Montana Septic Perspective

Montana Water Pollution Control Advisory Committee
DEQ Metcalf Building, Room 111
May 13, 2022

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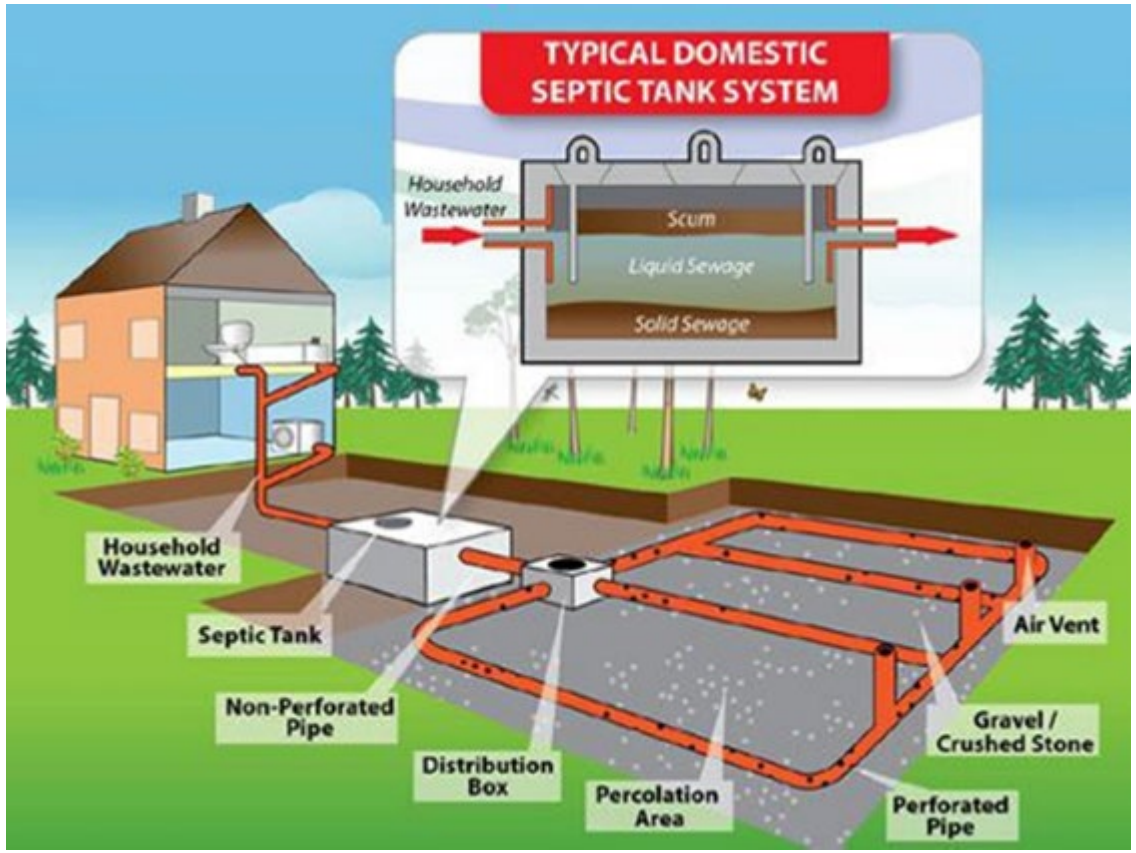
Presentation Outline

- Existing Regulatory Framework
- Whitefish Case Study
- Flathead Basin Commission Projects
- National Science Foundation Grant
- Other Efforts Underway
- Montana Legislative History
- Solution Matrix- Food for Thought

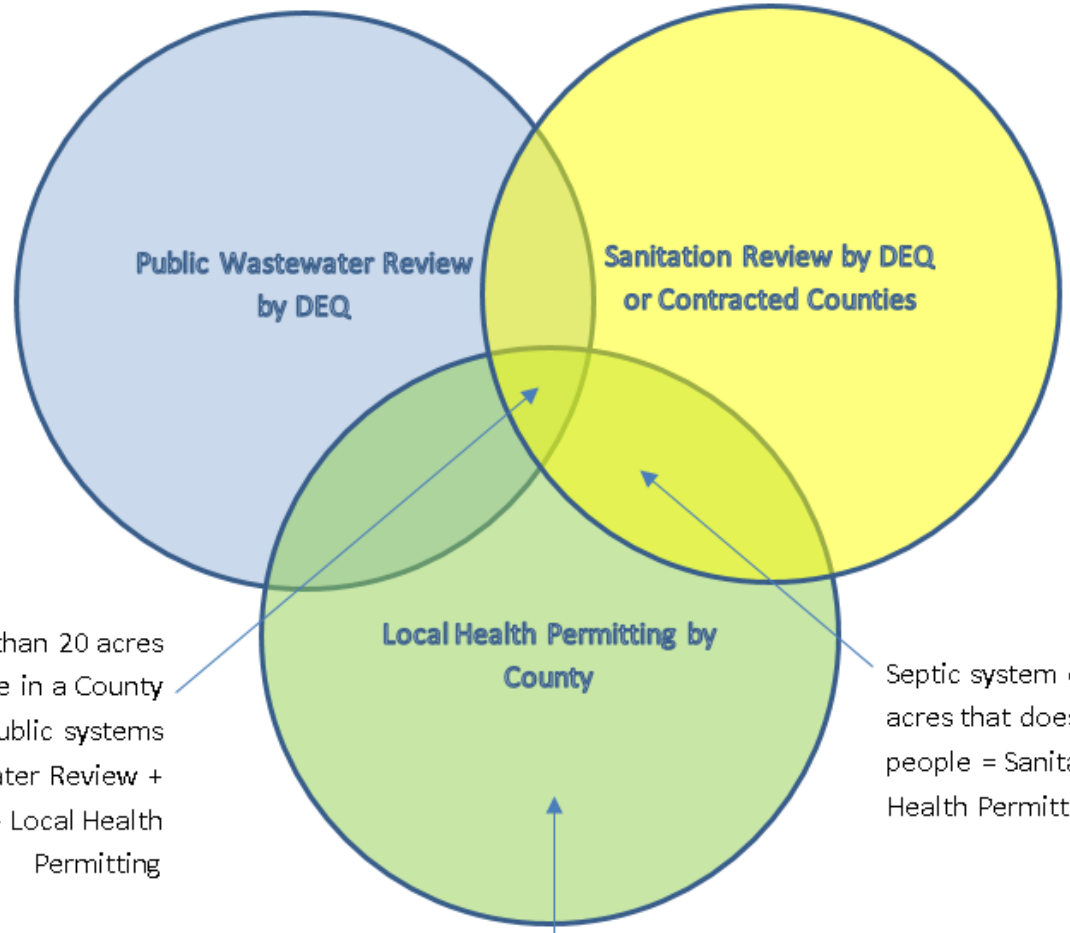


Courtesy: Waste Disposal Hub

State Regulatory Framework- A Passing Grade for New Septic Systems

According to current rules and regulations, the Department of Environmental Quality (DEQ) establishes design and permitting standards for on-site wastewater treatment systems, and local boards of health work with individual homeowners to permit systems that are allowable and adequate for a specific location.

DEQ Circular 4
MONTANA STANDARDS FOR SUBSURFACE WASTEWATER TREATMENT SYSTEMS
currently under review



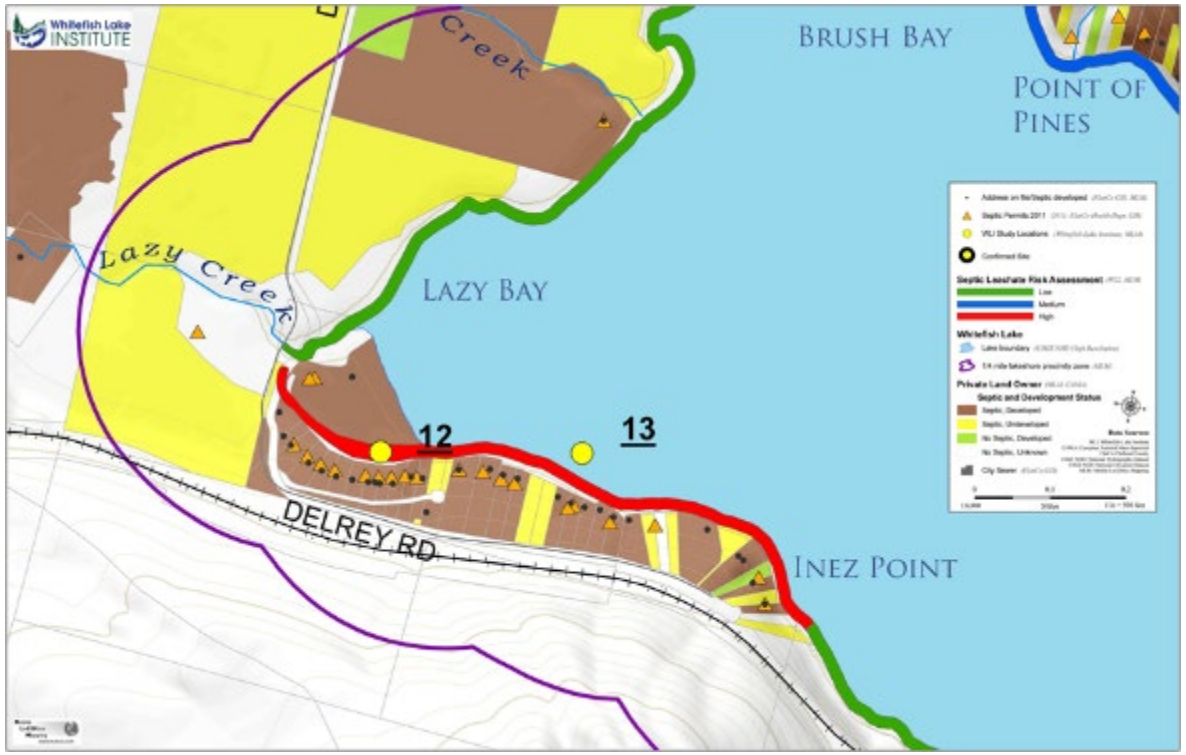
Septic system on lot less than 20 acres that serves > 25 people in a County that issues permits for public systems = Public Wastewater Review + Sanitation Review + Local Health Permitting

Septic system on lot less than 20 acres that does not serve > 25 people = Sanitation Review + Local Health Permitting.

Septic system on lot greater than 20 acres that does not serve > 25 people = Local Health Permitting

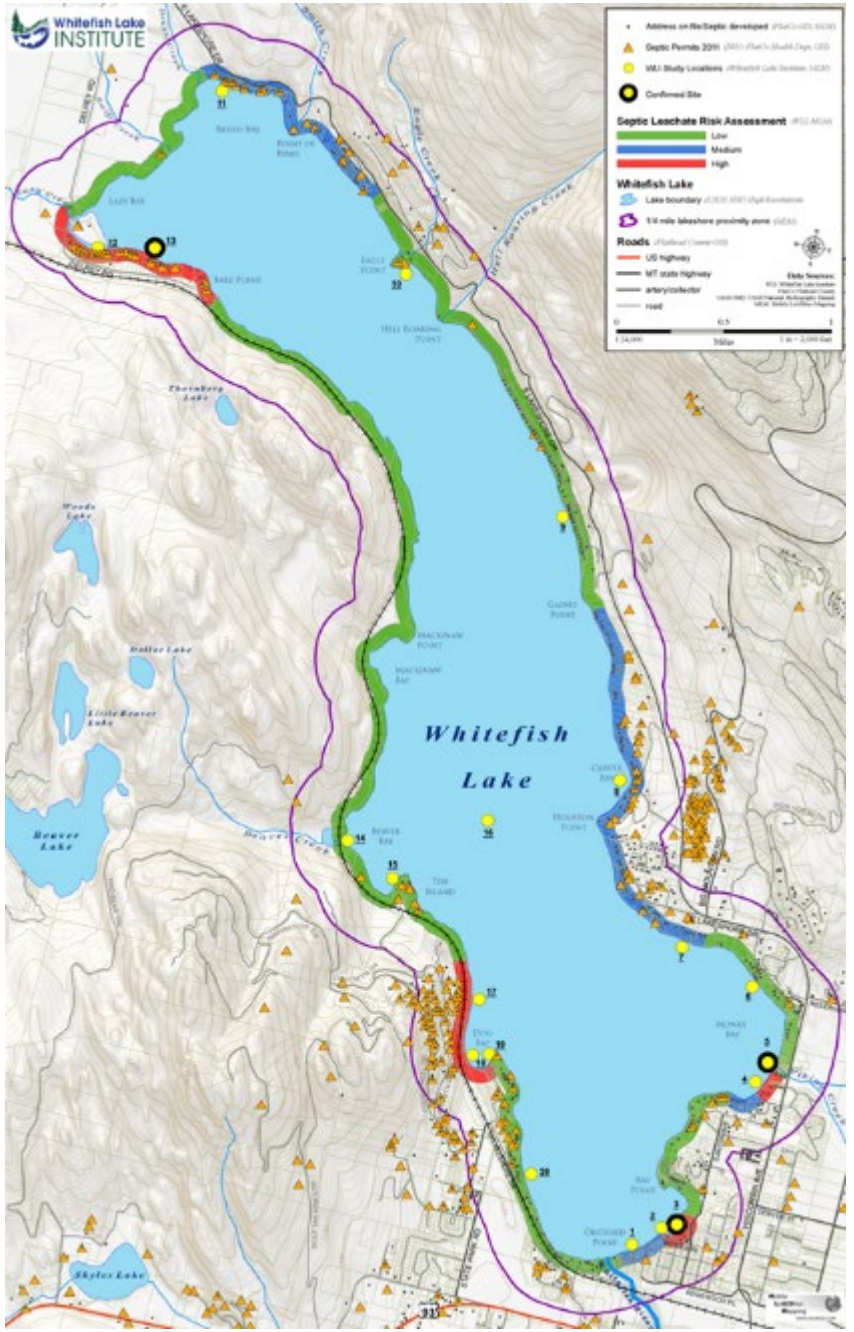
--Tim Davis, DEQ

Whitefish Lake Septic Study



Whitefish Juggernaut

- Whitefish Community Wastewater Committee
  - Tier Ranked Neighborhood Level Approach
  - Potential solutions vary based on locale
- Two Preliminary Engineering Reports
  - Lion Mountain
  - East Lakeshore Drive
  - Multiple funding partners
- Lion Mountain Discussion
  - Jurisdiction
  - Cost
  - Annexation



The Flathead Basin Commission

Mission

To protect the existing high quality of the Flathead Lake aquatic environment; the waters that flow into, out of, or are tributary to the Lake and; the natural resources and environment of the Flathead Basin.

The Flathead Basin Commission (FBC) was created in 1983 by the Montana Legislature as a non-regulatory entity to monitor and protect water quality and the natural resources in one of the State's most important watersheds. The twenty-three member Commission represents a cross-section of citizens and local, state, tribal, federal and provincial agency representatives.

Three committees: **On-site Wastewater Treatment**, Technical, E&O

Flathead Basin Commission On-site Wastewater Treatment Committee

Goal: Actionable measures to reduce water quality impacts from septic leachate

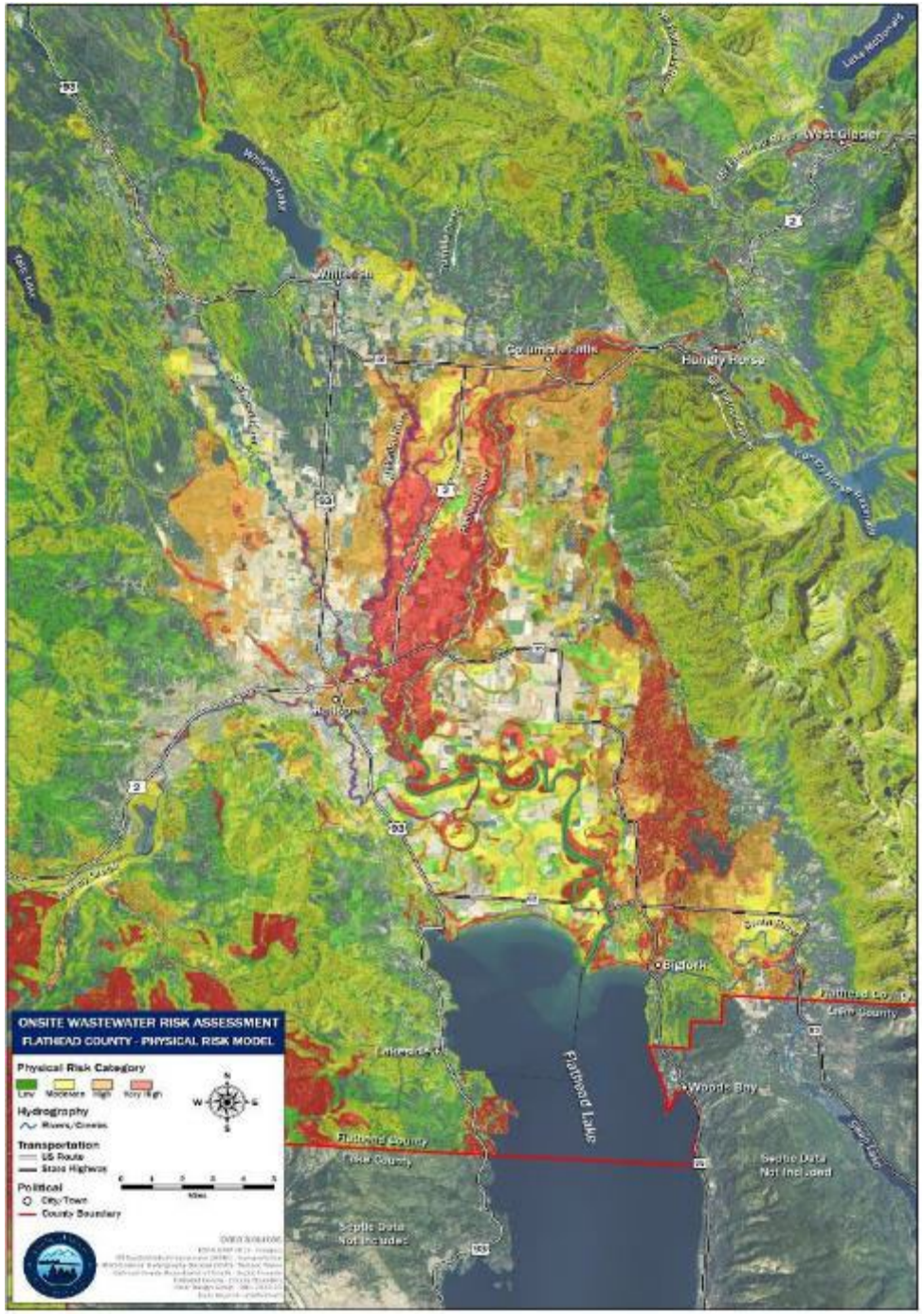
- Septic risk assessment (GIS)
- Synthetic DNA study
- Landowner assistance program
  - Have a septic system in need of pumping (has not been pumped in 3 or more years)
  - Be in close proximity to surface water (500 feet or less)
  - Live in the Flathead Basin. Priority will be given to specific watersheds: Lake Mary Ronan, Ashley Creek, and Spring Creek (see map below).
  - Contact Flathead or Lake County Conservation Districts
- National Science Foundation (NSF) Project Collaboration
  - Focus on socio-technical solution to meet a community-driven need
  - Identification of hurdles and development of solution strategies

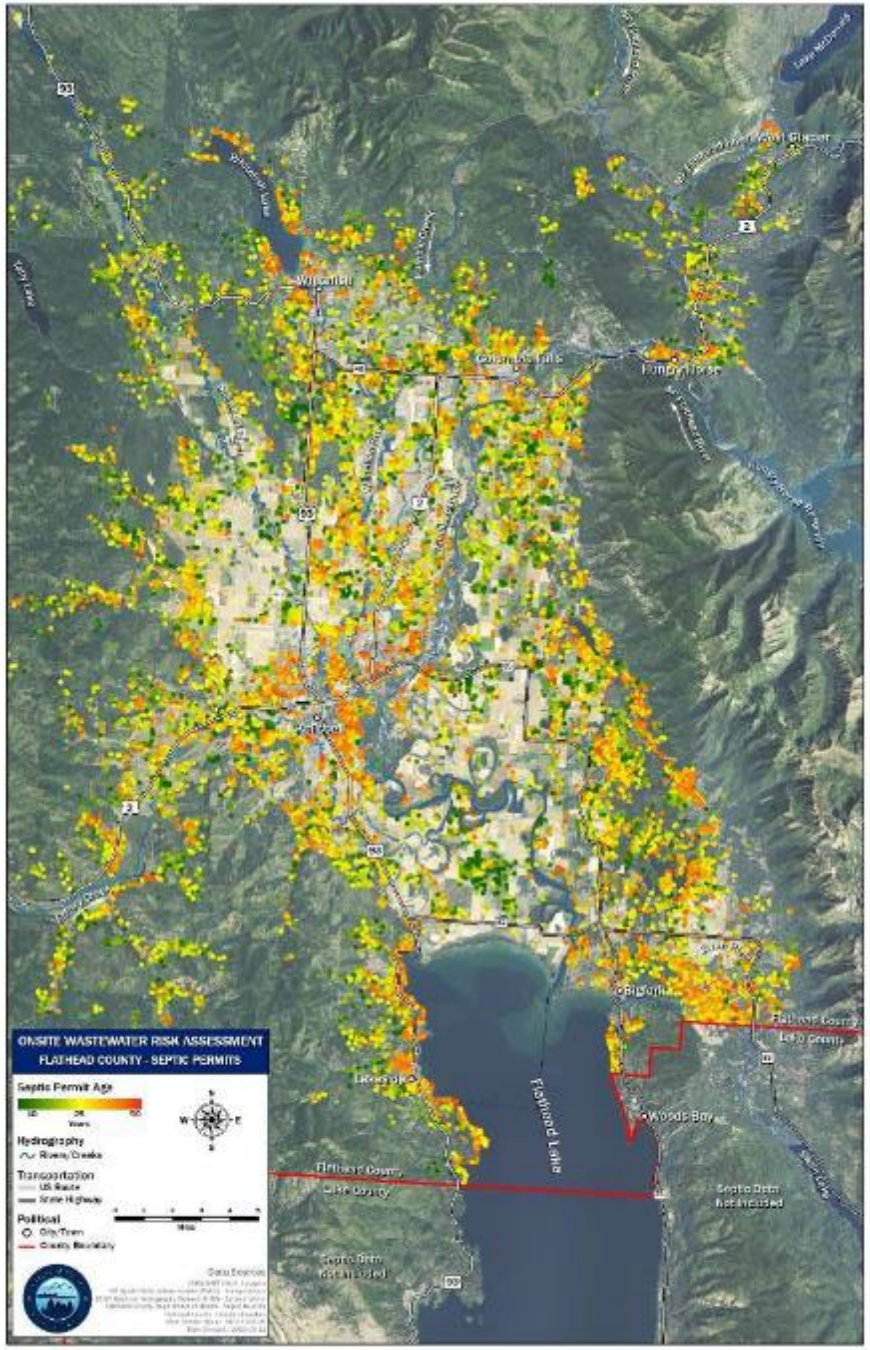
Physical Risk Model

- All physical risk layers added together to create overall physical risk model
- Map shows the potential risk for septic treatment failure based on the physical conditions

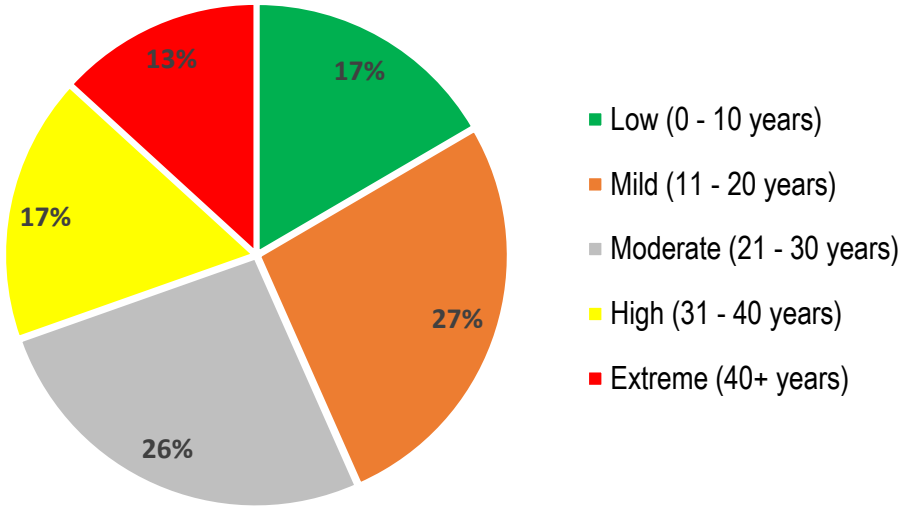
Physical Risk Model (Cumulative)	
Risk Category	**Value**
Very Low	0 – 2
Low	2 – 3
Moderate	3 – 5
High	5 – 7
Very High	7 – 15

Existing Septic Risk Model (Components)		
Feature	**Category**	**Value**
Nitrogen Risk (Soil)	Low	0
Nitrogen Risk (Soil)	High	3
Phosphorus Risk (Soil)	Low	0
Phosphorus Risk (Soil)	High	3
Groundwater < 10'	High	3
Groundwater 10' - 15'	Moderate	2
Groundwater 15' - 20'	Low	1
Groundwater > 20'	-	0
Slope (%) 0 - 10	-	0
Slope (%) 10 - 15	Low	1
Slope (%) 15 - 25	Moderate	2
Slope (%) 25 - 60	High	3
Slope (%) 60 - 90	-	0
Surface Water 500’ – 5000’	Low	1
Surface Water 100’ – 500’	Moderate	2
Surface Water 0’ – 100’	High	3

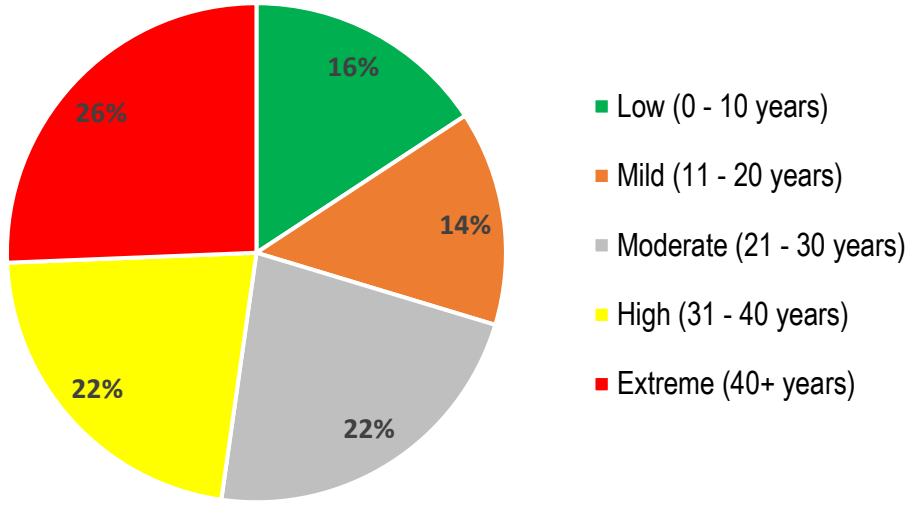




2020--Current Age
Proportion of Septic Systems in Each Risk Class
Flathead County (Permitted) TN= 21,415



2030--Projection
Proportion of Septic Systems in Each Risk Class
Flathead County (Permitted) TN= 25,415



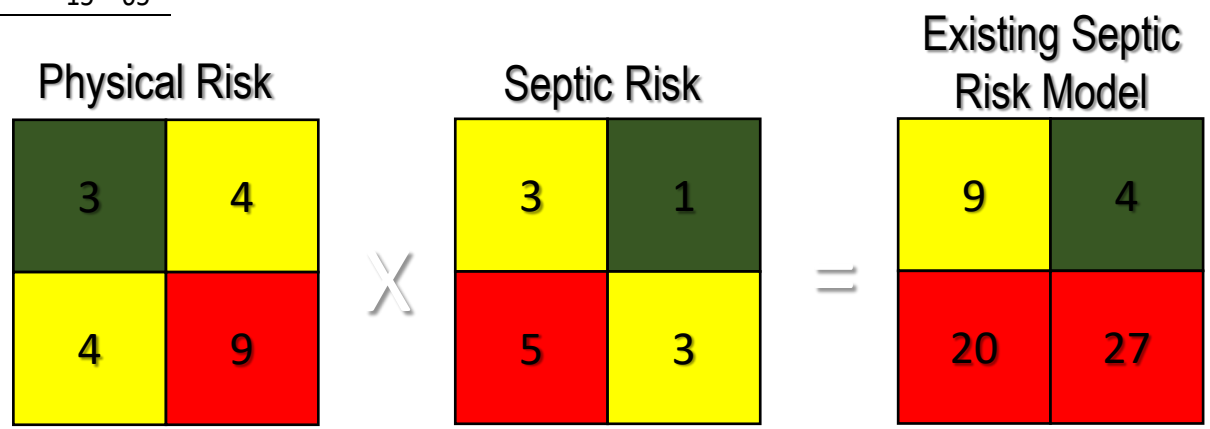
Existing Septic Risk Model

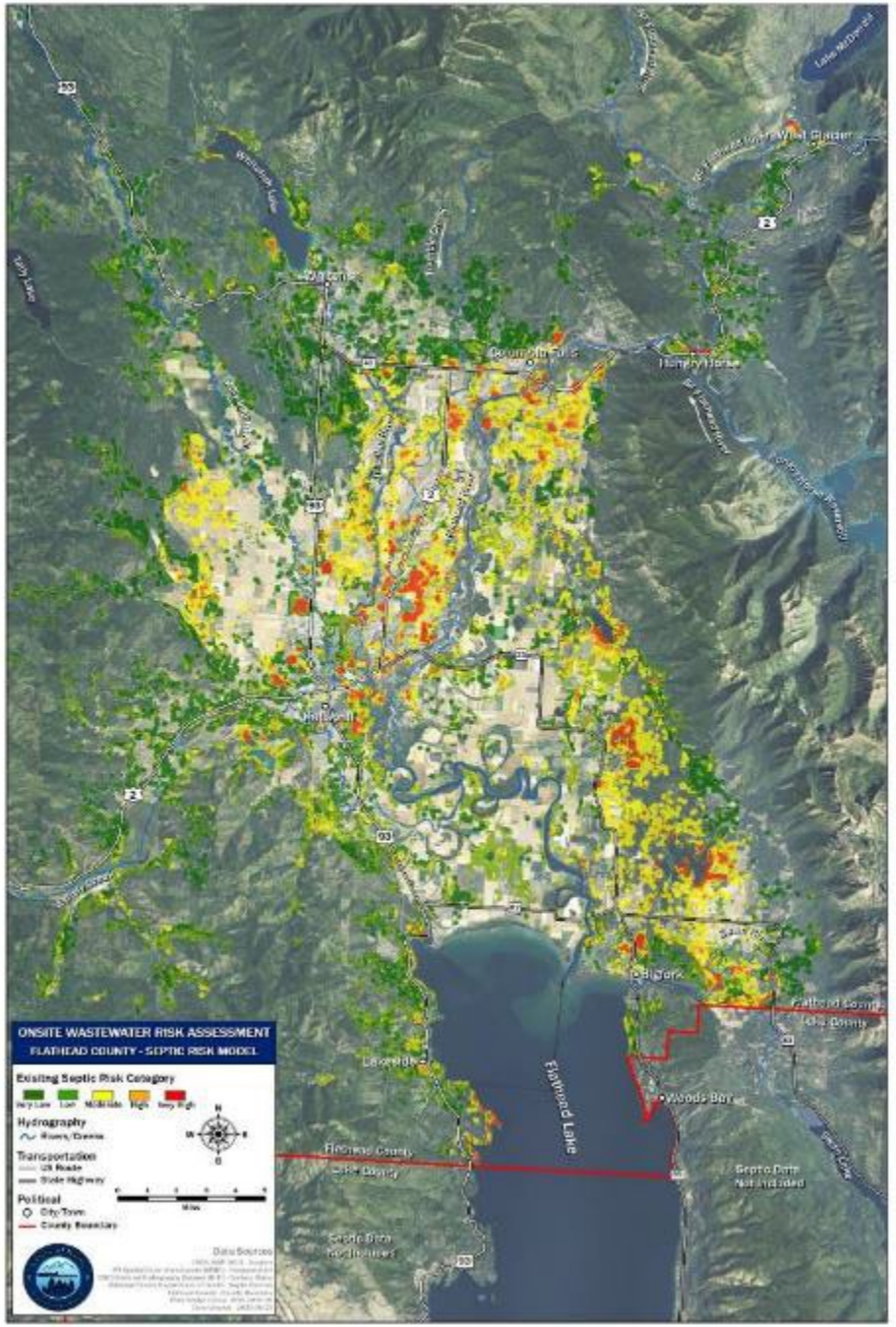
$$(G_w + S_w + M + N_r + P_r) \times S_r = E_r$$

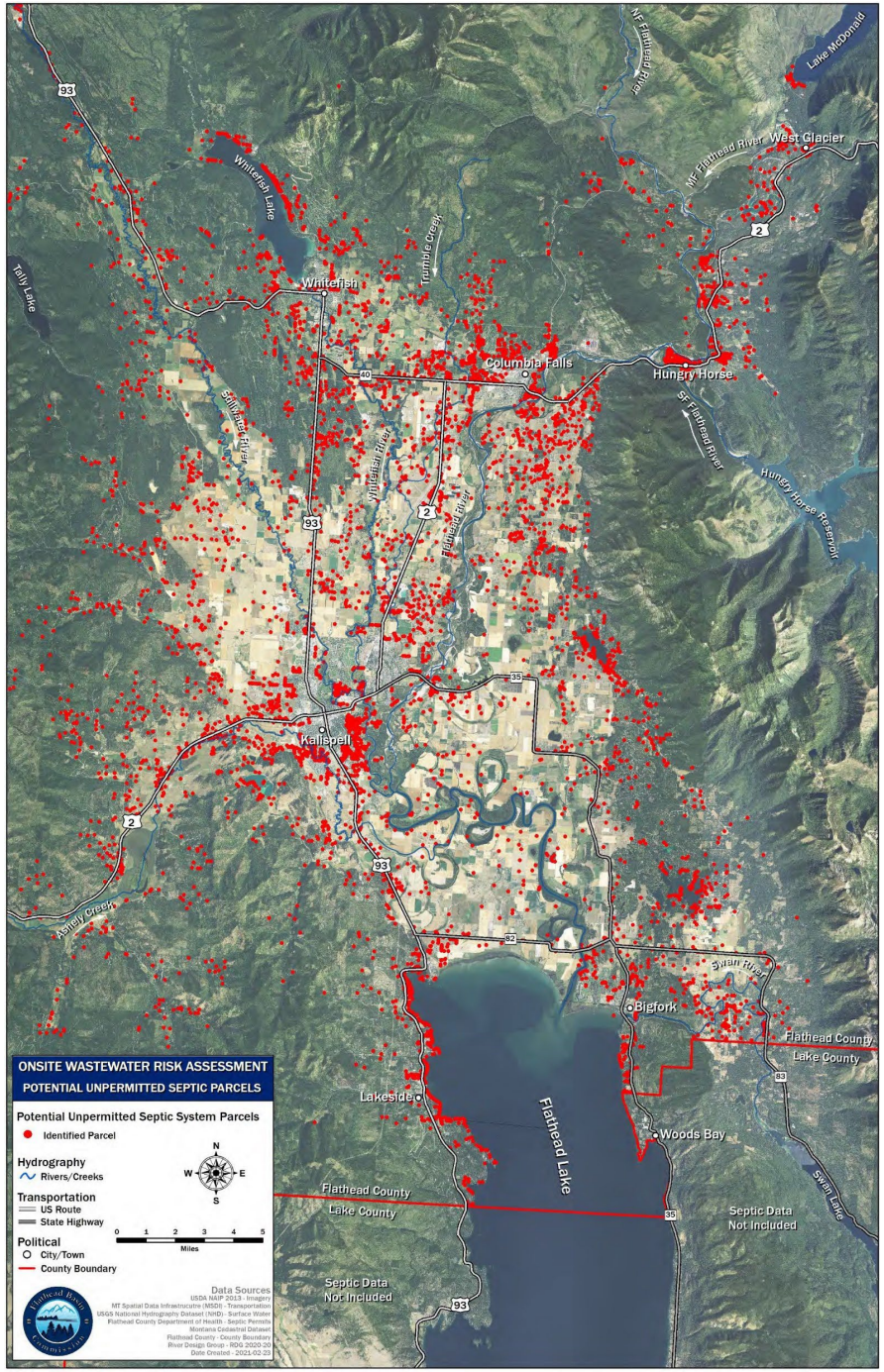
G_w – Groundwater Depth Risk Value
S_w – Surface Water Risk Value
M – Topographic Slope Risk Value
N_r – Nitrogen Translocation Risk Value
P_r – Phosphorous Translocation Risk Value
S_r – Septic Age Weighted Density Risk Value
E_r – Existing Septic Risk Value

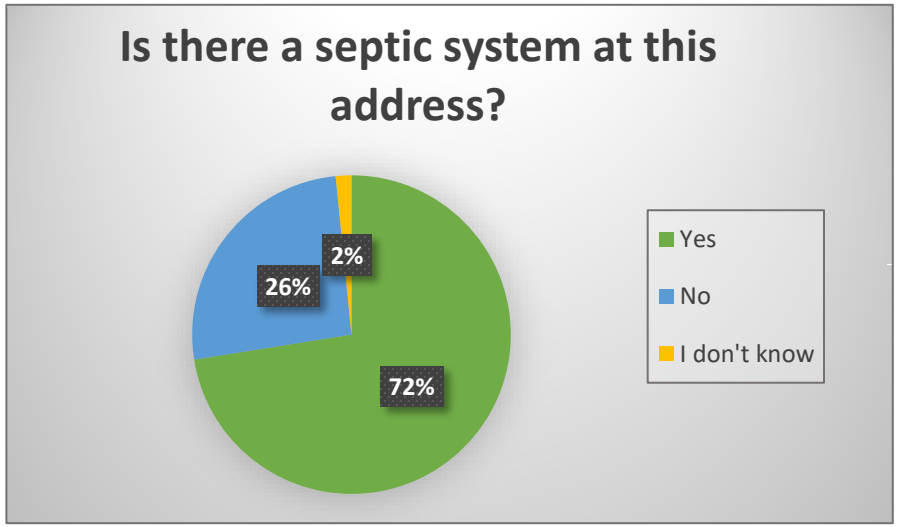
Existing Septic Risk Model	
Risk Category	**Value**
Very Low	0 – 2
Low	2 – 5
Moderate	5 – 10
High	10 – 15
Very High	15 – 65

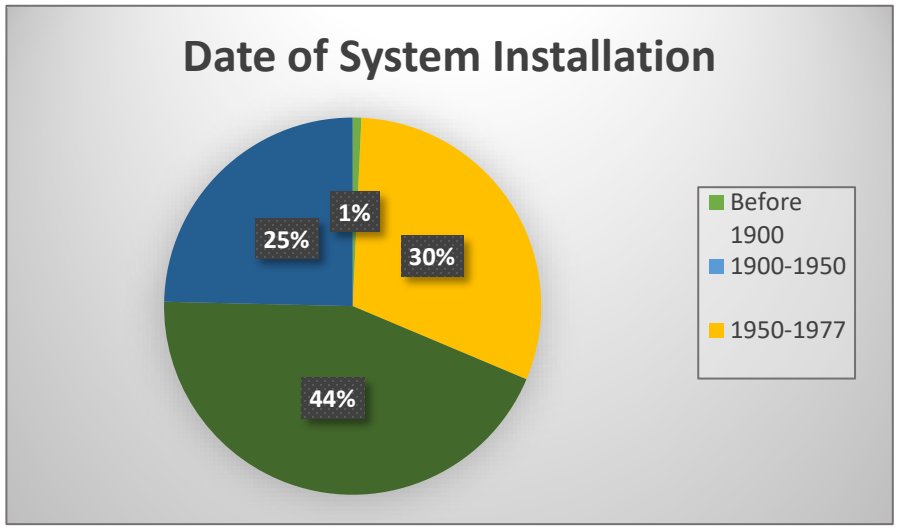
but wait…











- Best estimate for septic systems on landscape in Flathead County= 27,150
- Estimated 5,735 unpermitted systems
- 30-40 years of age (14%)
- >40 years of age (18%)

Synthetic DNA Study (2022)

- Whitefish Lake, Lake Mary Ronan
- Emerging technology partnership with Cornell University
- FBC EPA grant funding bulk of study
- Proof of Concept
- Validate FBC GIS risk assessment
- ArcNLET particle tracking module helped determine/refine the sampling plan
- Unique short strands of synthetically created DNA encased in a polymer (nanoparticle) and used as a tracer in groundwater
- Introduced into the septic systems of homeowners to assess the connection to groundwater
- Source tracking technique!

National Science Foundation Smart & Connected Communities Grant

- Collaboration between researchers, basin stakeholders, government agencies and communities
  - 3-day workshop at The University of Montana Flathead Lake Biological Station
  - Proof of concept on the use of data to motivate homeowners to adopt septic BMPs
  - Pilot microbial analysis to identify affected littoral areas
  - Assess policy and governance frameworks
  - Provide support to the FBC On-site Wastewater Treatment Committee

Other Efforts Underway

- Flathead County Biosolids Facility (septage)
  - Planning phase ($2M)
    - Issues
      - High strength waste (sludge) municipalities can't accept
        - Sources: septic tanks, vault toilets, holding tanks
      - Septage application areas sometimes in sensitive areas
      - PPCPs that may persist in environment
      - Conversion of ag land to development
      - Non-biological waste
      - Septage haulers in a pinch!
- University of Montana graduate student
  - Marie Watson
    - Focus is to understand social and cultural dynamics related to septic risk

courtesy: Michigan.gov

Is it just those Flathead Folks that are in a tizzy?

More than one in five households in the United States depend on individual onsite or small community cluster systems (septic systems) to treat their wastewater (EPA, 2022)

One half of the 428,000 households in Montana use septic systems (DEQ, 2018)

Some Montana examples—

- South Butte
  - Fractured granitic geology with increased development
  - ⬆Nitrate from septic density
- West Billings
  - ⬆Nitrate probably more related to agriculture currently, but increased development
- Gallatin Valley
  - Groundwater rich and ⬆Nitrate concerns over septic

Traditional Mitigation Methods

- Individual system replacement
  - Need replacement drainfield area
- Level II
  - >60% reduction in N. Little effect on P
- Community systems
  - Whitefish Lake Point of Pines
  - Flathead Lake Biological Station
- Hook up to municipal sewer system
  - May require annexation or wastewater agreement
    - Whitefish Mountain Resort

Long, narrow and steep lots like these on Whitefish Lake present challenges for individual septic field replacement.

Montana Mitigation Examples

Lewis & Clark County

- On-site domestic wastewater from privately owned septic systems is one of the largest sources of nitrogen and phosphorus to Lake Helena and many of its tributary streams (EPA, 2006)
- In 2011, a septic system maintenance program was established by the City-County Board of Health

Missoula City-County Health Department

- Over a twenty-year period, Missoula reduced septic systems from 38% to 22% in the WQD boundaries. Sewer connections increased 62% to 78% over the same time period
- Over a thirty-year period, 6,437 dwellings were connected to sewer, eliminating 1,287,400 GPD wastewater load to groundwater
- Nitrate in monitoring wells and public supply wells in the Missoula Valley have been significant reduced

Livingston

- ARPA project to connect 165 homes to city sewer services

Montana Legislative History

2021, HB62 – Rep. Mike Hopkins

- Update water and wastewater revolving loan program
- ***Became Law*** *(Ch. 29, 2021)*
- Increases bond authority for the state to "provide financial assistance to municipalities and private persons to finance or refinance part or all of the cost of projects" (75-5-1103).

2021, SB54 – Sen. Jason Ellsworth

- Require reviews of experimental on-site wastewater treatment systems
- ***Became law*** *(Ch. 49, 2021)*

2021, HB123 – Rep. David Bedey

- Revise laws regarding the stringency of local septic regulations
- ***Died in Standing Committee***

Montana Legislative History

2019, SJ-3 –Sen. Fred Thomas

- Evaluate current state and local regulations for designing and permitting septic systems and compare those regulations to other states
- Compile research on septic system programs in Montana
- Research funding needs and potential funding sources
- Examine alternative septic systems and provide recommendations to encourage the use of alternative on-site systems
- At its July 2019 meeting, the committee moved to study the resolution in its entirety while also receiving information and research related to failing and aging on-site wastewater treatment systems

2015, LC957 –Rep. Ed Lieser

- Require septic system disclosure
- ***Bill request received, but no draft created***

2013, HB483 –Rep. Ed Lieser

- Require septic inspection before property transfer
- ***Died in Standing Committee***

2011, SB 191 –Sen. Ron Erickson

- Require septic system disclosure on property sale
- ***Died in Standing Committee***

2011, HB602 –Rep. Walter McNutt – Interim study of exempt wells

- ***Became law*** *(Ch. 256, 2011)*

Solution Matrix—Food for Thought

- Method—Site Specific Mitigation and/or Policy
  - Septic inspection program
    - Lewis & Clark County example
  - Time of Sale or Transfer (TOST)
    - Michigan (Barry-Eaton) example
  - Lenders
- Scalable / Equitable
  - Financial, social and cultural considerations
- Jurisdictions
- Ancillary issues (septage)
- Synergy—Wellhead Protection Program
- Science and monitoring
  - MEANSS model (Regensberger, MDEQ)
    - Nutrient Trading, TMDLs
  - How much is enough? What questions do we need to answer?
  - Remote sensing?

BARRY-EATON DISTRICT HEALTH DEPARTMENT LOSES SEPTIC POLICY THAT PROTECTED WATER AND PUBLIC HEALTH

"A groundswell of frustrated citizens and personal beliefs swept the regulation from the books."

Q&A

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