

Soils

This section should **address the types of soils in the project area susceptible to unwanted impacts of herbicide application**, based on label statements.

Create soil data maps and reports using Web Soil Survey or through the local NRCS office. Maps and reports must include:

- **soil types with soil descriptions**
- **soil drainage class**
- **depth to water table**
- **soil erosion factors (K factor and Wind)**
- **soil pH (if any herbicide label contains limitations in regards to soil pH).**

If the project is too large to read soil labels on the map, separate the project into several sections and create a map for each area.

Selecting Your Project Area (AOI)

websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Area of Interest (AOI) | Soil Map | Soil Data Explorer | Download Soils Data | Shopping Cart (Free)

Search

Area of Interest Interactive Map

View Extent: Contiguous U.S. | Scale: (not to scale)

1

- Navigate to USDA Web Soil Survey <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>
- You **MUST** allow pop-ups to run this site

2

- Navigate to USDA Web Soil Survey <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>
- Select your project area as the Area of Interest (AOI) by **importing a shapefile (.shp) or zipped shapefile (.zip)** or drawing the area with the **polygon tool**

Saving Your Project Area (AOI)

1

- Save your project area (AOI) for use in ArcGIS, Google Earth, or later use in Web Soil Survey by **exporting a zipped shapefile (.zip)**
- Name your .zip file something recognizable and **download** it

2

Look for the .zip file folder in **“Downloads”** and save it someplace safe for later use

White House

Organize Open Share with E-mail Burn New folder

Name	D
NWTftest.zip	9,
2015_draft_agenda_August 21 for updati...	9,
comprehensive report_condensed.pdf	8,
2015_09_10_15_17_00...	0,

Soils and Soil Description

Area of Interest (AOI) **Soil Map** Soil Data Explorer Download Soils Data Shopping Cart (Free)

Search

Map Unit Legend

Lewis and Clark County Area, Montana (MT630)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
85E	Whitecow channery loam, 8 to 35 percent slopes	0.0	0.0%
85F	Whitecow channery loam, 35 to 60 percent slopes	118.9	16.7%
164E	Windham-Lap channery loams, 8 to 45 percent slopes	144.8	20.3%
184E	Mocmont very channery loam, cool, 15 to 35 percent slopes	11.2	1.6%
263E	Hauz-Sieben-Tolman channery loams, 8 to 45 percent slopes	1.0	0.1%
501B	Fluvaquents and Fluvaquentic Haplustolls soils, 0 to 4 percent slopes	4.8	0.7%
563E	Tolex-Tolman-Hauz channery loams, 8 to 45 percent slopes	0.3	0.0%
590E	Helmville channery loam,	140.0	19.7%

Soil Map

Scale (not to scale)

1

Once you have selected and AOI, click the **Soil Map** tab. If your AOI is too big, the map unit symbols will not appear in the image. You will need to break your project area into multiple smaller AOIs

Web Soil Survey

Archived Soil Surveys Soil Survey Status Glossary Preferences Link Logout Help

(AOI) **Soil Map** Soil Data Explorer Download Soils Data Shopping Cart (Free)

Printable Version **Add to Shopping Cart**

Add to Shopping Cart Options

Title: Soil Map

Subtitle (optional): NWTF project name

Cancel OK

2

- Click the **Add to Shopping Cart** button.
- Enter the name of your project in the **Subtitle box** and click **OK**.

Soil Texture and Rock Fragments

In the **Soil Map** view, look under the **Map Unit Name** to find texture and rock fragments

Area of Interest (AOI) **Soil Map** Soil Data Explorer Download Soils Data Shopping Cart (Free)

Printable Version Add to Shopping Cart ?

Search

Map Unit Legend

Lewis and Clark County Area, Montana (MT630)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
85E	Whitecow <u>channery loam</u> , 8 to 35 percent slopes	0.0	0.0%
85F	Whitecow <u>channery loam</u> , 35 to 60 percent slopes	118.9	16.7%
164E	Windham-Lap <u>channery loams</u> , 8 to 45 percent slopes		
184E	Mocmont very <u>channery loam</u> , cool, 15 to 35 percent slopes		
263E	Hauz-Sieben-Tolman <u>channery loams</u> , 8 to 45 percent slopes		
501B	Fluvaquents and Fluvaquentic Haplustolls soils, 0 to 4 percent slopes	4.8	0.7%
563E	Tolex-Tolman-Hauz <u>channery loams</u> , 8 to 45 percent slopes	0.3	0.0%
590E	Helmville channery loam,	140.0	19.7%

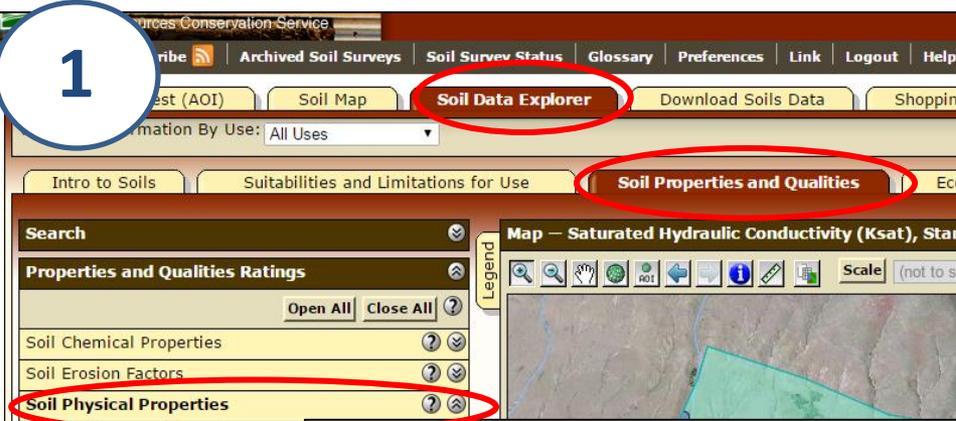
Soil Map

Scale (not to scale)

Click on the **Map Unit Name** to see a typical soil profile description

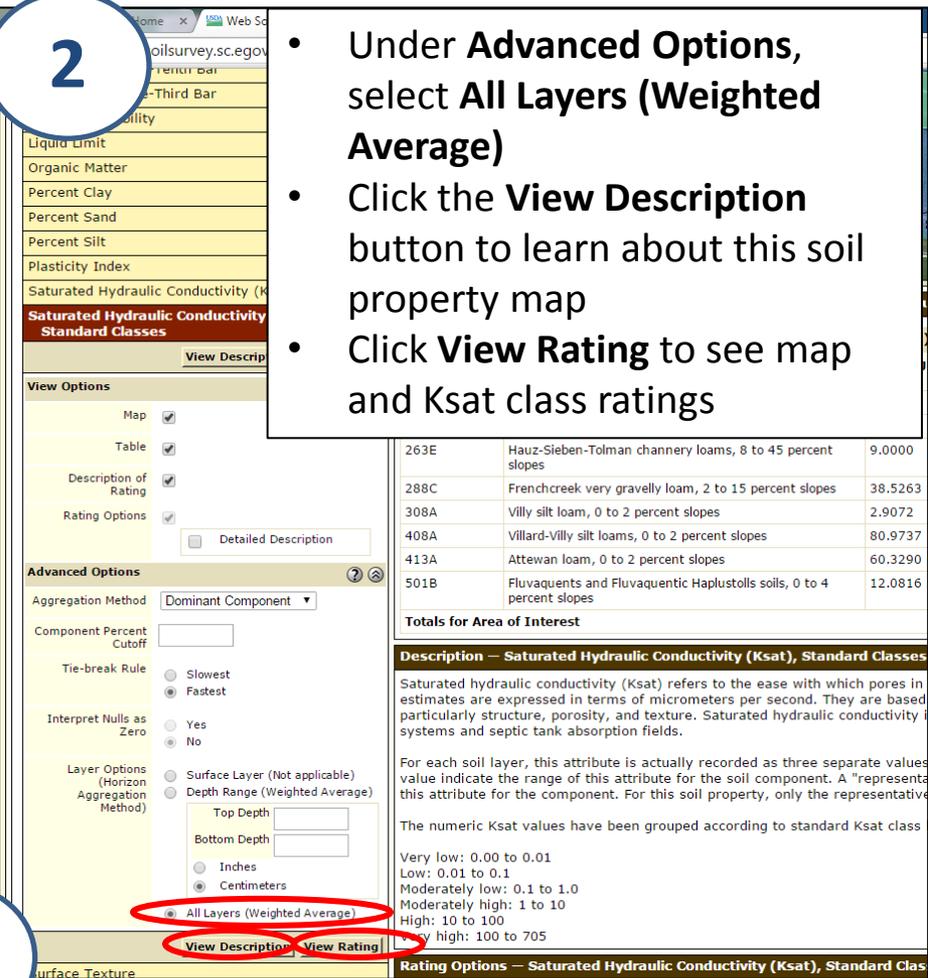
Excessively Drained Soils – Saturated Conductivity

1



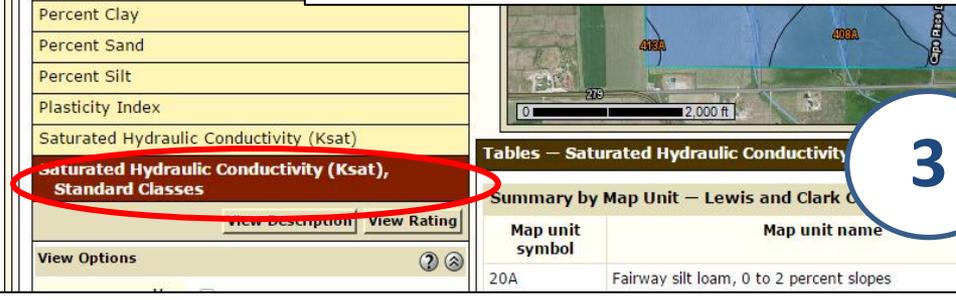
- Click the **Soil Data Explorer** tab
- Click the **Soil Properties and Qualities** tab
- Expand the **Soil Physical Properties** menu
- Select **Saturated Conductivity (Ksat), Standard Classes**

2



- Under **Advanced Options**, select **All Layers (Weighted Average)**
- Click the **View Description** button to learn about this soil property map
- Click **View Rating** to see map and Ksat class ratings

3



- Click the **Add to Shopping Cart** button.
- Type the name of your project in the **Subtitle** box and click **OK**.

Soil Code	Soil Name	Ksat Value
263E	Hauz-Sieben-Tolman channery loams, 8 to 45 percent slopes	9.0000
288C	Frenchcreek very gravelly loam, 2 to 15 percent slopes	38.5263
308A	Villy silt loam, 0 to 2 percent slopes	2.9072
408A	Villard-Villy silt loams, 0 to 2 percent slopes	80.9737
413A	Attewan loam, 0 to 2 percent slopes	60.3290
501B	Fluvaquents and Fluvaquentic Haplustolls soils, 0 to 4 percent slopes	12.0816

Totals for Area of Interest

Description – Saturated Hydraulic Conductivity (Ksat), Standard Classes

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in soil estimates are expressed in terms of micrometers per second. They are based particularly structure, porosity, and texture. Saturated hydraulic conductivity is used in systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values value indicate the range of this attribute for the soil component. A "r" represents this attribute for the component. For this soil property, only the representative value is shown.

The numeric Ksat values have been grouped according to standard Ksat class.

Very low: 0.00 to 0.01
 Low: 0.01 to 0.1
 Moderately low: 0.1 to 1.0
 Moderately high: 1 to 10
 High: 10 to 100
 Very high: 100 to 705

Rating Options – Saturated Hydraulic Conductivity (Ksat), Standard Classes

Excessively Drained Soils – Drainage Class

USDA United States Department of Agriculture
Natural Resources Conservation Service

Web Soil Survey

Contact Us | Subscribe | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Link | Logout | Help

Area of Interest (AOI) | Soil Map | **Soil Data Explorer** | Download Soils Data | Shopping Cart (Free)

View Soil Information By Use: All Uses | Printable Version | Add to Shopping Cart

Intro to Soils | Suitabilities and Limitations for Use | **Soil Properties and Qualities** | Ecological Site Assessment | Soil Reports

Search

Properties and Qualities Ratings

Open All | Close All

Soil Chemical Properties
Soil Erosion Factors
Soil Physical Properties
Soil Qualities and Features
AASHTO Group Classification (Surface)
Depth to a Selected Soil Restrictive Layer
Depth to Any Soil Restrictive Layer
Drainage Class
View Description | View Rating

View Options

Map
Table
Description of Rating
Rating Options
 Detailed Description

Advanced Options

Aggregation Method: Dominant Condition
Component Percent Cutoff:
Tie-break Rule: Lower Higher

View Description **View Rating**

Map — Drainage Class

Legend | Scale: (not to scale)

Tables — Drainage Class — Summary By Map Unit

Summary by Map Unit — Lewis and Clark County Area, Montana (MT630)

Map unit symbol	Map unit name			
20A	Fairway silt loam, 0 to 2 percent slopes	Somewhat poorly drained	27.9	2.7%
209A	Thess loam, 0 to 2 percent slopes	Well drained	158.8	15.1%

1

Close the **Soil Physical Properties** menu

- Expand the **Soil Qualities and Features** menu
- Select **Drainage Class**
- Click the **View Description** button to learn about this soil property map
- Click **View Rating** to see map and Drainage Class ratings

2

Click the **Add to Shopping Cart** button.

- Type the name of your project in the **Subtitle** box and click **OK**.

Soils with Shallow Groundwater

The screenshot shows the USDA Web Soil Survey interface. The 'Soil Data Explorer' tab is active. The 'Water Features' menu is expanded, and 'Depth to Water Table' is selected. The map shows soil units with depth to water table ratings. A table below the map provides a summary of these units for the Lewis and Clark County Area, Montana (MT630).

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI
20A	Fairway silt loam, 0 to 2 percent slopes	84	27.9
209A	Thess loam, 0 to 2 percent slopes	>200	158.8
263E	Hauz-Sieben-Tolman channery loams, 8 to 45 percent slopes	>200	250.4

1

Close the **Qualities and Features** menu

- Expand the **Water Features** menu
- Select **Depth to Water Table**
- Click the **View Description** button to learn about this soil property map
- Click **View Rating** to see map and depth to water table ratings

2

- Click the **Add to Shopping Cart** button.
- Type the name of your project and in the **Subtitle** box and click **OK**.

Susceptibility to Soil Erosion – Sheet and Rill Erosion Factor

USDA United States Department of Agriculture
Natural Resources Conservation Service

Web Soil Survey

Contact Us | Subscribe | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Link | Logout | Help

Area of Interest (AOI) | Soil Map | **Soil Data Explorer** | Download Soils Data | Shopping Cart (Free)

View Soil Information By Use: All Uses | Printable Version | **Add to Shopping Cart!**

Intro to Soils | Suitabilities and Limitations for Use | **Soil Properties and Qualities** | Ecological Site Assessment | Soil Reports

Search

Properties and Qualities Ratings

Open All | Close All

Soil Chemical Properties

Soil Erosion Factors

K Factor, Rock Free

K Factor, Whole Soil

View Description | View Rating

View Options

Map

Table

Description of Rating

Rating Options

Detailed Description

Advanced Options

Aggregation Method: Dominant Condition

Component Percent Cutoff:

Tie-break Rule: Lower Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable) Depth Range (Weighted Average)

Top Depth:

Bottom Depth:

Inches Centimeters

All Layers (Weighted Average)

Map – K Factor, Whole Soil

Scale: (not to scale)

Map unit symbols: 20A, 209A, 263E, 408A, 412A, 413A, 413B, 413C, 413D, 413E, 413F, 413G, 413H, 413I, 413J, 413K, 413L, 413M, 413N, 413O, 413P, 413Q, 413R, 413S, 413T, 413U, 413V, 413W, 413X, 413Y, 413Z

Tables – K Factor, Whole Soil – Summary By Map Unit

Summary by Map Unit – Lewis and Clark County Area, Montana (MT630)

Map unit symbol	Map unit name
20A	Fairway silt loam, 0 to 2 percent slopes
209A	Thess loam, 0 to 2 percent slopes
263E	Hauz-Sieben-Tolman channery loams, 8 to 45 percent slopes

1

Close the **Water Features** menu

- Expand the **Soil Erosion Factors** menu
- Select **K Factor, Whole Soil**
- Under Advanced Options, select **All Layers (Weighted Average)**
- Click the **View Description** button to learn about this soil property map
- Click **View Rating** to see map and K Factor ratings

2

Click the **Add to Shopping Cart** button.

- Type the name of your project in the **Subtitle** box and click **OK**.

Susceptibility to Soil Erosion – Wind Erodibility Group

The screenshot shows the USDA Web Soil Survey interface. The top navigation bar includes 'Contact Us', 'Subscribe', 'Archived Soil Surveys', 'Soil Survey Status', 'Glossary', 'Preferences', 'Link', 'Logout', and 'Help'. Below this are tabs for 'Area of Interest (AOI)', 'Soil Map', 'Soil Data Explorer', 'Download Soils Data', and 'Shopping Cart (Free)'. A dropdown menu for 'View Soil Information By Use' is set to 'All Uses'. On the right, there are links for 'Printable Version' and 'Add to Shopping Cart' (circled in red).

The main content area is divided into several sections:

- Search**: A search bar.
- Properties and Qualities Ratings**: A list of soil properties with expand/collapse icons. 'Soil Erosion Factors' and 'Wind Erodibility Group' are circled in red. Under 'Wind Erodibility Group', 'View Description' and 'View Rating' are also circled in red.
- View Options**: Checkboxes for 'Map', 'Table', 'Description of Rating', and 'Rating Options'. A 'Detailed Description' checkbox is unchecked.
- Advanced Options**: A dropdown for 'Aggregation Method' (set to 'Dominant Condition'), a 'Component Percent Cutoff' input field, and radio buttons for 'Tie-break Rule' (set to 'Lower').

The central map, titled 'Map – Wind Erodibility Group', shows a landscape with various soil units color-coded by erodibility. A scale bar indicates 2,000 feet. A callout box labeled '1' points to the map area.

Below the map is a table titled 'Tables – Wind Erodibility Group – Summary By Map Unit'. The table provides a summary of soil units in the Lewis and Clark County Area, Montana (MT630).

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
20A	Fairway silt loam, 0 to 2 percent slopes	6	27.9	2.7%
209A	Thess loam, 0 to 2 percent slopes	4L	158.8	15.1%
263E	Hauz-Sieben-Tolman channery loams, 8 to 45 percent slopes	7	250.4	23.9%
288C	Frenchcreek very gravelly loam, 2 to 15 percent slopes	8	95.0	9.1%

A callout box labeled '2' points to the table.

1

Expand the **Soil Erosion Factors** menu

- Select **Wind Erodibility Group**
- Click the **View Description** button to learn about this soil property map
- Click **View Rating** to see map and wind erodibility ratings

2

Click the **Add to Shopping Cart** button.

Type the name of your project in the **Subtitle** box and click **OK**.

Get Your Custom Soil Report

The screenshot shows the USDA Web Soil Survey interface. At the top, there is a navigation bar with links for 'Contact Us', 'Subscribe', 'Archived Soil Surveys', 'Soil Survey Status', 'Glossary', 'Preferences', 'Link', 'Logout', and 'Help'. Below this is a secondary navigation bar with tabs for 'Area of Interest (AOI)', 'Soil Map', 'Soil Data Explorer', 'Download Soils Data', and 'Shopping Cart (Free)'. The 'Shopping Cart (Free)' tab is highlighted with a red circle. In the top right corner, there is a 'Check Out' button, also circled in red. The main content area is divided into several sections: 'Search', 'Report Properties', 'Map Options', and 'Table of Contents'. The 'Report Properties' section includes fields for 'Title' and 'Subtitle'. The 'Subtitle' field has three radio button options: 'Area of Interest Name: "NWT" test', 'Custom Subtitle', and 'None'. The 'Area of Interest Name' option is selected and circled in red. The 'Table of Contents' section shows a list of report items, all of which are checked. A large blue circle with the number '1' is positioned over the 'Shopping Cart (Free)' tab and the 'Check Out' button. A second large blue circle with the number '2' is positioned over the 'Table of Contents' section.

1

- Click the **Shopping Cart (Free)** tab
- Select “Area of Interest Name “...” as your **Subtitle** choice
- Review the Report **Table of Contents** for each map and report: soil map, K Factor Whole Soil, Wind Erodibility Group, Saturated Hydraulic Conductivity (Ksat) Standard Classes, Drainage Class, and Depth to Water Table

2

- Click the **Checkout** button and select **Download later** as your delivery option

1) Describe the topography and slope of the project area.

- Identify locations of poorly drained soil that may cause runoff or areas that may have potential erosion due to removing the monoculture of noxious weeds.
- Examples include rolling hills, lower elevation mountains, relatively flat meadows, dryland farming along the west boundary which may be susceptible to wind erosion, steep slopes of drainage ditch with monoculture of spotted knapweed, etc.

2) List each mapped soil type and their characteristics within the project boundary.

- Soil types and descriptions can be found on the Web Soil Survey or WINPEST report.
- Example of a soil description:
 - Silty clay loams with deep water tables consisting of native shrub and big sage, shallow gravely loam soils and bedrock with minimal plant cover

3) Identify the soils that are at high risk for leaching or water ponding

- From the soil descriptions and produced maps for your project area look for key words and phases
 - High risk for leaching
 - Moderately high to very high Hydraulic Conductivity
 - Shallow water table
 - Soil Drainage Class of: Excessively Drained, Somewhat Excessively Drained, Well Drained, Moderately Well Drained
 - High risk for ponding
 - Hydric soils
 - Moderately low to very low Hydraulic Conductivity
 - Soil Drainage Class of: Very Poorly Drained, Poorly Drained, Somewhat Poorly Drained

4) List advisory and mandatory statements from each herbicide label regarding soils

and tomatoes.

Do not use spray equipment used to apply Chaparral for other applications to land planted to, or to be planted to, broadleaf plants unless it has been determined that all residues of this herbicide has been removed by thorough cleaning of equipment.

Soil pH Limitations

Chaparral should not be used on soils having a pH above 7.9, as extended soil residual activity could extend crop rotation intervals beyond normal. Under certain conditions, Chaparral could remain in the soil for 34 months or more injuring wheat and barley. In addition, other crops planted in high-pH soils can be extremely sensitive to low concentrations of Chaparral.

4

Specimen Label Revised 08-05-14

Checking Soil pH

Before using Chaparral, determine the soil pH of the areas of intended use. To obtain a representative pH value for the test area, take several 0" to 4" samples from different areas of the field and analyze them separately. Consult local extension publications for additional information on recommended soil sampling procedures.

- Read carefully all limitations on the
- Do not exceed s the same active allowable active
- For direct injecti formulations will taken to ensure

IMPORTANT RESTRICTIONS

- **Do not contaminate water intended for irrigation or domestic purposes.** Do not treat inside banks or bottoms of irrigation ditches, either dry or containing water, or other channels that carry water that may be used for irrigation or domestic purposes.
- Do not apply this product to lawns, turf, ornamental plantings, urban walkways, driveways, tennis courts, golf courses, athletic fields, commercial sod operations, or other high-maintenance, fine turfgrass areas, or similar areas.
- Trees adjacent to or in a treated area can occasionally be affected by root uptake of Milestone. Do not apply Milestone within the root zone of desirable trees unless such injury can be tolerated. Use special caution near roses, and leguminous trees such as locusts, redbud, mimosa, and caragana.
- Applications made during periods of intense rainfall, to soils saturated with water, surfaces paved with materials such as asphalt or concrete, or soils through which rainfall will not readily penetrate may result in runoff and movement of Milestone. Injury to crops may result if treated soil and/or runoff water containing Milestone is washed, or moved onto land used to produce crops. Exposure to Milestone may injure or kill susceptible crops and other plants, such as grapes, soybeans, tobacco, sensitive ornamentals. Do not treat frozen soil where runoff could damage sensitive plants.

- Do not apply this product in areas where the roots of desirable trees and/or shrubs may extend unless injury or loss can be tolerated. Root zone areas of desirable trees or vegetation are affected by local conditions and can extend well beyond the tree canopy.
- Do not apply this product if site-specific characteristics and conditions exist that could contribute to movement and unintended root zone exposure to desirable trees or vegetation unless injury or loss can be tolerated.
- Do not apply PERSPECTIVE® to roadsides or other non-crop areas during periods of intense rainfall, or where prevailing soils are either saturated with water or of a type through which rainfall will not readily penetrate, as this may result in off-site movement.
- Do not make applications when circumstances favor movement from treatment site.
- Do not apply or otherwise permit this product or sprays containing this product to come into contact with any non-target crop or desirable vegetation.
- Do not apply in or on dry or water containing irrigation ditches or canals including their outer banks.
- Do not apply through any type of irrigation system.

5) Describe which measures will be taken to reduce or remove contamination risk in susceptible soils (be as specific as possible).

Mitigation strategies are intended to be more stringent than label requirements.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

For the above statement some good mitigation strategies would be:

- Maintaining a 50 foot buffer around surface water
- Using a backpack sprayer in areas susceptible to leaching
- Using a different product that does have the same or similar warning.

Surface and Groundwater

This section should **address potential impacts to water in the project area.**

- **Create a surface water map** with any legible map source such as google earth, Montana Geographic Information Clearinghouse, paper topographical maps, etc.
 - Maps must clearly label all surface water features by name within the project area and adjacent to herbicide application areas.
 - Indicate unnamed features as “unnamed pond #1”, or “unnamed stream #2”.
- **Create a well location map and well log** through the Montana Geographic Information Clearinghouse (must use google chrome).
 - Maps must clearly label all wells less than 50 feet in depth within the project area boundary.

Go to <http://home.msl.mt.gov/> and select “Digital Library” on the right side of the screen

The screenshot shows the Montana State Library website. The browser address bar displays home.msl.mt.gov. The page header includes the Montana State Library logo and navigation links for SERVICES, AGENCIES, LOGIN, and a search bar. The main navigation menu on the left lists: MSL HOME, ABOUT THE LIBRARY, DIGITAL LIBRARY (circled in red), TALKING BOOK LIBRARY, SERVICES TO LIBRARIES, CALENDAR, and MAPS. The main content area features a search bar with the text "What are you looking for?" and a search button. Below the search bar are radio buttons for "MSL Websites", "Montana State Library Catalog", "GIS Data List", and "MT.Gov Connect". The page is divided into four columns of content: "About the Library" (Commission & Councils, Staff Directory, News, Policies, DRAFT Strategic Plan 2016-2021), "Research Resources" (Apply for a State Library Card, Geographic Information, Natural Heritage Program), "TALKING BOOK LIBRARY" (Search Online Catalogs, Volunteer, Donate), and "SERVICES TO LIBRARIES" (Library Directory, Learning, Talking Book Library). A social media widget on the right shows the Montana State Library Facebook page with a "Like Page" button and a post about new audio books.

Select "Montana Digital Atlas" under Featured Applications.

The screenshot shows the Montana State Library Digital Library website. The browser address bar displays digitallibrary.msl.mt.gov. The page header includes the Montana State Library logo and navigation links for SERVICES, AGENCIES, and LOGIN. A search bar is located in the top right corner.

The left sidebar contains a navigation menu with the following items:

- MSL HOME
- ABOUT THE LIBRARY >
- DIGITAL LIBRARY** ▾
- Government Information >
- Geographic Information Clearinghouse >
- Natural Heritage Program
- TALKING BOOK LIBRARY >
- SERVICES TO LIBRARIES >
- CALENDAR
- MAPS

The main content area features a large banner for the DIGITAL LIBRARY with a search bar and the text "What are you looking for?". Below the search bar are radio buttons for "Digital Library", "Montana State Library Catalog", "GIS Data List", and "MT.Gov Connect".

The "Featured Applications" section is highlighted with a red circle around the "Montana Digital Atlas" link. The list of applications includes:

- Montana Cadastral Application
- Montana Digital Atlas**
- Montana Place Names Companion

Other sections visible on the page include "Data Discovery and Access" (with links to Data List | Data Bundler, Montana Spatial Data Infrastructure (MSDI), and Aerial Photos | Web Map Services), "Featured Services" (with links to Montana Geography Facts, Legislative Snapshot, and Water Information System), and "GIS Community" (with links to State GIS Coordination, MAGIP, and MAGIP Calendar).

On the right side, there is a social media widget for the Montana State Library Facebook page, showing a "Like Page" button and a notification that the page shared a link 22 hours ago.

Close the welcome screen then select “Select Map Layers”.

The screenshot displays the Montana Digital Atlas web application. The browser address bar shows the URL https://mslservices.mt.gov/Geographic_Information/Applications/DigitalAtlas/. The page header includes the Montana State Government logo and navigation links for SERVICES, AGENCIES, and LOGIN. A search bar is located in the top right corner.

The main content area features a "GEOGRAPHIC INFORMATION" header with a search input field labeled "What are you looking for?" and a "Search" button. Below this is a "Site Navigation" link. A breadcrumb trail indicates the current location: Home / Geographic Information Clearinghouse / Applications / Data and Maps / Digital Atlas.

The "Montana Digital Atlas" section contains a "Welcome" message and a "Select Map Layers" button, which is circled in red. The "Base Maps" and "View Legend" buttons are also circled in red. The "Select Map Layers" button is highlighted with a red oval. The page also includes a "Login" button, a "No map layers selected" message, and a "Search" button. A list of search criteria is visible, including "Current Screen Extent", "Most Recent Search", and "Selection". A "Download Data" button is located at the bottom right.

Welcome

Welcome to the Montana Digital Atlas. The Digital Atlas is designed for finding geographic locations in Montana and exploring geographic databases, aerial photos, and topographic maps of those locations. It replaces the functionality of the State Library's old Digital Atlas and Topofinder applications. Please contact us at MSLDA@mt.gov if you experience difficulty with the application, if you see a problem with any of the data, or to suggest additional map layers.

Visit our [Help Page](#) for more in-depth instructions.

Topofinder Functions

- Use the *Search To* button to find counties, towns, place names, legislative districts, lakes or streams, quadrangles, public land survey locations, or to zoom to a map coordinate.
- Click on the map to place a marker and identify the map coordinates, quadrangles, township/range/section, and watershed of the location.

Mapping Functions

- Click the *Base Maps* button to choose the background base map or aerial photo.
- Use the *Select Map Layers* button to see the map layers that are available.
- Display pre-rendered maps by topic.
- Select multiple map layers from different categories
- Click a link under *Categories* to narrow down the list of layers
- Drag windows and popups to where they are most convenient for you

Select Map Layers

No map layers selected

Search **Generate Report**

- Current Screen Extent
(Zoom to previous report extent)
- Most Recent Search
Selection (Edit | Clear | Zoom To)
Type
Criteria
Buffer

Download Data

- Additional Map Information

Select "Water" and then check "Groundwater Wells"

The screenshot shows the Montana Digital Atlas web application. The browser address bar displays https://mslservices.mt.gov/Geographic_Information/Applications/DigitalAtlas/. The page header includes the Montana.gov logo and navigation links for SERVICES, AGENCIES, and LOGIN. A search bar is also present.

The main content area is titled "Montana Digital Atlas" and features a "Select Map Layers" dialog box. The dialog box has a "Clear All Map Layers" link and a "Base Maps" button. It is divided into two panes:

- Categories:** A list of categories including All, Most Popular, Staff Picks, Agriculture, Business, Demographics, Education, Energy, Health, Land Records, Libraries, Natural Resources, Telecommunications, Tourism, Transportation, Utilities, **Water** (circled in red), and Wildlife.
- Water:** A list of water-related layers with checkboxes:
 - Air Photo Dates
 - Air Photo Dates
 - Dams
 - Dams (2003)
 - Groundwater Wells (circled in red)
 - Groundwater Information Center Wells
 - Stream Monitoring
 - USGS Gauges (2015)
 - Streams and Lakes
 - Named Streams
 - Named Lakes
 - Water Rights
 - Places of Use (Minimum Scale: 198,000)
 - Diversions (Minimum Scale: 198,000)
 - Watershed Boundaries
 - 4th Code Sub-basin watersheds (Minimum Scale: 12,000,000)

On the right side of the dialog box, there are buttons for "Base Maps" and "View Legend". Below the dialog box, a map area is visible with a "Clear All Map/Report Options" link at the bottom.

On the right side of the main page, there is a "Login" button, a "Select Map Layers" button, and a "No map layers selected" message. Below this, there are "Search" and "Generate Report" buttons, and a section for "Current Screen Extent" and "Most Recent Search" with various options and a "Download Data" button.

Select "Search" and then search for your areas with any of the methods in the menu of option.

The screenshot displays the Montana Digital Atlas web application. The browser address bar shows the URL: https://msslservices.mt.gov/Geographic_Information/Applications/DigitalAtlas/. The page header includes the Montana.gov logo and navigation links for SERVICES, AGENCIES, and LOGIN. A search bar is present in the top right corner.

The main content area is titled "Montana Digital Atlas" and features a "Search" section. On the left, a "Search Types" menu lists various search methods: Address, Coordinates - Degrees/Minutes/Seconds, Coordinates - Degrees/Decimal Minutes, Coordinates - Decimal Degrees, Coordinates - UTM, Coordinates - State Plane, County, Incorporated Cities and Towns, Hydrography - Lakes, Hydrography - Streams, Legislative - House District, Legislative - Senate District, Place Names, Township/Range/Section, User Drawn Polygon, USGS - QUAD 24K, USGS - QUAD 100K, Watershed - 4th Code, and Watershed - 5th Code.

The "Address" search form includes fields for "Address", "Buffer" (set to 0), and "Buffer Units" (set to Miles). A "Search by address" button is highlighted in blue. Below the form is a "Results" section.

On the right side of the search interface, there is a "Login" button, a "Select Map Layers" button, and a message "No map layers selected". The "Search" button is circled in red. Below this, there are radio button options for "Current Screen Extent" (selected) and "Most Recent Search Selection". A "Download Data" button is also visible, with a list of options: Additional Map Information, Copy Geometry, Copy Current Map Link (including layer and search options), Welcome Screen, and Help.

Select "Generate Report" and scroll down the page to the report section under the map.

The screenshot displays the Montana.gov Digital Atlas interface. The browser address bar shows the URL https://mslservices.mt.gov/Geographic_Information/Applications/DigitalAtlas/. The page header includes the Montana.gov logo and navigation links for SERVICES, AGENCIES, and LOGIN. A search bar is located in the top right corner.

The main content area features a map of a region with numerous red cross markers representing groundwater wells. A large red circle is drawn around the map area. To the right of the map is a sidebar with the following elements:

- Map navigation controls (plus, minus, home icons).
- Scale: 1: 64,204.
- Map actions: Edit Map Graphics | Clear Map Graphics | Restore All Panels | Clear All Map/Report Options.
- Map Layers section: Select Map Layers button.
- Groundwater Wells section: Groundwater Information Center Wells (Remove | Metadata).
- Search and Generate Report buttons: The "Generate Report" button is circled in red.
- Current Screen Extent (Zoom to previous report extent).
- Most Recent Search: Selection (Edit | Clear | Zoom To), Type Address, Criteria 9088 DOUGLAS CIR, HELENA, MT, 59602, Buffer 3 Miles.
- Download Data button.
- Additional Map Information, Copy Geometry, Copy Current Map Link (including layer and search options), Welcome Screen, and Help links.

At the bottom of the page, a dark blue bar contains a "Report" button, which is also circled in red.

Click the Black arrow next to “Groundwater Information Center Wells” and a list of all the wells in your selected area will appear. You can download and save the list with the “Export Table to CSV” button to open into excel or other program.

The screenshot shows the Montana.gov Digital Atlas interface. At the top, there is a navigation bar with 'SERVICES', 'AGENCIES', and 'LOGIN' links, along with a search bar for 'MONTANA.GOV'. Below the navigation bar is a map area with a scale of 1:21,391 and a red circle highlighting a specific area. A 'Report' window is open, displaying a table of groundwater wells. The table has columns for Site Name, GWIC ID, Use Type, Site Type, Date Completed, Depth, Water Level, Depth Water Enters, and Drill Method. The 'Export Table to CSV' button is circled in red.

Report Options: [Export All to Excel](#) | [Print All](#) | [Clear Report Results](#) | [Expand All Panels](#) | [Close All Panels](#)

Summary

▶ Groundwater Information Center Wells - Record Count: 206

[Export Table to CSV](#) [Print Panel Results](#)

	Site Name	GWIC ID	Use Type	Site Type	Date Completed	Depth	Water Level	Depth Water Enters	Drill Method
Zoom To	PAULSON JIM	64693	DOMESTIC	WELL	3/16/1976	138	60	98	AIR ROTAR'
Zoom To	DAILEY, CORY & TARYN	274662	DOMESTIC	WELL	5/28/2013	159	91	99	ROTAR'
Zoom To	LUSTGRAFF, JEFFERY L. AND JOY A.	163871	DOMESTIC	WELL	4/10/1997	220	170	160	ROTAR'
Zoom To	THELAN DONALD	66345	DOMESTIC	WELL	9/1/1972	101	71	101	CABLE
Zoom To	GRABER LORI	187329	DOMESTIC	WELL	7/25/2000	100	52	80	
Zoom To	SHARBONO CONST #20	64704	DOMESTIC	WELL	8/15/1978	90	52	50	FORWA ROTAR'

1) List the type/number of surface water found in the project area

- Can us any legible map source like;
 - Digital sources (google earth, Montana Geographic Information Clearinghouse)
 - Paper topographic maps.
- On the map identify ALL surface water features.
 - Water features include rivers, streams (perennial and intermittent), lakes, reservoirs, ponds, stock ponds, irrigation ditches, etc.
- Describe the identified surface water features by type.
 - For example: there are 3 perennial streams, 2 stock ponds, and 3 irrigation ditches within the project area.

Groundwater identification

- The fastest way I have found to get a map with well locations in Montana is through the Montana Geographic Information Clearinghouse provided by the State Library at:
<http://home.msl.mt.gov/>
- You **MUST use Google Chrome** to run this site
 - This site can also be used for maps of surface water features as well.
 - I would strongly encourage field reconnaissance to look for wells. Not all wells have been entered into the GWIC database!

2) Describe any known areas with shallow ground water that do not have well information

- Any areas identified on your maps or in the field that have shallow groundwater either seasonally or continually.
 - For example wetlands and riparian areas.

3) List advisory and mandatory statements from each herbicide label regarding surface and ground water.

- Some examples of phrases that suggest a product can contaminate surface and/ or groundwater.
 - “known to leach through soil to groundwater”
 - “Users are advised not to apply where soils have a rapid or very rapid permeability and the underlying aquifer is shallow”
 - “High potential for runoff”
 - “Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark”
 - “Do not apply to irrigation ditches”
 - “Do not contaminate irrigation ditches or water used for irrigation”
 - “Do not apply when conditions favor runoff”
 - “May contaminate surface water through drift of spray in wind”
 - “This chemical has properties and characteristics associated with chemicals detected in groundwater”

Read the WHOLE label

- Usually Ground or Surface Water advisories follow or are incorporated into the **Environmental Hazards** section on the first few pages of the product label. See example below.

Environmental Hazards

This pesticide may be toxic to fish and aquatic invertebrates. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Do not contaminate water when disposing of equipment wash waters or rinsate.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Application around a cistern or well may result in contamination of drinking water or groundwater.

Clopyralid is a chemical which can travel (seep or leach) through soil and under certain conditions contaminate groundwater which may be used for irrigation or drinking purposes. Users are advised not to apply clopyralid where soils have a rapid to very rapid permeability throughout the profile (such as loamy sand to sand) and the water table of an underlying aquifer is shallow, or to soils containing sinkholes over limestone bedrock, severely fractured surfaces, and substrates which would allow direct introduction into an aquifer. Your local agricultural agencies can provide further information on the type of soil in your area and the location of groundwater.

From Curtail® label page 2

er, or to areas where surface water is present or to water and do not apply when/where conditions could ment washwaters or rinsate. Do not allow sprays to

ons as a result of label use. Use of this chemical in result in ground-water contamination.

as a high potential for runoff for several months or re more prone to produce runoff that contains this product is applied and surface water features such r from rainfall-runoff. Runoff of this product will be

From Wolverine™ label page 2

More examples

- But if you don't read the WHOLE label you might miss other warnings. Such as:

SENSITIVE AREAS: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitats for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

From Wolverine™ label page 9

Precautions and Restrictions

- Use directions in Dow AgroSciences supplemental labeling may supersede directions or limitations in this labeling.
- Do not exceed a cumulative amount of 0.25 lb active ingredient (ai) of clopyralid per acre per single crop year.
- Do not contaminate irrigation ditches or water used for irrigation or domestic purposes.
- Do not use in greenhouses.
- **Chemigation:** Do not apply this product through any type of irrigation system.

From Curtail® label page 3

4) Describe which measures will be taken to reduce or remove contamination risk to surface and groundwater

- **Be as specific as possible**
- These will depend on the products you will be using, the presence of surface water, and the depth to ground water...
- Explain mitigation efforts to protect surface and ground water such as;
 - Buffer zones around well heads or surface water
 - Timing of applications to avoid conditions that promote leaching or runoff (i.e. when rain is not forecasted for next few days).
 - hand/ spot treatment vs broadcast or aerial applications near sensitive areas.
 - alternatives to pesticides in sensitive areas (hand pulling, bio-control,...)

Goats eat leafy Spurge!



Public Water Supplies

- Every PWS has a Well Control Zone associated with its permitting. Well Control Zones have special restrictions about the storage and usage of hazardous materials (including pesticides). In Montana, Control Zones typically consist of a 100 foot radius exclusion zone. When in doubt contact the Montana Department of Environmental Quality.