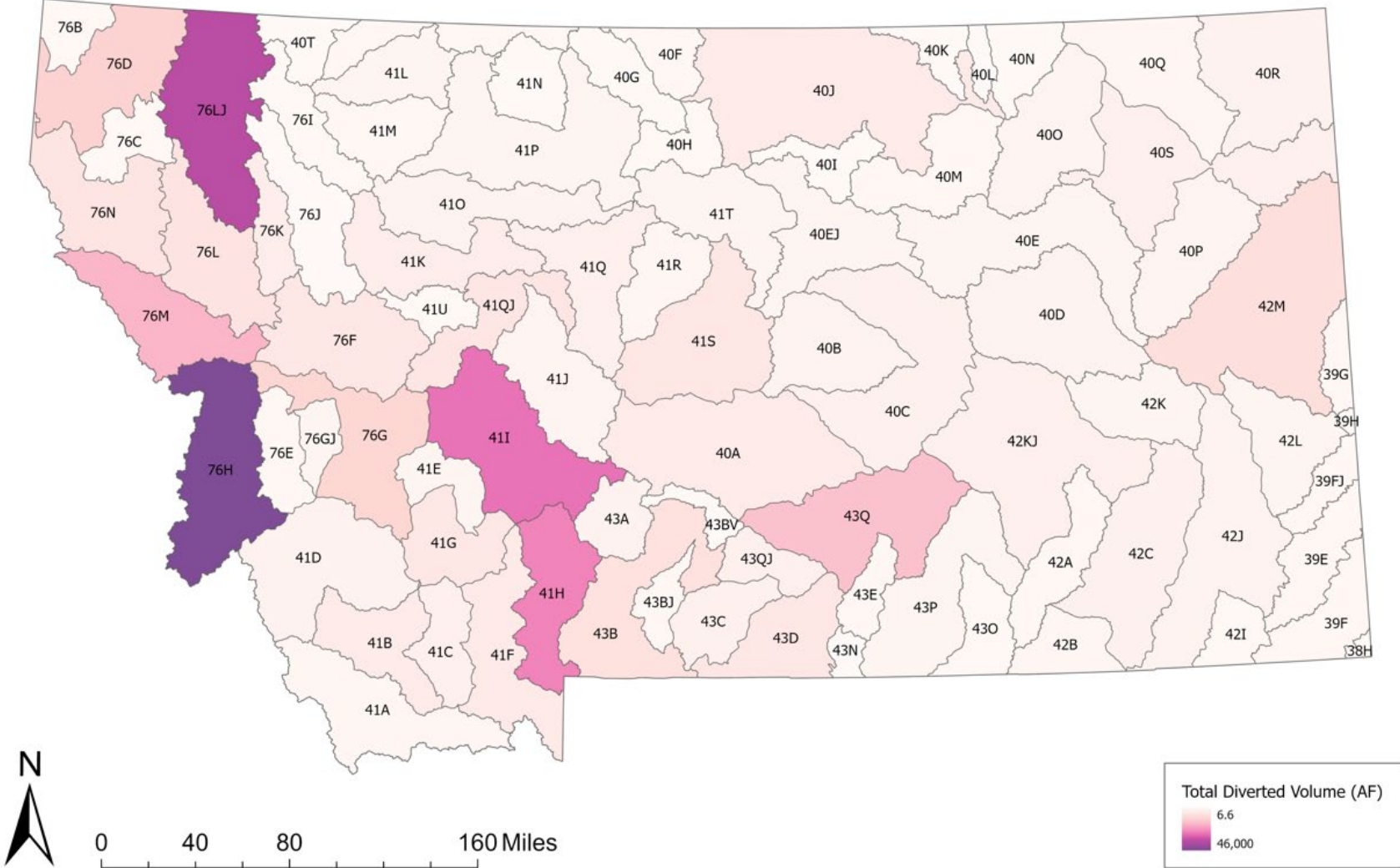
Summary:

- Domestic purpose is by far the most common, followed by lawn and garden purpose and stock purpose.

Limitations:

- This includes other exemptions, such as geothermal heating and cooling and emergency fire protection.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).
- Single water rights can have multiple purposes, so the total number of purposes is much larger than the total number of exempt well water rights.

14. Exempt wells total volume statewide (map)



Basin #	Basin Name	Total Volume (AF)
41QJ	MISSOURI RIVER FROM HOLTER DAM TO THE SUN RIVER	6,799
41D	BIG HOLE RIVER	2,795
43E	PRYOR CREEK	776
41C	RUBY RIVER	3,288
41B	BEAVERHEAD RIVER	5,332
43A	SHIELDS RIVER	2,723
40N	ROCK CREEK	307
43BJ	BOULDER RIVER	745
42C	TONGUE RIVER BELOW HANGING WOMAN CREEK	2,897
39G	BEAVER CREEK	719
40S	MISSOURI RIVER BELOW FORT PECK DAM	3,262
41I	MISSOURI RIVER ABOVE HOLTER DAM	28,531
42B	TONGUE RIVER ABOVE AND INCLUDING HANGING WOMAN CREEK	1,366
40D	DRY CREEK	2,107
41A	RED ROCK RIVER	1,269
40L	FRENCHMAN CREEK	97
39FJ	LITTLE BEAVER CREEK	804
76G	CLARK FORK ABOVE BLACKFOOT RIVER	11,391
76E	ROCK CREEK	799
39H	LITTLE MISSOURI BELOW LITTLE BEAVER CREEK	48
40T	HUDSON BAY DRAINAGE	295
41Q	MISSOURI RIVER FROM SUN RIVER TO MARIAS RIVER	3,516
41T	MISSOURI RIVER FROM MARIAS RIVER TO AND INCLUDING BULLWHACKER CREEK	1,584
41O	TETON RIVER	2,223
40H	BIG SANDY CREEK	522

Basin #	Basin Name	Total Volume (AF)
76M	CLARK FORK BETWEEN BLACKFOOT RIVER AND FLATHEAD RIVER	18,208
76H	BITTERROOT RIVER	46,352
43B	YELLOWSTONE RIVER ABOVE AND INCLUDING BRIDGER CREEK	8,200
76B	YAAK RIVER	541
40M	BEAVER CREEK	654
42K	YELLOWSTONE RIVER BETWEEN TONGUE AND POWDER RIVER	1,685
42I	LITTLE POWDER RIVER	618
43BV	SWEET GRASS CREEK	414
40A	MUSSELLSHELL RIVER ABOVE ROUNDUP	5,229
43QJ	YELLOWSTONE RIVER FROM BRIDGER CREEK TO THE CLARKS FORK YELLOWSTONE	3,676
76K	SWAN RIVER	4,378
40O	MILK RIVER BELOW WHITEWATER CREEK INCLUDING PORCUPINE CREEK	1,784
40Q	POPLAR RIVER	1,302
39F	LITTLE MISSOURI RIVER ABOVE LITTLE BEAVER CREEK	823
38H	BELLE FOURCHE RIVER ABOVE CHEYENNE RIVER	30
76F	BLACKFOOT RIVER	6,375
43D	CLARKS FORK YELLOWSTONE RIVER	6,326
42J	POWDER RIVER BELOW CLEAR CREEK	2,321
76C	FISHER RIVER	510
76L	FLATHEAD RIVER BELOW FLATHEAD LAKE	7,352
41J	SMITH RIVER	1,967
41R	ARROW CREEK	1,265
41K	SUN RIVER	4,224
41F	MADISON RIVER	5,726
42L	O'FALLON CREEK	1,598

Basin #	Basin Name	Total Volume (AF)
41N	WILLOW CREEK	300
40G	SAGE CREEK	383
76GJ	FLINT CREEK	1,519
76I	MIDDLE FORK FLATHEAD RIVER	471
40F	MILK RIVER ABOVE FRESNO RESERVOIR	1,128
43P	BIGHORN RIVER BELOW GREYBULL RIVER	1,560
41L	CUT BANK CREEK	1,451
41M	TWO MEDICINE CREEK	1,073
41G	JEFFERSON RIVER	6,320
41P	MARIAS RIVER	1,522
41E	BOULDER RIVER	1,480
43O	LITTLE BIGHORN RIVER	462
41H	GALLATIN RIVER	25,746
42M	YELLOWSTONE RIVER BELOW POWDER RIVER	8,599
39E	BOX ELDER CREEK	774
76LJ	FLATHEAD RIVER TO AND INCLUDING FLATHEAD LAKE	36,796
43C	STILLWATER RIVER	3,139
43N	SHOSHONE RIVER	90

Basin #	Basin Name	Total Volume (AF)
40B	FLATWILLOW CREEK INCLUDING BOX ELDER CREEK	2,438
40R	BIG MUDDY CREEK	2,596
76J	SOUTH FORK FLATHEAD RIVER	7
76N	CLARK FORK BELOW FLATHEAD RIVER	7,090
41U	DEARBORN RIVER	482
40K	WHITEWATER CREEK	194
40P	REDWATER RIVER	2,074
76D	KOOTENAI RIVER	12,223
42A	ROSEBUD CREEK	918
40J	MILK RIVER BETWEEN FRESNO RESERVOIR AND WHITEWATER CREEK	5,166
41S	JUDITH RIVER	6,547
40I	PEOPLES CREEK	178
40C	MUSSELSHELL RIVER BELOW ROUNDUP	3,112
40EJ	MISSOURI RIVER BETWEEN BULLWHACKER CREEK AND MUSSELSHELL RIVER	1,503
40E	MISSOURI RIVER BETWEEN MUSSELSHELL RIVER AND FORT PECK DAM	1,586
42KJ	YELLOWSTONE RIVER BETWEEN BIGHORN RIVER AND TONGUE RIVER	3,377
43Q	YELLOWSTONE RIVER BETWEEN CLARKS FORK YELLOWSTONE AND BIGHORN RIVER	15,940

Description:

- Total diverted volume per basin is based on the total volume listed on each groundwater certificate, when available. Higher diverted volume amounts coincide with higher population areas.

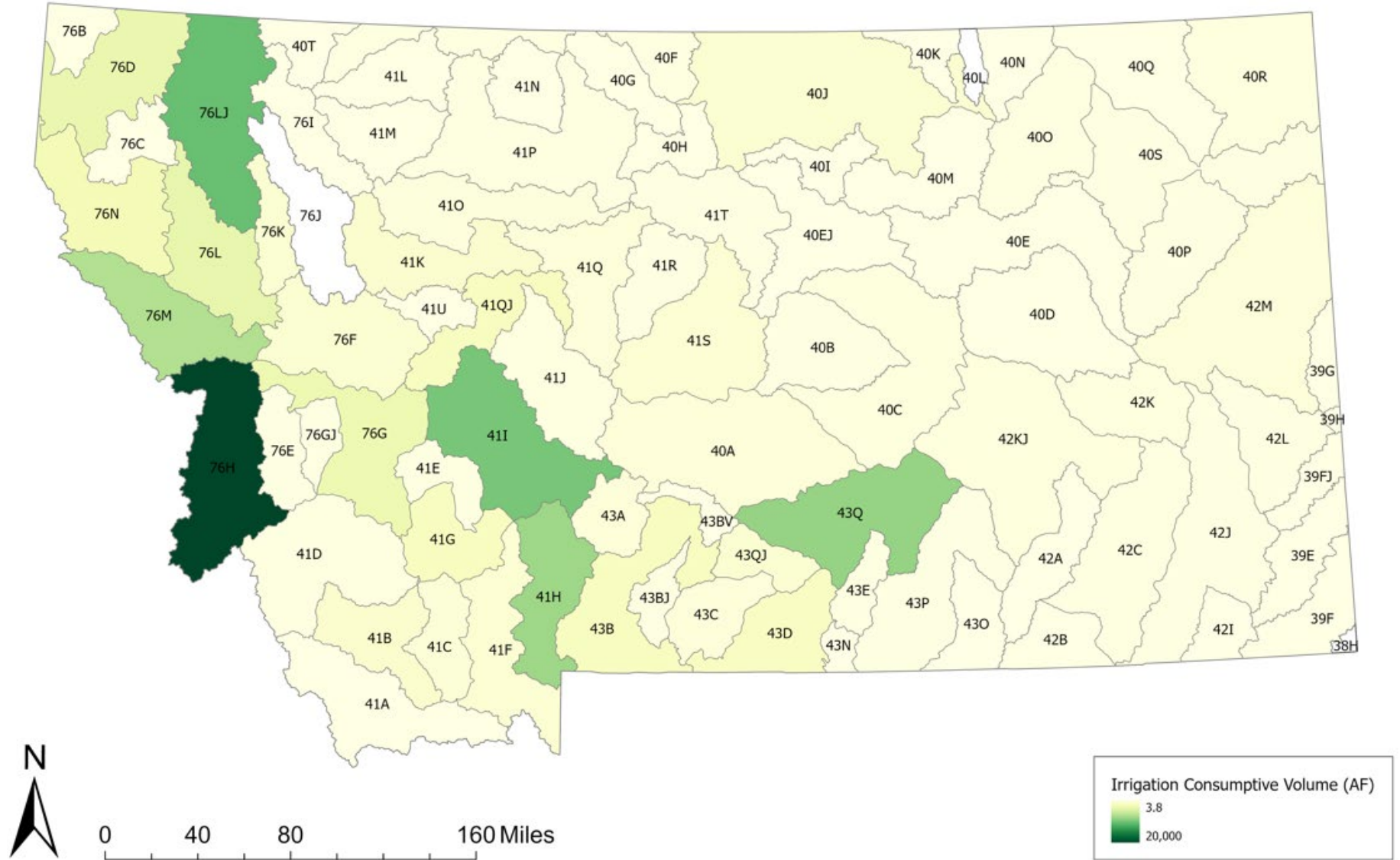
Timeframe: 1973 – 2023**Summary:**

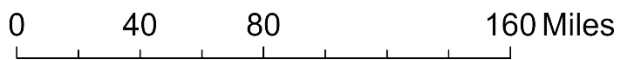
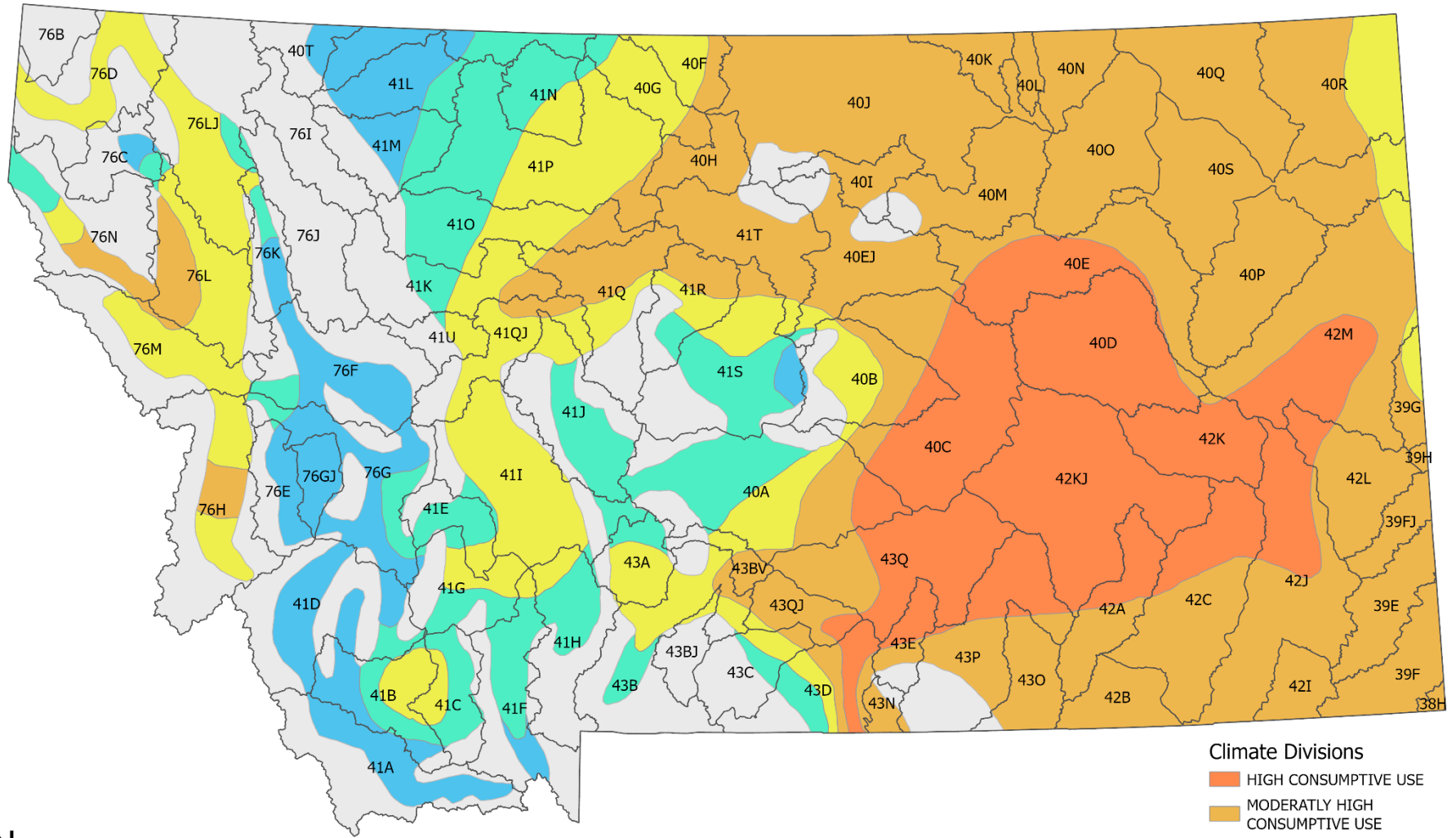
- This graphic illustrates that there are high exempt well volumetric use areas across the state.

Limitations:

- This includes other exemptions, such as geothermal heating and cooling and emergency fire protection.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).
- Not all exempt well water rights have a listed total volume. Water rights with no volume listed were not included in the analysis.

15. Exempt wells irrigation (including lawn and garden) consumptive volume (map)





- Climate Divisions**
- HIGH CONSUMPTIVE USE
 - MODERATLY HIGH CONSUMPTIVE USE
 - MODERATE CONSUMPTIVE USE
 - MODERATLY LOW CONSUMPTIVE USE
 - LOW CONSUMPTIVE USE
 - MOUNTAIN AREAS

Basin #	Basin Name	Irrigation Volume (AF)
41QJ	MISSOURI RIVER FROM HOLTER DAM TO THE SUN RIVER	2,027
41D	BIG HOLE RIVER	278
43E	PRYOR CREEK	194
41C	RUBY RIVER	762
41B	BEAVERHEAD RIVER	1,370
43A	SHIELDS RIVER	717
40N	ROCK CREEK	4
43Bj	BOULDER RIVER	139
42C	TONGUE RIVER BELOW HANGING WOMAN CREEK	271
39G	BEAVER CREEK	98
40S	MISSOURI RIVER BELOW FORT PECK DAM	145
41I	MISSOURI RIVER ABOVE HOLTER DAM	10,056
42B	TONGUE RIVER ABOVE AND INCLUDING HANGING WOMAN CREEK	63
40D	DRY CREEK	56
41A	RED ROCK RIVER	87
40L	FRENCHMAN CREEK	-
39Fj	LITTLE BEAVER CREEK	86
76G	CLARK FORK ABOVE BLACKFOOT RIVER	3,235
76E	ROCK CREEK	144
39H	LITTLE MISSOURI BELOW LITTLE BEAVER CREEK	5
40T	HUDSON BAY DRAINAGE	15
41Q	MISSOURI RIVER FROM SUN RIVER TO MARIAS RIVER	665
41T	MISSOURI RIVER FROM MARIAS RIVER TO AND INCLUDING BULLWHACKER CREEK	150
41O	TETON RIVER	513
40H	BIG SANDY CREEK	77

Basin #	Basin Name	Irrigation Volume (AF)
76M	CLARK FORK BETWEEN BLACKFOOT RIVER AND FLATHEAD RIVER	7,214
76H	BITTERROOT RIVER	20,110
43B	YELLOWSTONE RIVER ABOVE AND INCLUDING BRIDGER CREEK	2,018
76B	YAAK RIVER	79
40M	BEAVER CREEK	31
42K	YELLOWSTONE RIVER BETWEEN TONGUE AND POWDER RIVER	294
42I	LITTLE POWDER RIVER	25
43BV	SWEET GRASS CREEK	31
40A	MUSSELLSHELL RIVER ABOVE ROUNDUP	711
43QJ	YELLOWSTONE RIVER FROM BRIDGER CREEK TO THE CLARKS FORK YELLOWSTONE	1,137
76K	SWAN RIVER	1,100
40O	MILK RIVER BELOW WHITEWATER CREEK INCLUDING PORCUPINE CREEK	266
40Q	POPLAR RIVER	89
39F	LITTLE MISSOURI RIVER ABOVE LITTLE BEAVER CREEK	47
38H	BELLE FOURCHE RIVER ABOVE CHEYENNE RIVER	-
76F	BLACKFOOT RIVER	1,080
43D	CLARKS FORK YELLOWSTONE RIVER	1,909
42J	POWDER RIVER BELOW CLEAR CREEK	178
76C	FISHER RIVER	72
76L	FLATHEAD RIVER BELOW FLATHEAD LAKE	3,783
41J	SMITH RIVER	270
41R	ARROW CREEK	152
41K	SUN RIVER	1,246
41F	MADISON RIVER	1,053
42L	O'FALLON CREEK	143

Basin #	Basin Name	Irrigation Volume (AF)
41N	WILLOW CREEK	10
40G	SAGE CREEK	56
76GJ	FLINT CREEK	158
76I	MIDDLE FORK FLATHEAD RIVER	47
40F	MILK RIVER ABOVE FRESNO RESERVOIR	252
43P	BIGHORN RIVER BELOW GREYBULL RIVER	147
41L	CUT BANK CREEK	95
41M	TWO MEDICINE CREEK	60
41G	JEFFERSON RIVER	2,038
41P	MARIAS RIVER	249
41E	BOULDER RIVER	218
43O	LITTLE BIGHORN RIVER	29
41H	GALLATIN RIVER	8,178
42M	YELLOWSTONE RIVER BELOW POWDER RIVER	633
39E	BOX ELDER CREEK	70
76LJ	FLATHEAD RIVER TO AND INCLUDING FLATHEAD LAKE	10,728
43C	STILLWATER RIVER	664
43N	SHOSHONE RIVER	13

Basin #	Basin Name	Irrigation Volume (AF)
40B	FLATWILLOW CREEK INCLUDING BOX ELDER CREEK	189
40R	BIG MUDDY CREEK	325
76J	SOUTH FORK FLATHEAD RIVER	-
76N	CLARK FORK BELOW FLATHEAD RIVER	2,696
41U	DEARBORN RIVER	54
40K	WHITEWATER CREEK	7
40P	REDWATER RIVER	124
76D	KOOTENAI RIVER	3,555
42A	ROSEBUD CREEK	29
40J	MILK RIVER BETWEEN FRESNO RESERVOIR AND WHITEWATER CREEK	1,103
41S	JUDITH RIVER	972
40I	PEOPLES CREEK	7
40C	MUSSELSHELL RIVER BELOW ROUNDUP	429
40EJ	MISSOURI RIVER BETWEEN BULLWHACKER CREEK AND MUSSELSHELL RIVER	43
40E	MISSOURI RIVER BETWEEN MUSSELSHELL RIVER AND FORT PECK DAM	60
42KJ	YELLOWSTONE RIVER BETWEEN BIGHORN RIVER AND TONGUE RIVER	371
43Q	YELLOWSTONE RIVER BETWEEN CLARKS FORK YELLOWSTONE AND BIGHORN RIVER	8,627

Description:

- Irrigation consumption based on maximum acres irrigated when listed on an exempt well water right and totaled within each administrative basin and climatic area where groundwater development is located. Consumed volumes per acre for each climatic area are listed below.
 - Climatic Area 1: 2.1 AF/Acre
 - Climatic Area 2: 1.9 AF/Acre
 - Climatic Area 3: 1.7 AF/Acre
 - Climatic Area 4: 1.4 AF/Acre
 - Climatic Area 5: 1.0 AF/Acre
 - Climatic Area 6: 1.0 AF/Acre

Timeframe: 1973-2023

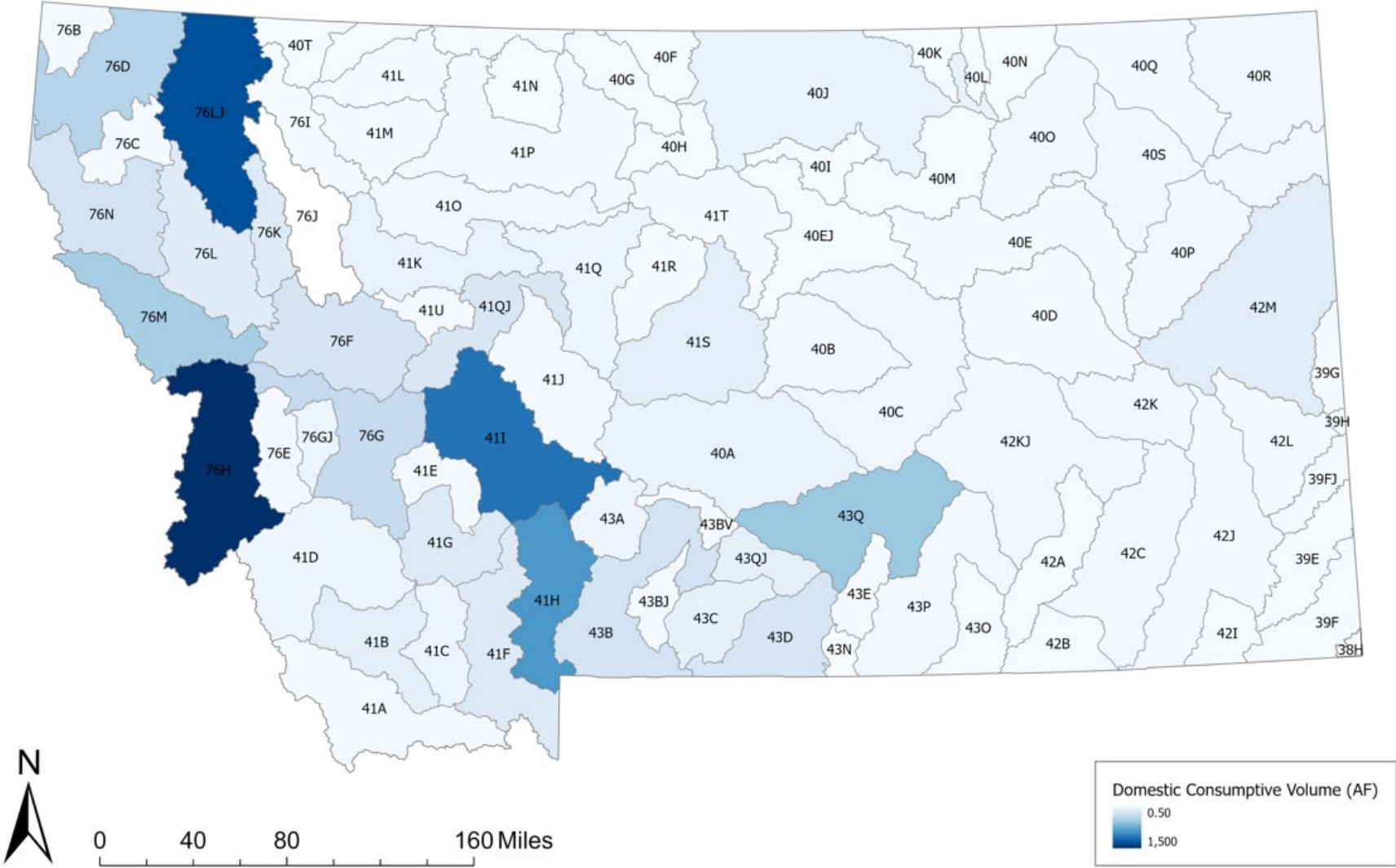
Summary:

- This graphic also illustrates that the majority of lawn and garden and irrigation purposes are located in the high growth areas.
- The highest number of acres is under the lawn and garden purpose. This data set includes lawn and garden and irrigation purposes.

Limitations:

- Lawn and garden purpose and irrigation purpose have been used interchangeably and also as different types of purposes, so we are assuming the same consumption for both in this exercise.
- Early domestic use included $\frac{1}{4}$ acre of lawn and garden in the volume, but maximum acres was not listed. Any lawn & garden use for these rights would not be included in this analysis.
- Some exempt well water rights did not list maximum acres for lawn and garden and/or irrigation use. These would not be included in this analysis.
- Prior to 1993, exempt well rights only had a flow rate limitation (100 gpm), so some high acreages and volumes exist in the records for exempt wells.
- Scale of mapped climatic areas is coarse. Application analysis uses a finer dataset for determining consumed volumes.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).

16. Consumptive volume based on domestic use (map)



Basin #	Basin Name	Domestic Volume (AF)
41QJ	MISSOURI RIVER FROM HOLTER DAM TO THE SUN RIVER	219
41D	BIG HOLE RIVER	65
43E	PRYOR CREEK	13
41C	RUBY RIVER	73
41B	BEAVERHEAD RIVER	137
43A	SHIELDS RIVER	72
40N	ROCK CREEK	1
43BJ	BOULDER RIVER	25
42C	TONGUE RIVER BELOW HANGING WOMAN CREEK	37
39G	BEAVER CREEK	14
40S	MISSOURI RIVER BELOW FORT PECK DAM	43
41I	MISSOURI RIVER ABOVE HOLTER DAM	1,084
42B	TONGUE RIVER ABOVE AND INCLUDING HANGING WOMAN CREEK	5
40D	DRY CREEK	13
41A	RED ROCK RIVER	22
40L	FRENCHMAN CREEK	1
39FJ	LITTLE BEAVER CREEK	10
76G	CLARK FORK ABOVE BLACKFOOT RIVER	366
76E	ROCK CREEK	28
39H	LITTLE MISSOURI BELOW LITTLE BEAVER CREEK	1
40T	HUDSON BAY DRAINAGE	8
41Q	MISSOURI RIVER FROM SUN RIVER TO MARIAS RIVER	67
41T	MISSOURI RIVER FROM MARIAS RIVER TO AND INCLUDING BULLWHACKER CREEK	14
41O	TETON RIVER	39

Basin #	Basin Name	Domestic Volume (AF)
76M	CLARK FORK BETWEEN BLACKFOOT RIVER AND FLATHEAD RIVER	504
76H	BITTERROOT RIVER	1,460
43B	YELLOWSTONE RIVER ABOVE AND INCLUDING BRIDGER CREEK	260
76B	YAAK RIVER	25
40M	BEAVER CREEK	8
42K	YELLOWSTONE RIVER BETWEEN TONGUE AND POWDER RIVER	39
42I	LITTLE POWDER RIVER	5
43BV	SWEET GRASS CREEK	6
40A	MUSSELLSHELL RIVER ABOVE ROUNDUP	93
43QJ	YELLOWSTONE RIVER FROM BRIDGER CREEK TO THE CLARKS FORK YELLOWSTONE	124
76K	SWAN RIVER	185
40O	MILK RIVER BELOW WHITEWATER CREEK INCLUDING PORCUPINE CREEK	28
40Q	POPLAR RIVER	21
39F	LITTLE MISSOURI RIVER ABOVE LITTLE BEAVER CREEK	7
38H	BELLE FOURCHE RIVER ABOVE CHEYENNE RIVER	-
76F	BLACKFOOT RIVER	245
43D	CLARKS FORK YELLOWSTONE RIVER	235
42J	POWDER RIVER BELOW CLEAR CREEK	22
76C	FISHER RIVER	18
76L	FLATHEAD RIVER BELOW FLATHEAD LAKE	167
41J	SMITH RIVER	32
41R	ARROW CREEK	10
41K	SUN RIVER	96
41F	MADISON RIVER	187

Basin #	Basin Name	Domestic Volume (AF)
40H	BIG SANDY CREEK	8
41N	WILLOW CREEK	1
40G	SAGE CREEK	5
76GJ	FLINT CREEK	82
76I	MIDDLE FORK FLATHEAD RIVER	10
40F	MILK RIVER ABOVE FRESNO RESERVOIR	9
43P	BIGHORN RIVER BELOW GREYBULL RIVER	29
41L	CUT BANK CREEK	9
41M	TWO MEDICINE CREEK	12
41G	JEFFERSON RIVER	191
41P	MARIAS RIVER	15
41E	BOULDER RIVER	36
43O	LITTLE BIGHORN RIVER	7
41H	GALLATIN RIVER	871
42M	YELLOWSTONE RIVER BELOW POWDER RIVER	161
39E	BOX ELDER CREEK	8
76LJ	FLATHEAD RIVER TO AND INCLUDING FLATHEAD LAKE	1,281
43C	STILLWATER RIVER	117
43N	SHOSHONE RIVER	2

Basin #	Basin Name	Domestic Volume (AF)
42L	O'FALLON CREEK	17
40B	FLATWILLOW CREEK INCLUDING BOX ELDER CREEK	26
40R	BIG MUDDY CREEK	46
76J	SOUTH FORK FLATHEAD RIVER	-
76N	CLARK FORK BELOW FLATHEAD RIVER	256
41U	DEARBORN RIVER	17
40K	WHITEWATER CREEK	3
40P	REDWATER RIVER	29
76D	KOOTENAI RIVER	434
42A	ROSEBUD CREEK	9
40J	MILK RIVER BETWEEN FRESNO RESERVOIR AND WHITEWATER CREEK	94
41S	JUDITH RIVER	137
40I	PEOPLES CREEK	1
40C	MUSSELSHELL RIVER BELOW ROUNDUP	50
40EJ	MISSOURI RIVER BETWEEN BULLWHACKER CREEK AND MUSSELSHELL RIVER	8
40E	MISSOURI RIVER BETWEEN MUSSELSHELL RIVER AND FORT PECK DAM	15
42KJ	YELLOWSTONE RIVER BETWEEN BIGHORN RIVER AND TONGUE RIVER	47
43Q	YELLOWSTONE RIVER BETWEEN CLARKS FORK YELLOWSTONE AND BIGHORN RIVER	556

Description:

- Diverted volume for domestic use is assumed to be 1 AF per household (ARM 36.12.115).
- Consumptive volume for domestic purpose is estimated to be 10% of diverted volume, so equal to 0.1 AF per household. .

Timeframe: 1973-2023

Summary:

- This graphic also illustrates that the majority of domestic and multiple domestic purposes are located in the high growth areas and coincide with areas of highest consumptive use for irrigation using exempt wells.

Limitations:

- 1 AF was used for every exempt filing listing domestic or multiple domestic purposes rather than the volume on the water right to not account for lawn and garden in the domestic calculation.
- The DNRC standard of 1 AF per household is based on a household of five people using approximately 180 gallons per day (GPD) per person for 365 days per year, and is known to be on the generous side (compared to MT DEQ average household use of 0.28 AF (250 gpd per dwelling for 365 days per year)).
- The DNRC standard of 10 percent consumption for self-supplied domestic withdrawals is based on information from Ivanhenko et al. (2010), Kimsey and Flood (1987), Paul et al. (2007) and Vanslyke and Simpson (1974). For other wastewater treatment types including central treatment facility or evaporation basins or land application from the mentioned references, the Department assumes 5 percent and 100 percent consumption, respectively.
- For purposes of this analysis, 10% consumption was used, but this value can vary based on wastewater treatment type.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).

References:

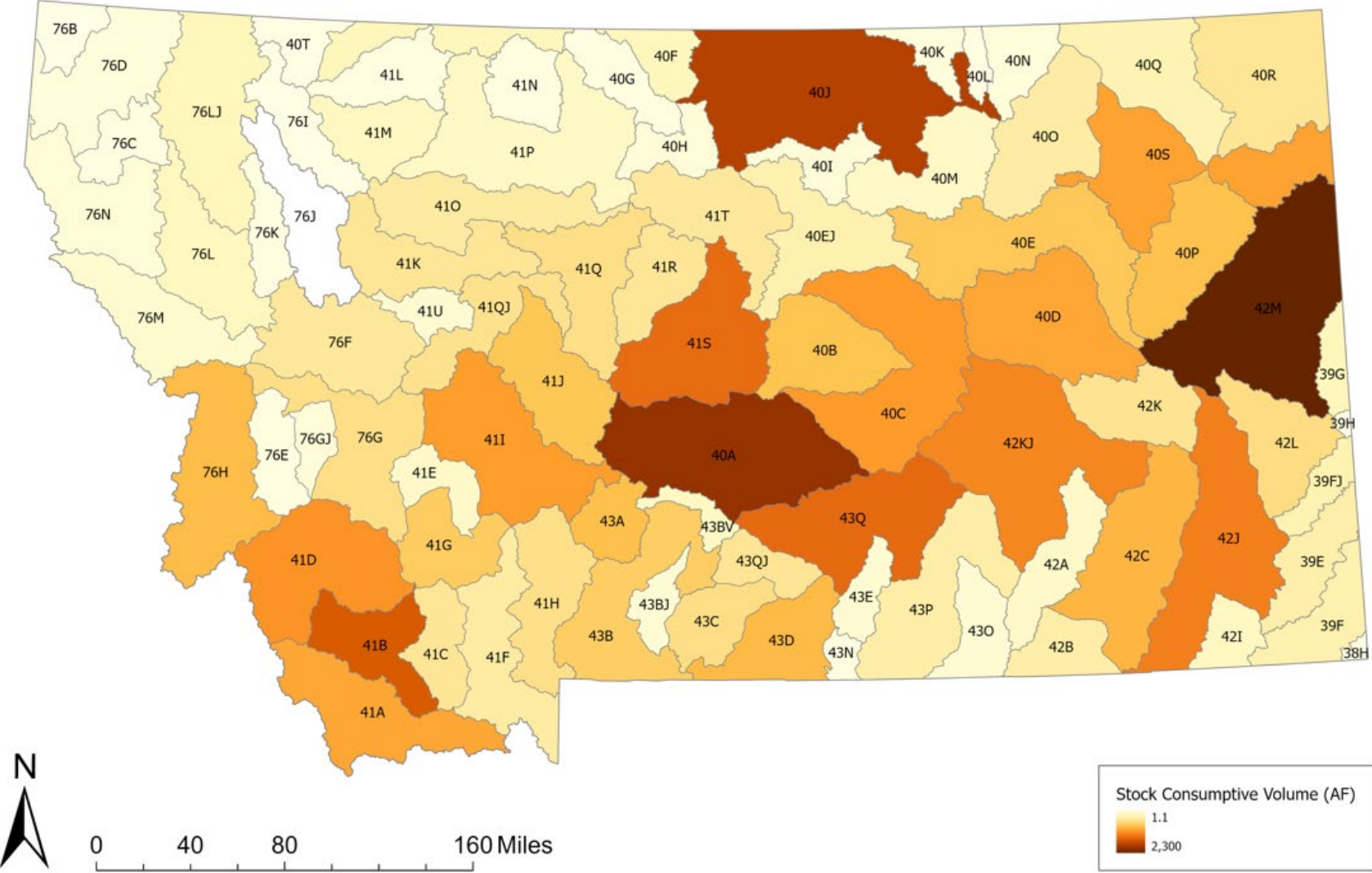
Ivanhenko, Tamara, and Flynn, J.L., 2010, Estimated withdrawals and use of water in Colorado, 2005: U.S. Geological Survey Scientific Investigations Report 2010–5002, 61 p.

Kimsey, D.W. and P.K. Flood, 1987. Domestic consumptive use, technical memorandum to the Chief Engineer of the State of Colorado, 16 p.

Paul, W., Poeter, E., and R Laws, 2007. Consumptive loss from an individual sewage disposal system in a semi-arid mountain environment. Colorado Water, Newsletter of the Water Center of Colorado State University, August-September 2007, Volume 24, Issue 4.

Vanslyke, G. and H. Simpson, 1974. Consumptive use of water by homes utilizing leach fields for sewage disposal, technical memorandum by the Colorado Division of Water Resources, 5 p.

17. Consumptive volume based on stockwater use (map)



Basin #	Basin Name	Stock Volume (AF)
41QJ	MISSOURI RIVER FROM HOLTER DAM TO THE SUN RIVER	601
41D	BIG HOLE RIVER	1,201
43E	PRYOR CREEK	143
41C	RUBY RIVER	539
41B	BEAVERHEAD RIVER	1,633
43A	SHIELDS RIVER	900
40N	ROCK CREEK	77
43BJ	BOULDER RIVER	123
42C	TONGUE RIVER BELOW HANGING WOMAN CREEK	975
39G	BEAVER CREEK	293
40S	MISSOURI RIVER BELOW FORT PECK DAM	1,100
41I	MISSOURI RIVER ABOVE HOLTER DAM	1,136
42B	TONGUE RIVER ABOVE AND INCLUDING HANGING WOMAN CREEK	426
40D	DRY CREEK	1,079
41A	RED ROCK RIVER	1,075
40L	FRENCHMAN CREEK	20
39FJ	LITTLE BEAVER CREEK	359
76G	CLARK FORK ABOVE BLACKFOOT RIVER	626
76E	ROCK CREEK	34
39H	LITTLE MISSOURI BELOW LITTLE BEAVER CREEK	13
40T	HUDSON BAY DRAINAGE	9
41Q	MISSOURI RIVER FROM SUN RIVER TO MARIAS RIVER	624
41T	MISSOURI RIVER FROM MARIAS RIVER TO AND INCLUDING BULLWHACKER CREEK	509
41O	TETON RIVER	470
40H	BIG SANDY CREEK	94

Basin #	Basin Name	Stock Volume (AF)
76M	CLARK FORK BETWEEN BLACKFOOT RIVER AND FLATHEAD RIVER	144
76H	BITTERROOT RIVER	928
43B	YELLOWSTONE RIVER ABOVE AND INCLUDING BRIDGER CREEK	778
76B	YAAK RIVER	1
40M	BEAVER CREEK	214
42K	YELLOWSTONE RIVER BETWEEN TONGUE AND POWDER RIVER	571
42I	LITTLE POWDER RIVER	252
43BV	SWEET GRASS CREEK	234
40A	MUSSELLSHELL RIVER ABOVE ROUNDUP	2,067
43QJ	YELLOWSTONE RIVER FROM BRIDGER CREEK TO THE CLARKS FORK YELLOWSTONE	556
76K	SWAN RIVER	28
40O	MILK RIVER BELOW WHITEWATER CREEK INCLUDING PORCUPINE CREEK	449
40Q	POPLAR RIVER	346
39F	LITTLE MISSOURI RIVER ABOVE LITTLE BEAVER CREEK	377
38H	BELLE FOURCHE RIVER ABOVE CHEYENNE RIVER	7
76F	BLACKFOOT RIVER	503
43D	CLARKS FORK YELLOWSTONE RIVER	937
42J	POWDER RIVER BELOW CLEAR CREEK	1,347
76C	FISHER RIVER	27
76L	FLATHEAD RIVER BELOW FLATHEAD LAKE	267
41J	SMITH RIVER	850
41R	ARROW CREEK	543
41K	SUN RIVER	543
41F	MADISON RIVER	462
42L	O'FALLON CREEK	648

Basin #	Basin Name	Stock Volume (AF)
41N	WILLOW CREEK	35
40G	SAGE CREEK	30
76GJ	FLINT CREEK	96
76I	MIDDLE FORK FLATHEAD RIVER	1
40F	MILK RIVER ABOVE FRESNO RESERVOIR	290
43P	BIGHORN RIVER BELOW GREYBULL RIVER	431
41L	CUT BANK CREEK	42
41M	TWO MEDICINE CREEK	251
41G	JEFFERSON RIVER	802
41P	MARIAS RIVER	218
41E	BOULDER RIVER	204
43O	LITTLE BIGHORN RIVER	130
41H	GALLATIN RIVER	614
42M	YELLOWSTONE RIVER BELOW POWDER RIVER	2,343
39E	BOX ELDER CREEK	403
76LJ	FLATHEAD RIVER TO AND INCLUDING FLATHEAD LAKE	293
43C	STILLWATER RIVER	636
43N	SHOSHONE RIVER	31

Basin #	Basin Name	Stock Volume (AF)
40B	FLATWILLOW CREEK INCLUDING BOX ELDER CREEK	873
40R	BIG MUDDY CREEK	544
76J	SOUTH FORK FLATHEAD RIVER	-
76N	CLARK FORK BELOW FLATHEAD RIVER	102
41U	DEARBORN RIVER	142
40K	WHITewater CREEK	65
40P	REDWATER RIVER	896
76D	KOOTENAI RIVER	76
42A	ROSEBUD CREEK	204
40J	MILK RIVER BETWEEN FRESNO RESERVOIR AND WHITewater CREEK	1,887
41S	JUDITH RIVER	1,498
40I	PEOPLES CREEK	92
40C	MUSSELSHELL RIVER BELOW ROUNDUP	1,159
40EJ	MISSOURI RIVER BETWEEN BULLWHACKER CREEK AND MUSSELSHELL RIVER	381
40E	MISSOURI RIVER BETWEEN MUSSELSHELL RIVER AND FORT PECK DAM	837
42KJ	YELLOWSTONE RIVER BETWEEN BIGHORN RIVER AND TONGUE RIVER	1,300
43Q	YELLOWSTONE RIVER BETWEEN CLARKS FORK YELLOWSTONE AND BIGHORN RIVER	1,520

Description:

- Stock use per ARM 36.12.115 is 15 gallons per day per animal unit, or 0.17 AF per year per animal unit. Stock watering is assumed to be 100% consumed, but may vary based on individual situations.

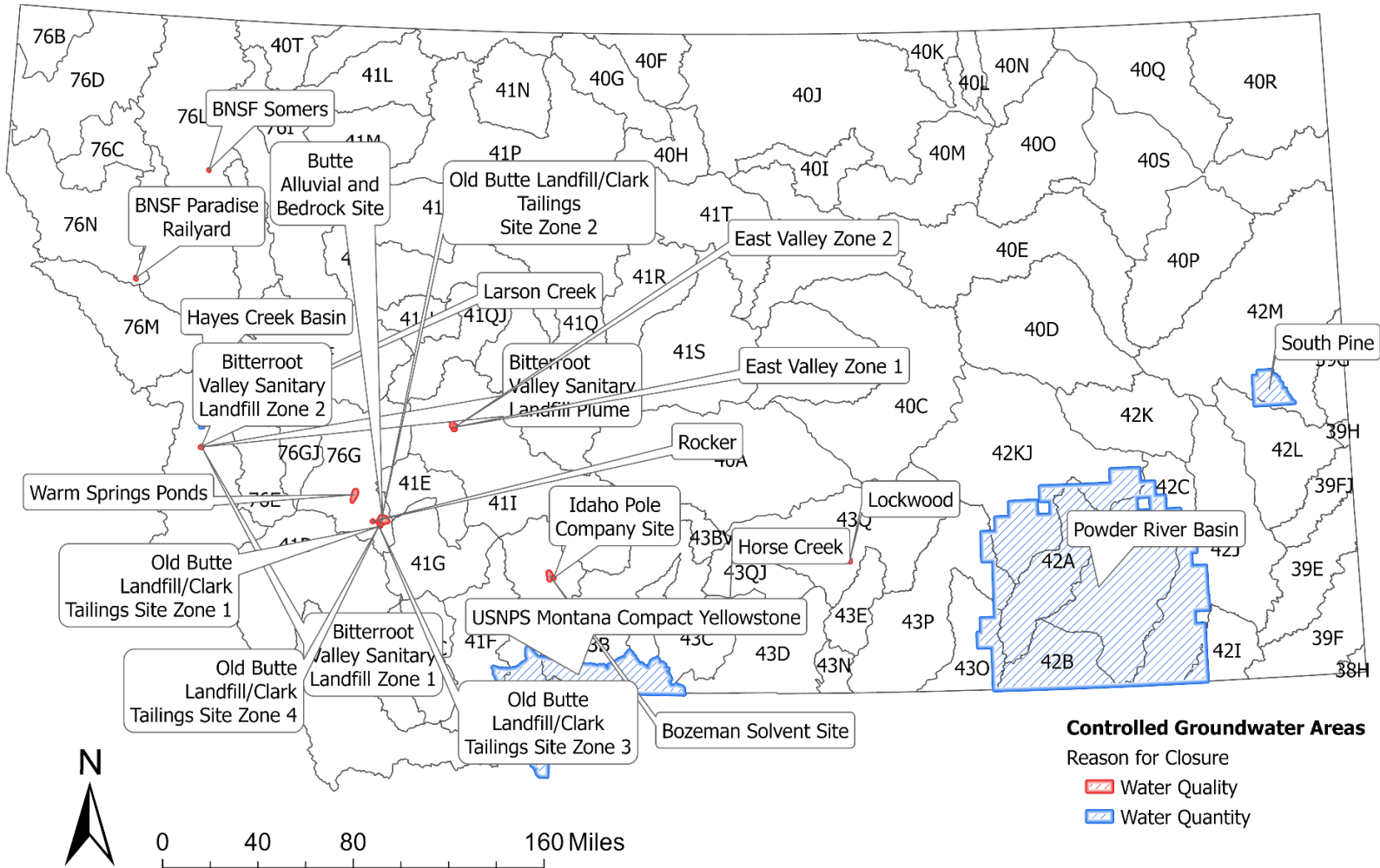
Timeframe: 1973-2023**Summary:**

- Exempt wells are used for stockwater in rural, less-populated, administrative basins and are generally dispersed and not concentrated.

Limitations:

- Not all exempt wells have the number of animal units listed. Not all animals are there fulltime.
- There is non-consumed portion that is not accounted for, however, considering that stock ponds are often seasonal and have float valves, the department considers this volume negligible. The assumption of 100% consumed, is similar to the standard for land application of treated wastewater and that little to none returns to the source.
- Not all wells are compliant, so this does not include non-filed wells.
- Dataset does not include pending groundwater Notices of Completion (Form 602).

18. Controlled Groundwater Areas (map)



Description:

- Per §85-2-506, MCA, the Department may designate permanent or temporary controlled groundwater areas (CGWAs) through the rulemaking process. Broadly speaking, CGWAs are designated to address issues with water quality or water quantity. There are 17 total active CGWAs. A significant legislative change occurred in 2009, clarifying process and limiting Temporary CGWAs.

Timeframe: 1967-2023

Summary:

- The rulemaking process can be initiated by the Department or by petitioner (state or local public health agencies, a municipality, county, conservation district, local water quality district, or 1/3 of the water right holders in the proposed CGWA). Petitioners must complete and submit a Form 630 to the Department with analysis prepared by a hydrogeologist, qualified scientist, or qualified professional engineer concluding one or more of the criteria in §85-2-506 (5), MCA have been met, and petitioners must describe the kind of corrective controls they are requesting. To designate a permanent controlled groundwater area, the Department must find that certain criteria have been met and cannot be appropriately mitigated. Prior to the passing of SB 120 in the 2009 Legislative Session, CGWAs were designated by Final Order rather than Administrative Rule.

Limitations:

- Each CGWA is unique, and the full details can be found in the corresponding Final Order or Rule. More information is available on the Department website.

Controlled Groundwater Areas Addressing Water Quantity

There are 17 total CGWAs. The table below includes only active CGWAs designated to address water quantity. Full details of each CGWA are in the corresponding Final Order or Rule.

Hayes Creek Basin Controlled Groundwater Area Missoula County	All new groundwater appropriations require a permit. The Order includes limitations on number of wells per lot and static water level measurements must be submitted annually to the Department. CGWA was designated 11/30/1998 by Final Order.
Horse Creek Controlled Groundwater Area Stillwater County	One Notice of Completion of Groundwater Development (for a maximum of 1 AF/35 GPM) can be filed on each parent tract; all other new groundwater appropriations require a permit. Water use for lawn and garden irrigation may be restricted based on a standard precipitation index (SPI) calculated and posted monthly on the Department website during the irrigation season. Quarterly measurements must be taken and submitted to the Department annually. CGWA was designated 1/3/12 through Administrative Rulemaking (ARM 36.12905).
Larson Creek Controlled Groundwater Area Ravalli County	All new groundwater appropriations require a permit. CGWA was designated 11/14/1988 by Final Order.
Powder River Basin Controlled Groundwater Area Powder River County	Applies only to wells designed and installed for the extraction of coalbed methane (CBM). CBM operators must offer water mitigation agreements to owners of water wells or natural springs within the area that may be impacted by the operation. CGWA was designated 12/15/1999 by Final Order.
South Pine Controlled Groundwater Area Fallon, Prairie, and Wibaux Counties	All new groundwater appropriations require a permit. CGWA was designated 11/1/1967 by Final Order.
Yellowstone Controlled Groundwater Area	All new groundwater appropriations require a permit. Water use must be measured and reported annually. NPS is notified of pending permits and given opportunity to object. CGWA was established on 1/31/94 under the Reserved Water Rights Compact between NPS and State of Montana.

19. Legislative Basin Closures (map)

Statewide Basin Closures and Controlled Groundwater Areas August 2015



Description:

- The figure above includes Controlled Groundwater Areas, Administrative Rule Closures, a Montana Supreme Court Order Closure, DNRC-Ordered Milk River Closures, Compact Closures, and Legislative Basin Closures.

Timeframe: 1973-2023**Summary:**

- The five Legislative Basin Closures are summarized in the table below. Per §85-2-319, MCA, the Legislature may stop applications for new appropriations and applications for state water reservations in highly appropriated basins.

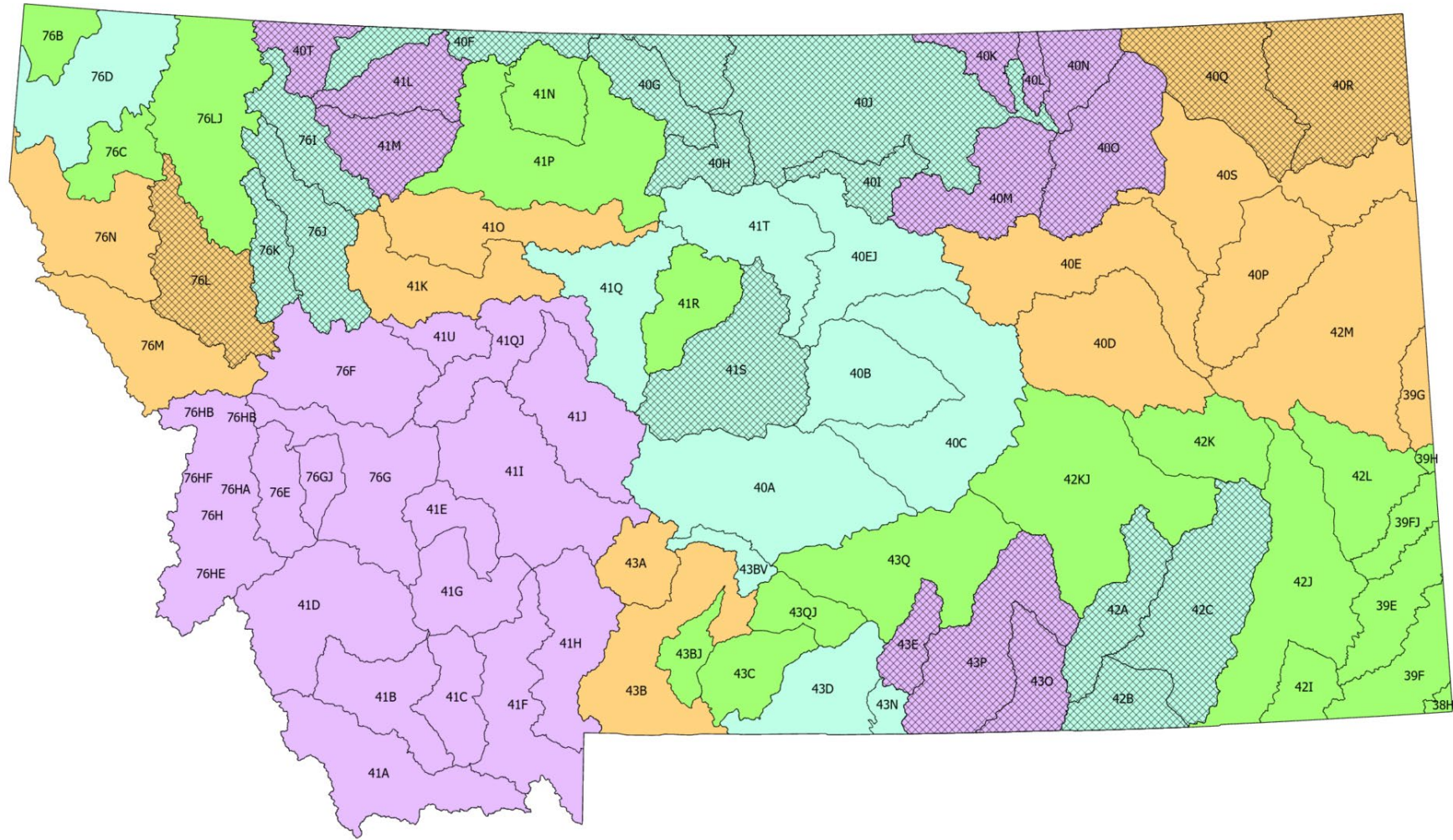
Limitations:

- More information about all types of closures can be found on the Department website.

20. Legislative Basin Closures (table)

Legislative Basin Closures	
Closure	Special Circumstances
Upper Clark Fork River Basin Legislative Closure §85-2-336, MCA	DNRC may not grant a permit unless it meets one of the exceptions. Created a steering committee to report and make recommendations to the Legislature regarding the closure every five years.
Bitterroot River Basin Legislative Closure §85-2-344, MCA	DNRC may not grant a permit until closure terminates* 2 years after all water rights in the subbasin arising under the law of the state are subject to an enforceable and administrable decree as provided in §85-2-406(4), MCA or if it meets one of the exceptions.
Upper Missouri River Basin Legislative Closure §85-2-343, MCA	DNRC may not grant a permit unless it meets exceptions. This closure is temporary** until final decrees have been issued for all the subbasins of the Upper Missouri River basin.
Jefferson-Madison River Basin Legislative Closure §85-2-341, MCA	DNRC may not grant a permit unless it meets one of the exceptions.
Teton River Basin Legislative Closure §85-2-330, MCA	DNRC may not grant a permit unless it meets one of the exceptions.
<p>*Allowing the Bitterroot closure to terminate may allow permits to be granted for a few months of the years when water is legally available.</p> <p>**Pending the adjudication, allowing the closure to terminate DNRC would still not be able to grant permits due to no water being legally available.</p>	

21. Qualitative assessment: ability to permit a new well without mitigation due to legal availability issues and/or adverse effect (map)



Description:

- For a groundwater permit application, legal availability of hydraulically connected surface water must be evaluated. Legal availability of surface water is determined by analyzing physical availability minus legal demands. To find water legally available, the modeled depletions from the proposed groundwater appropriation need to be less than or equal to the amount of water found to be legally available¹. If water is not legally available, mitigation is required.
- Adverse effect is evaluated based on the applicant’s plan for the exercise of the permit. The plan must demonstrate they can adequately control their water use so that prior appropriators’ rights may be satisfied. Legal availability of water may influence the ability of a permit applicant to satisfy this requirement.
- These qualitative assessments are based on regional manager expertise from regional application processing, regional specific hydrology expertise from field visits and published scientific studies, and regional public anecdotal information.
- Green basins – a groundwater permit may be obtained without mitigation
- Blue basins – groundwater permit without mitigation generally possible
- Orange basins – mitigation more likely than not required to obtain a groundwater permit
- Purple basins – mitigation required to obtain a groundwater permit
- Crosshatch – permitting without the need for mitigation is complicated by compacts or other major basin closures

Timeframe: 2023 assessment

Summary:

- Most basins colored Blue/Orange/Purple are due to groundwater/surface water connection, and no, or limited, remaining surface water legal availability.
- Four basins are noted to have limited groundwater physical availability (43N, 42M, 41T and 40EJ)
- 26 Basins (crosshatch – not including red legislatively closed basins that also have federal and tribal compacts) are noted to have challenges to permit groundwater because of federal or tribal compacts

Limitations:

- Legal Availability and Adverse effect are assessed on an application-by-application basis
- Montana Integrated Hydrologic Model System (MIHMS, coming end of 2024) will have a detailed analysis of physical availability statewide for surface water, with a long-term plan to have legal demands and groundwater analysis, incorporated into the modeling effort.
- Limitations of GW models and errors: groundwater models have uncertainty in four main areas including the conceptual framework, model parameters, calibration, and prediction. In general, model and groundwater model uncertainty should be positively approached to make better decisions including where additional data can be collected and the caveats with model outputs. There are no documented model uncertainty standards, unlike what is recorded for most other published data (i.e., streamflow records/gaging error).

¹ [Permit Application Manuals](#) (see pages 37-50)

22. DNRC identified focus aquifers has been moved to a separate document.