

# GROUND WATER DISCHARGES AS POINT SOURCES TO PROPOSED GALLATIN ORW

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Presented by:  
Eric Regensburger  
DEQ, Public Water and Subdivisions Bureau  
444-0916  
[eregensburger@mt.gov](mailto:eregensburger@mt.gov)

# Topics

- **ORW SUMMARY**
  - Location
  - ORW criteria
  - Point Sources
- **GROUND WATER CONNECTION TO SURFACE WATER**
  - Criteria used
  - Affected area
  - Impacts from ORW designation

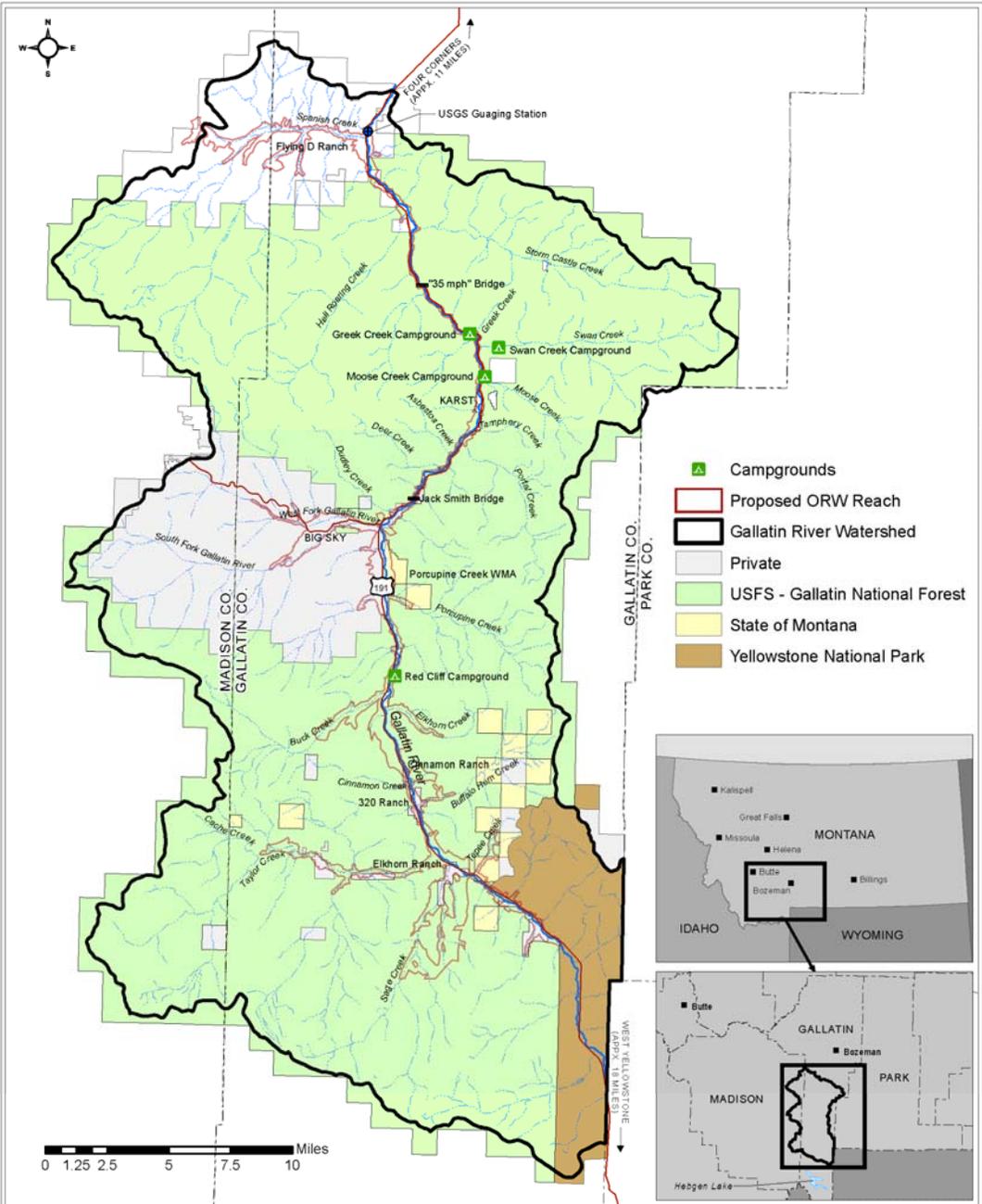


FIGURE 1

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**STUDY AREA**  
**GALLATIN RIVER ORW EIS**

# ORW Requirements

- **REQUIREMENTS LISTED IN THE WATER QUALITY ACT (75-5-316, MCA)**
  - Cannot allow “...new or increased point source discharge that would result in a permanent [measurable] change in the water quality of an ORW”
  - A source has to meet all 3 criteria to be impacted by ORW designation
  - Focus on criteria for determining point source loads to the river...

# What is an ORW Point Source?

1. DIRECT DISCHARGE INTO RIVER
2. GROUND WATER DISCHARGE THAT IS IN DIRECT HYDRAULIC CONNECTION WITH THE RIVER

# Direct Hydrologic Connection (“footprint”)

- **POLLUTANT TRAVEL TIME TO RIVER IS MAIN FACTOR**
  - Hydraulic Gradient
  - Hydraulic Conductivity
  - Porosity
- **USED 1-YEAR TIME OF TRAVEL AS THE INITIAL CRITERIA FOR DIRECT CONNECTION**
- **COULD SHORTEN FOOTPRINT BASED ON:**
  - Elevation above river / depth to ground water
  - Confined conditions of aquifer
  - Madison aquifer (karst) given additional criteria
- **MINIMUM FOOTPRINT WIDTH = 300'**

# Impacts on Development in Footprint

- **Reduce amount of discharges originating inside the footprint (effectively limit number of wastewater systems near the river)**
- **Areas outside of the footprint still need to meet nondegradation requirements (no change from current procedures)**

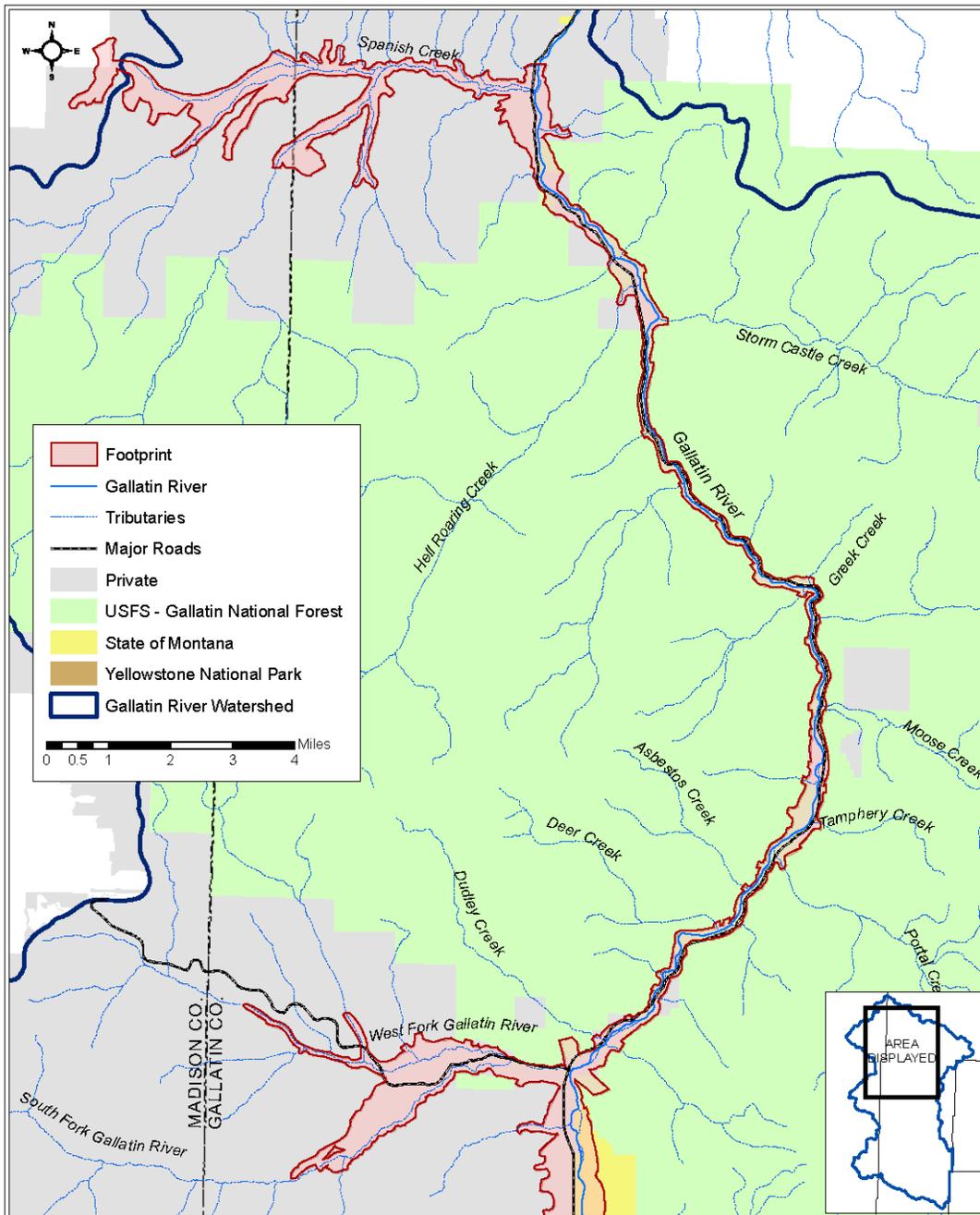


FIGURE 2-2

**FOOTPRINT OF ZONE OF HYDROLOGIC CONNECTIVITY OF GALLATIN RIVER (NORTH HALF)**  
**GALLATIN RIVER ORW EIS**

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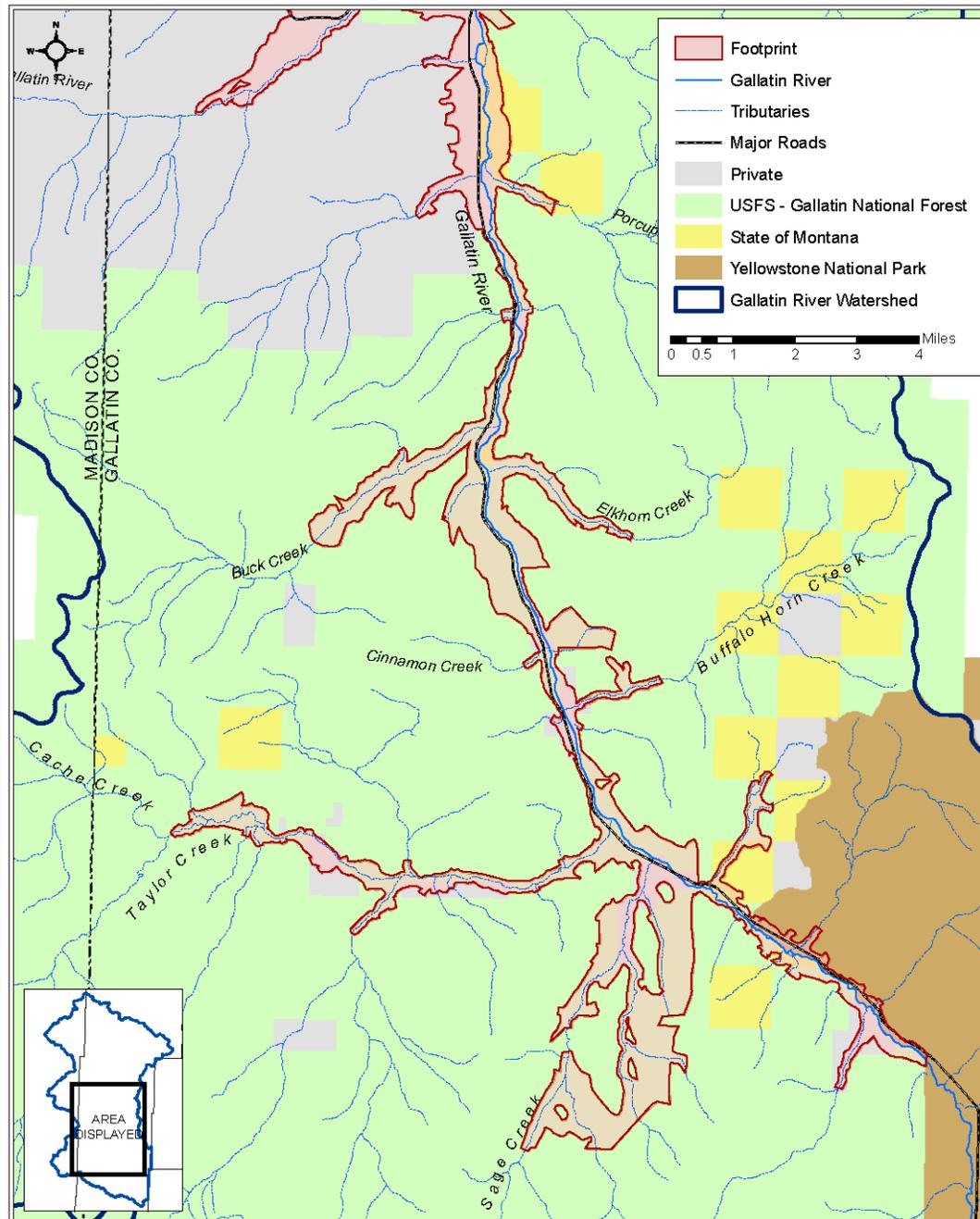


FIGURE 2-2 (continued)

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**FOOTPRINT OF ZONE OF HYDROLOGIC CONNECTIVITY  
OF GALLATIN RIVER (SOUTH HALF)  
GALLATIN RIVER ORW EIS**

**QUESTIONS?**

**Table F-4. Setback Criteria For Potential Contaminant Sources From Mainstem Of Gallatin River And Perennial Tributaries By Characteristics Of The Uppermost Aquifer**

<b>Highly Vulnerable Coarse-Grained Units</b> <u>(high groundwater velocity)</u>	<b>Highly Vulnerable Geologic Units</b> <u>(high groundwater velocity)</u>	<b>Moderately Vulnerable Geologic Units</b> <u>(moderate groundwater velocity)</u>	<b>Low Vulnerability Geologic Units</b> <u>(lower groundwater velocity)</u>
<b>Rank: 3</b>	<b>Rank: 3</b>	<b>Rank: 2</b>	<b>Rank: 1</b>
Full extent of continuous deposit in contact with Gallatin River or tributaries (1-Year TOT is greater than 1 mile) <sup>a</sup> .	A setback of ½-mile (2640 feet) <sup>a</sup> where the aquifer is unconfined, or	A setback of 2000 feet <sup>b</sup> where the aquifer is unconfined, or	A setback of ¼-mile (1320 feet) <sup>a</sup> where the aquifer is unconfined, or
	A setback from the Gallatin River or tributaries where land surface is 40 <sup>b</sup> feet or greater above average river elevation in the shortest linear direction.	A setback from the Gallatin River or tributaries where land surface is 40 <sup>b</sup> feet or greater above average river elevation in the shortest linear direction.	A setback from the Gallatin River or tributaries where land surface is 40 <sup>b</sup> feet or greater above average river elevation in the shortest linear direction.
	except, that the minimum setback shall not be less than 300 feet;	except, that the minimum setback shall not be less than 300 feet;	except, that the minimum setback shall not be less than 300 feet;
	except, if bedrock aquifer is shown to be confined, the minimum setback of 300 feet <sup>c</sup> applies.	except, if bedrock aquifer is shown to be confined, the minimum setback of 300 feet <sup>c</sup> applies.	except, if bedrock aquifer is shown to be confined, the minimum setback of 300 feet <sup>c</sup> applies.
	except, the minimum setback for Madison Group (Mm) shall not be less than the shorter of ½-mile, the Madison ridge top closest to the river, or a change in geologic unit.		

<sup>a</sup> Setback distance based on One-Year Time of Travel distance calculated from best available data.

<sup>b</sup> 40-foot elevation difference results in estimated 25-foot or more above the water table; criteria from Baldwin (1997).

<sup>c</sup> 300-foot setback distance interpreted from septic system plume studies by Woessner et al. (1996).

# Affected Activities (3 criteria)

## 1. NEW OR INCREASED SOURCES

- Discharges that aren't existing, or haven't been approved, authorized, licensed or permitted by DEQ or local government body by the effective date of designation

## 2. PERMANENT SOURCES

- Permanent and “measurable” ( measurable = DEQ-7 trigger values) ...

## 3. POINT SOURCE

- Direct discharges to Gallatin River (or to tributaries that cause a permanent/measurable change in the Gallatin River)
- Ground water discharges with a “direct hydrologic connection” to Gallatin River

# Potential Impacts on Development

- **Reduce number of single family equivalents (SFEs) within footprint – allow only 67 SFEs**
- **Encourage alternative wastewater treatment and disposal inside footprint – allow >67 SFEs**
- **Encourage development of new regional wastewater system(s) with disposal not regulated by ORW designation – allow up to all 652 SFEs**
- **Encourage hookup to existing wastewater treatment system with disposal not regulated by ORW designation – allow up to all 652 SFEs**
- ...

# Potential Impacts on Development

- Lots inside footprint without existing or previously state approved system may not be able to get septic system on their lot.
- Increase cost of average home in Big Sky area by 1 - 3%