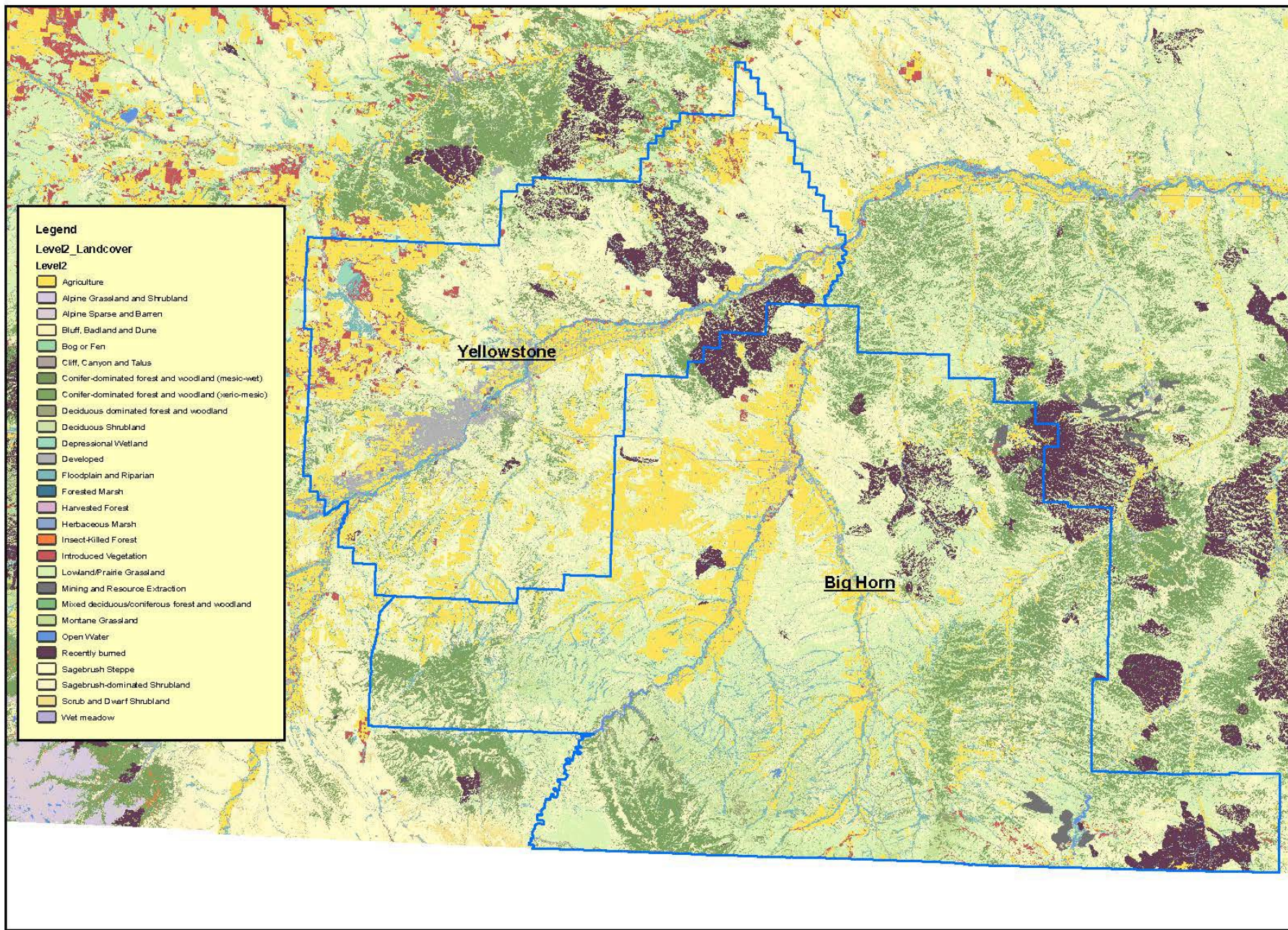


The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text is centered on the slide.

SALINITY WORKSHOP

MARCH 1ST, 2022

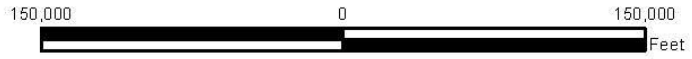
SEANNA TORSKE, USDA-NRCS



- Legend**
- Level2_Landcover**
- Level2**
- Agriculture
 - Alpine Grassland and Shrubland
 - Alpine Sparse and Barren
 - Bluff, Badland and Dune
 - Bog or Fen
 - Cliff, Canyon and Talus
 - Conifer-dominated forest and woodland (mesic-wet)
 - Conifer-dominated forest and woodland (xeric-mesic)
 - Deciduous dominated forest and woodland
 - Deciduous Shrubland
 - Depressional Wetland
 - Developed
 - Floodplain and Riparian
 - Forested Marsh
 - Harvested Forest
 - Herbaceous Marsh
 - Insect-Killed Forest
 - Introduced Vegetation
 - Lowland/Prairie Grassland
 - Mining and Resource Extraction
 - Mixed deciduous/coniferous forest and woodland
 - Montane Grassland
 - Open Water
 - Recently burned
 - Sagebrush Steppe
 - Sagebrush-dominated Shrubland
 - Scrub and Dwarf Shrubland
 - Wet meadow

Assisted By Seanna Torske

Prepared with assistance from USDA-Natural Resources Conservation Service

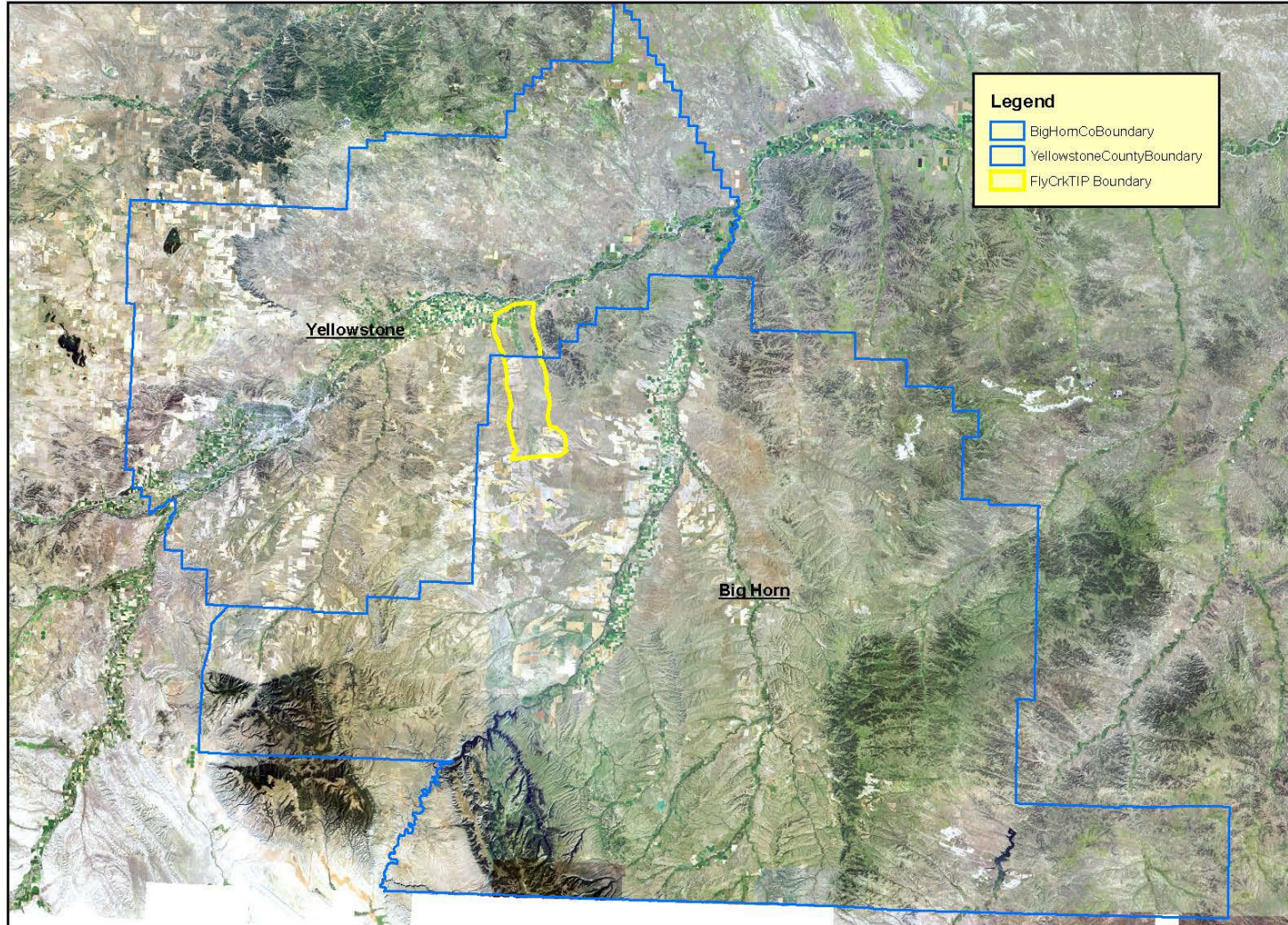


Agency: USDA-NRCS



2017 Imagery

Areas of Concern



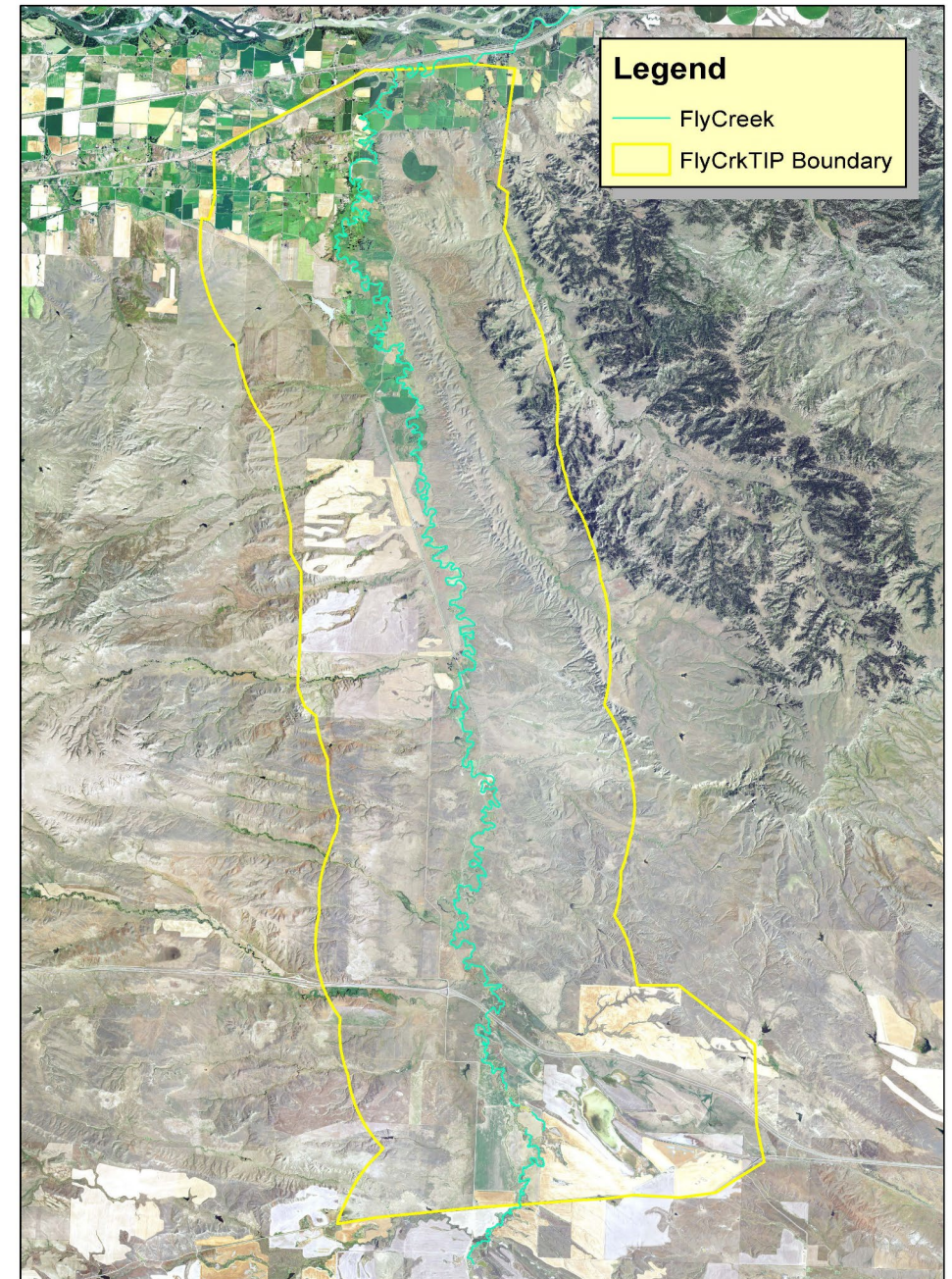
Assisted By Seanna Torske

Prepared with assistance from USDA-Natural Resources Conservation Service



2017 Imagery

Agency: USDA-NRCS



Assisted By: Seanna Torske

Prepared with assistance from USDA-Natural Resources Conservation Service



2017 Imagery



FLY CREEK AREA OF CONCERN

- BILLINGS FIELD OFFICE STAFF RECEIVED REPORTS OF LIVESTOCK DEATHS ALONG FLY CREEK DURING 2018 AND 2019.
 - LANDOWNERS TURNED IN WATER SAMPLES THEY HAD TAKEN DURING THIS TIME (BOTH WELL WATER AND FLY CREEK SAMPLES).
- SPRING 2020 - NRCS STAFF SUBMITTED A TARGETED IMPLEMENTATION PLAN (TIP) PROPOSAL TO OUR STATE LEADERSHIP TEAM.
 - ADDITIONAL RESEARCH INTO THE CAUSES OF THE ISSUES WAS NEEDED FOR APPROVING THIS TIP.



FLY CREEK AREA OF CONCERN

- FALL/WINTER 2020— OUR STATE GEOLOGIST WORKED WITH MT BUREAU OF MINES & GEOLOGY TO SAMPLE EXISTING WELLS WITHIN THE FLY CREEK WATERSHED.
- SUMMER 2021 – STATE GEOLOGIST COMPLETED A COMPREHENSIVE REVIEW OF THE FLY CREEK WATERSHED, INCLUDING THE FOLLOWING FINDINGS:
 - CONSIDERATION FOR SETBACK DISTANCES FROM AG FACILITIES, WELLS, AND FLY CREEK.
 - FLOODING AND DROUGHT CYCLES IN THE AREA.
 - LOCAL GEOLOGY WITH SIGNIFICANT AMOUNTS OF SHALE.
 - CONSIDERABLE WATER QUALITY ISSUES NOTED IN SHALLOW WELLS (LESS THAN 100 FT DEEP).



United States Department of Agriculture

FLY CREEK GEOLOGY and HYDROGEOLOGY REPORT

Draft: 5/8/2020
Final: 5/28/2020

SUBJECT: ENG – Fly Creek Hydrogeology Report

File Code: 210-16-7

TO: Tyler Martindale
Area Engineer
Natural Resources Conservation Service
Bozeman Area Office, Montana

1.0 INTRODUCTION

Fly Creek is a Yellowstone Tributary in south central Montana, approximately 30 miles east from Billings, Montana. Fly Creek headwaters is in the Crow Reservation on the Yellowstone and Big Horn County line and its confluence with the Yellowstone River is near the town of Pompey's Pillar, Montana. Ranchers along Fly Creek noticed increased cattle health issues the past several years, including deaths. Several producers collected and analyzed water quality samples from their water wells to discover exceedingly high nitrate, sodium, and sulfate. Ranchers approached NRCS with this information and is asking for assistance to address the problem.

The purpose of this report is to:

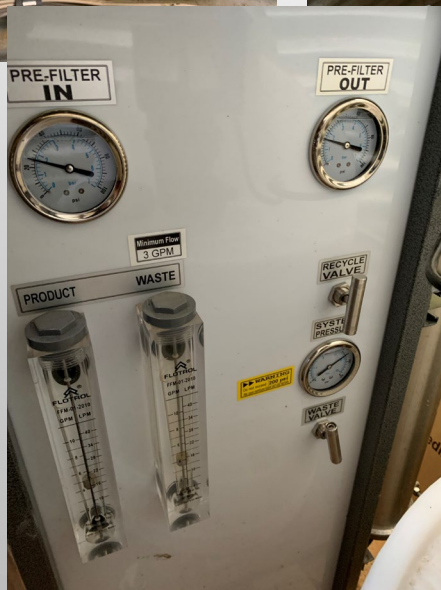
1. Evaluate the potential to drill new wells or use existing wells for better water quality
2. Identify livestock water quality within the Fly Creek Watershed
3. Identify cause of poor water quality
4. Evaluate if TIP practices will result in substantial/measurable improvement.
5. Provide input on water monitoring protocol

Information contained within this report is based on the United States Geological Survey (USGS) publications, peer reviewed publications, and the Montana Bureau of Mines and Geology (MBMG) geologic maps and Ground Water Information Center (GWIC). The report author used ArcMap to identify various water well depths and their locations and plot wells on topographic and geologic maps.

2.0 GENERAL GEOLOGY

Surface geology across the upper and lower Fly Creek watershed consists primarily of Cretaceous aged marine- and fresh-water sedimentary rock, capped by alluvium, mostly along stream, river, and tributary channels, and terrace deposits. Bedrock exposures include interbedded sandstones, shales, mudstone, and coal of the Lance Formation, Bearpaw Formation marine shales, and fresh to brackish Judith River Formation sandstones and shales. Subsurface formations directly under the Judith River Formation are, from youngest to oldest, Claggett marine shales, Eagle Sandstones, thick sequences of Colorado Group shales, Kootenai and Eagle sandstones. There are small outcrops within the watershed of the Eagle Sandstone and underlying Telegraph Creek Formations.

FLY CREEK AREA OF CONCERN



- FALL 2021, MONTANA NRCS WAS ABLE TO GET THE PRACTICE LIVESTOCK WATER TREATMENT FACILITY, APPROVED AS AN INTERIM PRACTICE FOR FISCAL YEAR 2022.
- FEBRUARY 2022 - THE INTERIM PRACTICE HAS BEEN INCLUDED IN THE UPDATED TIP PROPOSAL
- MARCH 2022 – ALL TIP PROPOSALS FOR FY2023 CONSIDERATION WILL BE REVIEWED BY NRCS STATE LEADERSHIP TEAM.

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