



Gallatin/Big Sky Noxious Weed Committee

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Gallatin/Big Sky Noxious Weed Committee

2012 Annual Report

By Jennifer Mohler, Coordinator



Moose twins photographed at Portal Creek Flats in the Gallatin Canyon.

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Introduction

Project Area

The project area encompasses the portion of the Gallatin River Watershed south from Four Corners to the border of Yellowstone Park. Elevation ranges from 5000 feet near Four Corners to over 11,000 feet in the highest peaks. Annual precipitation ranges from 12-15 inches near Four Corners to 45 inches in the higher elevations. Most precipitation falls as snow, particularly above 6000 feet. Average temperatures range from 6° F in winter to 78° F in summer but can vary from over 100° F in summer to -40° F in winter. Soils are medium to moderately coarse with abundant rock fragments and are shallow in mountainous terrain and deeper in valley bottoms.

Valley floors are drier and are primarily shrub steppe/grassland. Lodgepole Pine with an understory of grouse whortleberry, pine grass, heartleaf arnica, or Oregon grape is the most common cover type found in the mid-elevations (5500-9500 feet). Douglas fir and Engelmann Spruce are common as well. Alpine vegetation includes whitebark pine, subalpine fir, sheep fescue, and alpine bluegrass.

The majority of property within the project area is National Forest System lands managed by the U.S. Forest Service. Private lands are concentrated in the Big Sky area, between Gallatin canyon and Four Corners. Montana Fish, Wildlife, and Parks maintain the Gallatin Game Range, which has parcels in the Buffalo Horn Creek and Taylor Fork Drainages as well as parcels adjacent to Big Sky. Yellowstone National Park is not included in the Project area.

Land Use

The U.S. Forest Service is the largest land owner in the project area, which is managed for multiple uses including: timber production, recreation, wildlife habitat, and watershed protection. Land from Four Corners south to the mouth of the canyon is mostly privately owned and land use is a mixture of agriculture, residential subdivisions, and businesses. Highway 191, which runs through Gallatin Canyon, is also a major transportation route connecting southwestern Montana and eastern Idaho.

The Gallatin Canyon and Big Sky area are known for world class outdoor recreation such as skiing, fishing, hunting, whitewater rafting, rock climbing, horseback riding, and backpacking. The natural amenities and proximity to the city of Bozeman and Yellowstone National Park draw a wide variety of outdoor enthusiasts from around the world.

Increased recreational use of the area has led to a high degree of residential and commercial development in the Big Sky area. Development of the area includes many subdivisions, homes, condominiums, businesses, and 2 major ski resorts. These pressures on the area have led to the inevitable introduction of noxious weed seeds from a variety of sources, and major development projects have provided ideal habitat for noxious weeds to thrive.

Gallatin / Big Sky Noxious Weed Committee

In 2004, a group of concerned citizens, local organizations, and state and federal agencies formed the Gallatin/Big Sky Noxious Weed Committee (hereafter known as the Committee) to address the proliferation of spotted knapweed, oxeye daisy, and other noxious weeds along Highway 191 and in the Big Sky area. The Committee operates under the Northern Rocky Mountain RC&D and is grant funded.

The Gallatin/Big Sky Noxious Weed Committee's project area encompasses some of the most ecologically and economically important resources in the state. The Gallatin River is a centerpiece within the Greater Yellowstone Ecosystem and provides vital habitat and water for plants, wildlife, and the people who live and recreate in the area. Those of us who live in this area of Montana choose to do so because of the abundance of recreational opportunities, the amazing and unique wildlife that resides here, and the stunning beauty of the landscape.

Continued spread of noxious weeds will negatively impact wildlife, fisheries, water quality, downstream agricultural water users, and scenic beauty. In essence, our love of wilderness and wildlife can have a direct impact on its health, and working to address the negative effects of our actions is a reflection of our core community values. Working to protect native ecosystems and natural resources is a tangible way to reduce our impact on the land.

Noxious weeds replace native plants, disrupt plant diversity, and remove much-needed food sources for wildlife. The U.S. Forest Service and the Gallatin County Weed District have identified this corridor as a high priority area for noxious weed management. In addition, Yellowstone National Park (YNP) identified the spread of noxious weeds as the #1 threat to the Park's health. Montana State University surveys show that weeds are spreading in this area more rapidly than in other areas of the state. Continued spread of weeds will impact wildlife, increase erosion, degrade water quality, and distract from scenic beauty.

Montana State University researchers point out that:

- Noxious weeds out compete and displace most native plants. Their invasion changes the way ecosystems work and degrades habitat for native wildlife and fish.
- For most recreationists, spiny weeds, such as Canada thistle and musk thistle, limit river access.
- Loss of habitat for game animals and fish decreases success of hunters and anglers.
- Noxious weed infestations have reduced the appraised value of land. In Oregon, a \$2 million land transaction was reduced by \$200,000 because of the level of sulfur cinquefoil infestation.
- In 1994, knapweeds alone cost Montanans \$14 million. Currently, weeds cost farmers over \$100 million each year in expenses and crop production losses in Montana.

Purpose

The primary responsibilities of the Committee include:

- Providing technical assistance to private landowners and other land managers
- Educating the local community about noxious weeds and their impacts
- Assisting with noxious weed control activities
- Coordinating noxious weed control efforts among existing weed control entities

2012 Accomplishments

This report details the activities and accomplishments of the Gallatin/Big Sky Noxious Weed Committee for the 2012 field season. A number of goals for the Committee were established at the January 9, 2012 meeting, which can be broadly categorized into four major areas: Education/Outreach, Land Owner Assistance, Partnership Efforts, and Committee Efforts.

Education/Outreach

Advertising: The 2012 advertising campaign was initiated in two local newspapers, Lone Peak Lookout and Big Sky Weekly. The ads focused on landowner assistance (site visits), general weed education, and highlighted our presence at the Big Sky Farmers Market. The ads included logos of committee sponsors and where possible, partners.

Lone Peak Lookout ads ran weekly for 13 weeks starting July 19 and ending October 11. Big Sky Publishing (Lone Peak Lookout) donated 10% of the summer advertising campaign (total paid was \$387.12) for a total of \$43 on 3"x2" black and white ad (shown below).

**Got Noxious Weeds?
We can help!**

**For free assistance, contact Jennifer Mohler at
406-209-0905 or bigskyweeds@gmail.com,
and visit www.bigskyweeds.org.**

Visit us at our booth at the Big Sky Farmers Market!

Help protect wildlife habitat, water resources,
& native plants by controlling noxious weeds!

Big Sky Weekly ads ran biweekly (the paper is distributed every 2 weeks) in 9 spots from June 29 to October 19. Outlaw Partners (Big Sky Weekly) donated 25% of the summer advertising campaign (total paid was \$712.50) for a total of \$237.50 for ¼ page color ads (shown below). Four versions of the ads ran, each highlighting a different noxious weed with specific information for that weed.

**Got Noxious Weeds?
We can help!**

**The Gallatin/Big Sky Noxious
Weed Committee**

provides **free onsite assistance**, including identifying weeds on your property & recommending treatment methods.

**For assistance, contact Jennifer Mohler at
406-209-0905 or bigskyweeds@gmail.com,
and visit www.bigskyweeds.org.**

Noxious Weed Spotlight: Musk Thistle

Musk thistle is an aggressive biennial weed, requiring 2 years to complete a reproductive cycle, that reproduces solely from seed. Thus, the key for successful management is to prevent seed production. It's a prolific seed producer, as 1 plant can produce up to 20,000 seeds. To successfully manage musk thistle, prevent seed formation. Cut and bag flowers heads to prevent seed from spreading. For maximum effectiveness, apply herbicides increases before it bolts and flowers.

Visit us at our booth at the Big Sky Farmers Market!

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& native plants by controlling noxious weeds!

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Noxious Weed Spotlight: Yellow Toadflax

Yellow toadflax, commonly called butter & eggs, is a non-native perennial that was introduced as an ornamental plant. Reproducing from seed and creeping roots, it alters and simplifies the species composition of natural communities and can lead to serious erosion problems. It's invading pristine areas, including Yellowstone National Park. Control toadflax by cutting, pulling, or spraying seed stalks prior to seed set. **Learn more at www.bigskyweeds.org**

Visit us at our booth at the Big Sky Farmers Market!

Help protect wildlife habitat, water resources,
& native plants by controlling noxious weeds!



**Got Noxious Weeds?
We can help!**

Now is a great time to manage the noxious weeds on your property, and the Gallatin/Big Sky Noxious Weed Committee can help!

We provide **free onsite assistance**, including identifying weeds on your property & recommending treatment methods.

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Noxious Weed Spotlight: Oxeye Daisy

Oxeye daisy is a perennial, resembling Shasta daisy, that's common in meadows, roadsides and along trails in Big Sky and the Gallatin Canyon. This aggressive invader can form dense stands that displaces native plants. Because of the plant's beauty and showiness, conscientious management is often neglected. Unfortunately, some of Montana's state listed noxious weeds are still offered for sale in wildflower seed mixes. Be on the lookout when purchasing seeds for your garden or landscaping. More photos & information @ www.bigskyweeds.org.



Visit us at our booth at the Big Sky Farmers Market!

Help protect wildlife habitat, water resources, & native plants by controlling noxious weeds!







**Got Noxious Weeds?
We can help!**

Now is a great time to manage the noxious weeds on your property, and the Gallatin/Big Sky Noxious Weed Committee can help!

We provide **free onsite assistance**, including identifying weeds on your property & recommending treatment methods.

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Noxious Weed Spotlight: Hoary Alyssum

Hoary alyssum, commonly called whitetop, is an annual, biennial, or perennial in the mustard family and can grow up to three feet tall. It's proven to be highly invasive, as it's particularly adapted to dry conditions. All parts of the plant are covered with short, star-shaped hairs that give the plant a silver-grayish appearance. You can find it almost everywhere; along roads, trails, gravelly stream banks, in lawns, vacant lots, and overgrazed pastures. It's toxic to horses, and remains toxic in cured hay. More photos & information @ www.bigskyweeds.org.



Visit us at our booth at the Big Sky Farmers Market!

Help protect wildlife habitat, water resources, & native plants by controlling noxious weeds!






Newspaper Coverage of Events:

Additional educational and outreach goals were achieved with the assistance of local newspapers, such as the Big Sky Weekly and Lone Peak Lookout, and on-line magazines. The following is a listing of newspaper articles during 2012:

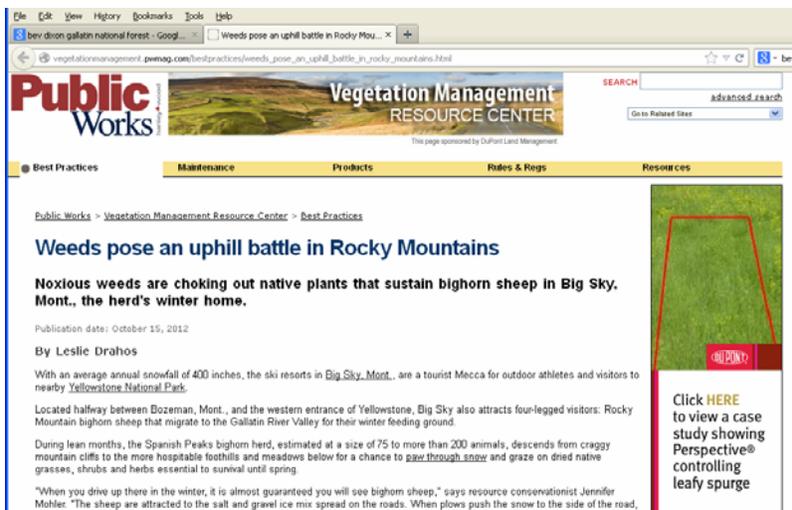
Lone Peak Lookout: War on Weeds (Thursday, June 28, 2012)

Big Sky Weekly:

- Annual river clean up and weed pull event announcement (June 5, 2012)
- Fourth annual Gallatin Weed Pull collects 1,120 pounds of weeds, trash (June 12, 2012)
- Treatment of noxious weeds in big horn sheep winter habitat (July 23, 2012)
- Ophir School Classes Map Noxious Weeds in Big Sky (October 2, 2012)

On September 18, the coordinator was contacted by Leslie Drahos, who writes a monthly article for a web site, pwmag.com, under the theme of vegetation management. The site is the digital arm of a monthly print magazine called Public Works. The web page is sponsored by Dupont land management and addresses the responsible use of herbicide for vegetation management by public sector entities--local, state and federal--charged with controlling and maintaining plant growth on a vast amount of public property. After two phone interviews, Leslie wrote an article and emailed a link to it:

http://vegetationmanagement.pwmag.com/bestpractices/weeds_pose_an_uphill_battle_in_rocky_mountains.html



Road Signs: Two signs just off Highway 191 were erected in 2005 by the Committee and remain there today. One is located at the canyon entrance, another near Storm Castle. These signs are within view of everyone who drives the canyon, helping spread the “Zero Spread” word.



Big Sky Natural Resource Guide

In collaboration with the Big Sky Natural Resource Council, the coordinator created a natural resource guide to educate the community about the council and local natural resource organizations. Crystal Beckman, the coordinator for the Council, provided Jennifer with the Council’s text and Jennifer created the guide. It’s available in print form at local Big Sky spots (e.g., Big Sky Chamber of Commerce, local grocery stores, etc.) and on the web at www.bigskyncr.org, on the resource library page.



Outdoor Banner

In July, the Committee procured an outdoor banner to help spread the word about noxious weeds. The banner was used at all appropriate events, including the Big Sky Farmers Market and Big Sky Country Fair.



Community Events

Gallatin County Farm Fair May 8-10

In its eighth year, the Farm Fair has grown to three days and provides over 936 fourth graders from 20 schools in Gallatin County a hands-on experience at 16 booths dedicated to farm life. The goal is to introduce kids to all the agri-sciences and where our food comes from and how it gets to their tables. Teachers appreciate the opportunity to get the kids out of the classroom and learn about all the careers and possibilities in the agriculture world. The fair helps students to foster an appreciation for Montana farmers and ranchers, demonstrating to the kids the importance of agriculture and how it relates to them in our community and in the world. The fair is being held on a working ranch, owned by Ed and Punky Brainard, north of Belgrade. The Bozeman Chamber of Commerce and the Belgrade Chamber of Commerce sponsored the event, along with Carrie Taylor and the Gallatin Valley Agriculture Committee organized the fair. Those adding to the success of this experience are the valley businesses that financially supported the Farm Fair and over 75 volunteers and presenters who made sure the kids had a great time.

The fair consists of 16 different agriculture stations. Some of the stations will include dairy cows, goats, pigs, beef cattle, draft horses, pleasure horses, bees and pollination, forestry, noxious weeds, irrigation, farm safety, crops, wheat, potatoes, weeds, 4-H, and, the ever popular homemade ice cream.

Jennifer Mohler joined Mike Jones and John Ansley from the Gallatin County Weed District to host a Noxious Weed booth. A new class of students visited the booth every 15 minutes, so presentation time was short. After covering basic noxious weed education points (what is a noxious weed, how did they get here, where did they come from, why are they bad, how do you work to control/manage them), students were challenged to see if they could spit sunflowers seeds as far as leafy spurge explosively dehisces its seed. The student that spit the farthest received a prize of a weed ID booklet, plastic noxious weed plant, or a temporary tattoo. The activity was a hit, as students, teachers and volunteers seemed to enjoy the seed spreading challenge.



4th Annual Gallatin Weed Pull and River Clean Up June 9, 2012

Under the threat of heavy rain, twenty-four brave volunteers made a difference in the fight against noxious weeds along the treasured Gallatin River. On Saturday, June 9, the Gallatin/Big Sky Noxious Weed Committee in partnership with Madison-Gallatin Trout Unlimited held the fourth annual weed pull and river clean up day. Volunteers came from various groups to help set a new record by collecting 1120 pounds of noxious weeds and trash. Not only were the 24 volunteers to be commended for braving the advancing rain storms, but they out-pulled last year's 28 volunteers by 60 lbs!

Volunteers met in the parking lot of the old Gourmet Gas Station along highway 191 for coffee and muffins, and were treated to a first ever volunteer prize drawing. The Greater Gallatin Watershed Council donated 4 gift bags and 2 hats. Montana Fish, Wildlife and Parks donated a first aid kit and 2 Columbia shade hats. Simms donated 4 t-shirts, 13 sweatshirts, and a Headwaters Gear Bag. Because of the generosity of these donors, every volunteer walked away with a gift, and considering the weather conditions, the volunteers earned it!

After distributing the prizes, thanking donors and sponsors, including the Bozeman Daily Chronicle, Lone Peak Lookout and Big Sky Weekly for donating partial advertising for the event, volunteers split into 5 teams and headed to various locations along the Gallatin River to collect noxious weeds and trash. Each team had a leader who helped with plant identification, so only noxious weeds were pulled.

The cleanup sites chosen were heavily used recreation sites on public land: Cameron Bridge Fishing Access site; 30 acres of forest service property located just north of Rock Haven Camp; unnamed boat launch just south of Storm Castle bridge; Storm Castle River Access; and Portal Creek Flats. Portal Creek Flats has been a pull site for the past three years, and while returning volunteers noticed fewer weeds due to their efforts, a few patches of spotted knapweed were extremely healthy this year, highlighting a well-known fact about noxious weeds: it takes multiple years of aggressive treatment to eliminate established noxious weed patches.

While volunteers remained relatively dry for most of the morning, at 11:30 am thunder sounded the final call and rain began to come down. Regretfully, due to the weather conditions and a forgetful coordinator, no pictures were taken. Bags were collected and disposed of, and volunteers dispersed in seek of shelter from the cold rain.

Special thanks go out to Madison-Gallatin Trout Unlimited; Greater Gallatin Watershed Council; Simms; Montana Fish, Wildlife and Parks; Gallatin County Weed District; Gallatin National Forest Service; Big Sky Resort Area District, Northern Rocky Mountain RC&D; Big Sky Weekly; Bozeman Daily Chronicle; and Lone Peak Lookout for helping the Gallatin/Big Sky Noxious Weed Committee make a difference in our efforts of zero spread along the beloved Gallatin River.

Newspaper coverage of event provided by the Big Sky Weekly: Fourth annual Gallatin Weed Pull collects 1,120 pounds of weeds, trash (June 12, 2012).

Table 1. Annual Weed Pull Data 2009-2012

	2009	2010	2011	2012
# Volunteers	55	38	28	24
Pounds collected	---	850 lbs	1060 lbs	1120 lbs

**Volunteers needed for the
4th Annual Gallatin River Clean Up &
Noxious Weed Pull**

Got gloves and a free Saturday morning? Help cleanup your favorite fishing access & recreation sites along the Gallatin River with Trout Unlimited & Gallatin/Big Sky Noxious Weed Committee, and enjoy a light breakfast on us!




WHEN: Saturday, June 9th 9am – Noon

WHERE: Rendezvous in the parking lot of 7888 Gallatin Rd (old Gourmet Gas Station)

BRING: Gloves, shovels, & sun block.

RSVP: by Wednesday June 6th at 5 pm by contacting Jennifer Mohler @ 406-209-0905 or bigskyweeds@gmail.com

Simms, Montana Fish, Wildlife and Parks, and the Greater Gallatin Watershed Council have donated items that volunteers will be eligible to win!








VOLUNTEERS WANTED 

Got gloves and a free Saturday morning?
Help cleanup your favorite fishing access & recreation sites along the Gallatin River with Trout Unlimited & Gallatin/Big Sky Noxious Weed Committee, and enjoy a light breakfast on us!

When: Saturday, June 9th 9am – Noon
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RSVP: by Wednesday June 6th at 5 pm by contacting Jennifer Mohler @ 406-209-0905 or bigskyweeds@gmail.com

For more information, visit www.bigskyweeds.org
The Gallatin/Big Sky Noxious Weed Committee is sponsored by the Northern Rocky Mountain RC&D.

**BOZEMAN DAILY
CHRONICLE**
empowering the community

EVENT SPONSORS ARE:
Madison-Gallatin Trout Unlimited,
Gallatin/Big Sky Noxious Weed Committee,
Big Sky Resort Area District,
Northern Rocky Mountain RC&D.

EVENT PARTNERS ARE:
Simms,
Gallatin County Weed District,
Greater Gallatin Watershed Council,
Montana Fish, Wildlife and Parks

**2nd Annual Bighorn Sheep Winter Range Noxious Weed Treatment
Cooperative Project with Gallatin County Weed District, Gallatin National Forest Service
and Montana Department of Transportation
June 26 & 28**

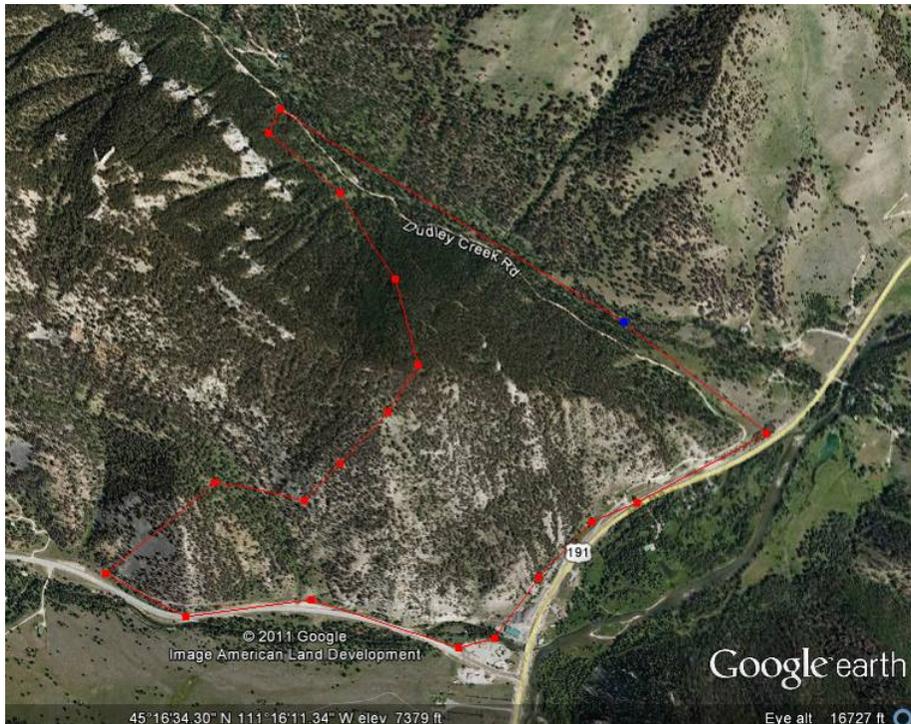
Bighorn sheep are high-country ungulates that thrive on steep mountainsides and require a combination of four habitat elements: ample wild grasses and forbs, reliable water sources, wide visibility so they can see predators, and steep, bare slopes nearby for escaping danger. Such habitat exists northwest of US Highway 191 and Big Sky Spur Road. As many locals know, it's common to see bighorn sheep along these roads during winter, proving this area to be critical winter range.

Unfortunately, noxious weeds have also found a niche here, and are spreading rapidly. Spotted knapweed, hoary alyssum, houndstongue, oxeeye daisy, canada thistle, and musk thistle are among the noxious weeds that are thriving on this steep hillside, crowding out native plants that the bighorn rely on.



For the second year in a row, the Gallatin/Big Sky Noxious Weed Committee, Montana Department of Transportation, Gallatin National Forest Service, and Gallatin County Weed District worked together to treat noxious weeds on the winter range. For two days, crews climbed steep slopes with backpack sprayers and used 300 foot long hoses to reduce the amount of noxious weeds that dominate the winter range. A total of 160 gallons of herbicide were used over the two days, consisting of a mix of 2.5 pints/acres of Forefront and 1 oz/acre of Telar with Phase as a surfactant.

While crews made a huge difference, this area will require treatment for consecutive years in order to ensure bighorn sheep can rely on healthy winter range.



The red outline above shows the area treated. The terrain is incredibly difficult to navigate and access, with steep slopes and unstable footing. Spray trucks with long hoses were

used for the slopes adjacent to the roads, but for the remainder of the area, backpack sprayers were used. Treatment of the area is very physically demanding and difficult, a likely reason why this area has not received the attention it needs.

Additional weed treatment was conducted on following days by Jeremy Rose of the Gallatin National Forest. Locations treated were Portal Creek Flats, Deer Creek trailhead, and Durnahm Meadows.

Articles about the cooperative project appeared in the Lone Peak Lookout, “War on Weeds” (Thursday, June 28, 2012), and Big Sky Weekly, “Treatment of Noxious Weeds in Big Horn Sheep Winter Habitat” (July 23, 2012).

The Committee continued efforts to improve the conditions on the winter range by organizing a meeting of interested parties. On October 2, Committee members, including Don McAndrew, Mike Jones, and John Ansley were joined by:

- Susan Lamont, with the Gallatin National Forest
- Bev Dixon, Wildlife Biologist with the Gallatin National Forest
- Julie Cunningham, Wildlife Biologist with MT Fish, Wildlife & Parks

The meeting consisted of brain storming and strategic planning for additional efforts to map, treat, and monitor invasive plant species in the project area.

The level of cooperation and additional treatment efforts of Committee partners indicates a high level of commitment to the project. With such strong support by all involved, the Committee will continue to improve and expand the effort on the Bighorn Sheep Winter Range.

Big Sky Forestry Workshop June 29, 2012 Big Sky Natural Resource Council

The Big Sky Natural Resource Council hosted its first Big Sky Forestry Workshop on June 29 at the Big Sky Chapel. The workshop is part of the council’s Healthy Forest Initiative, which strives to increase landowners’ knowledge and responsibility, treat forested acres as a whole ecosystem rather than individual sections, and strengthen local wood markets.

Workshop topics include what healthy forests look like; tree, plant, and weed identification; forest insects and disease; forest management, and protection from wildfire.

Presenters were from the Montana Department of Natural Resource and Conservation, U.S. Forest Service, Gallatin Valley Land Trust, MSU Gallatin County Extension, Northern Rocky Mountain Resource Conservation and Development, and Gallatin/Big Sky Noxious Weed Committee.

Jennifer set up a table with weed mounts and educational handouts for participants to look over and take home. She gave a presentation on weed identification, ecology, and management. Participants were encouraged to contact her for a site visit.



Big Sky Farmers Market Wednesday Evenings, July 11- September 5

The Big Sky Farmers Market was held every Wednesday from 5-8 pm at the Fire Pit Park in Big Sky from July 11th through September 5th. There were between 30 and 90 vendors, featuring fresh produce, herbs, plants and flowers, baked goods, woodworking, log furniture, antler art, photography and fine art, jewelry, clothing, and various other food vendors.

The Committee hosted a table with weed mounts, educational handouts, business cards, posters, and the new outdoor GBSNWC banner.

The booth proved very popular, as many were drawn by the “pretty framed flowers” only to learn they were noxious weeds. One patron even asked “how much,” as she was ready to buy the flowers to hang in her house. Eager to raise money for the committee, she was told they were \$200 each...and then told they were actually noxious weeds. Everyone got a good laugh, and even better, it was a great opportunity to educate the part time residents about noxious weeds.

Another landowner became very upset as she learned that what she thought was a beautiful flower was indeed a noxious weed. She recently built in Spanish Peaks and quickly arranged for a site visit.

Both locals and visitors visited the booth, engaged in conversation, and many walked away with weed ID booklets, along with more insight into how noxious weeds affect the greater Yellowstone ecosystem. Many visitors expressed their appreciation that outreach and education about noxious weeds was a priority for the community.

Many wonderful connections were made, including Lone Peak High School’s teacher Nancy Sheil who was beginning to plan for a GPS mapping project and was very interested in mapping noxious weeds. That project came to fruition and more information about it is provided below under “Weed Mapping with Lone Peak High School’s Nancy Sheil.” Overall, the Farmers Market proved to be a great opportunity to engage with locals and visitors about noxious weeds.



Big Sky Country Fair July 28

The Committee hosted a booth at the Big Sky Country Fair on July 28 at the Big Sky Town Center. The 30 year community event celebrates art and entertainment, beginning with a 5K race, and is followed by a local community parade. Numerous children's activities and food vendors were interspaced with booths selling various items and local non-profits working to promote community awareness on various issues.



The booth was similar to that of the Farmers Market, with weed mounts, educational handouts, and posters. Both visitors and locals visited the booth.

Signs for Big Sky Community Corporation August 29

The Committee was contacted by Jessie Wiese, Executive Director of the Big Sky Community Corporation regarding educational noxious weed signs. BSCC is a 501(c)(3) not-for-profit entity created in 1998 to promote, acquire, preserve, and maintain land, parks, trails, and easements for the use of the people of the Big Sky Community and the general public.

Jessie was interested in acquiring more weed signs, similar to the one placed at Ousel Falls Trailhead, in order to spread the word about noxious weeds. Jennifer tracked down 3 signs (pictured below) and had a sticker made to cover up an outdated Committee contact phone number. Once corrected, she delivered those signs to Jessie on August 29th. The signs will likely be placed at the Big Sky Community Park, Kircher Park, and the picnic area at Ousel Falls in fall 2012 or spring 2013.

In January 2013, Jessie relayed that for 3 months this summer, a counter was installed at Ousel Falls trailhead and recorded 15,000 visitors. Ousel Falls has proved to be a popular destination and having a noxious weed ID sign at the trailhead is a great opportunity for the Committee to get the word out.



Big Sky Owners Association Meeting August 31, 2012 Summit Hotel, Big Sky Mountain Village

The BSOA is Big Sky's oldest and largest home owner's association comprising over 8,000 acres; 29 condominium associations; 14 subdivisions; multiple certificates-of-survey and other land tracts. BSOA's membership consists of 2,350 property owners - 85% of which are not full-time Big Sky residents. Mary Jane McGarity, Executive Director of BSOA, and Michele

Geppert, Big Sky Architectural Committee Coordinator, have worked closely with Jennifer all year to assist property owners and tackle invasive plant species within BSOA's territory.

Jennifer Mohler attended the Big Sky Owners Association Meeting and reception on August 31. The meeting was held at the Talus Room in the Summit Hotel, where once again noxious weed control with regards to the golf course was brought up by property owners. After the meeting adjourned, everyone moved over to the reception at Whisky Jack's.

Jennifer set up a table with weed information, handouts, brochures, weed identification mounts, and contact cards. This year, the table was directly in front of the food, thus garnering the attention of every person who ate. Many landowners asked questions, took handouts, and 2 site visits were scheduled.



Weed Mapping with Lone Peak High School's Nancy Sheil September 21

In August, twelve Montana teachers were selected to participate in a workshop on GPS (Global Positioning Systems) and GIS (Geographic Information Systems) held on the Montana State University campus. The teachers were selected via competitive application based on their ideas for incorporating GPS/GIS into their classrooms; their commitment to outdoor education; and their interest in sharing the technology with other teachers, students, families, and community members. Lone Peak High School's Environmental Science and Math teacher Nancy Sheil was one of those chosen for the workshop.

Nancy approached Jennifer at the Farmers Market in July to explore a collaborative project to map noxious weeds. After a bit of planning, Nancy's class embarked to map noxious weeds on various trails in the Hyalite Porcupine Buffalo Horn Wilderness Study Area (HPBH WSA), as a main trailhead into the area is located across Highway 191 from the High School.

The Montana Wilderness Study of 1977 designated seven wilderness study areas, including HPBH WSA, where federal agencies were required to maintain the wilderness character. It is comprised of 143,989 acres with 208 miles of trails.

The HPBH WSA supports diverse vegetation communities. At the lowest elevations grasslands are found, which then transition into Douglas fir and/or limber pine stands. At higher elevations, lodgepole pine, spruce, and subalpine forests are found. The highest elevations contain whitebark pine and, beyond the timberline, alpine tundra or alpine turf. Forested portions of the HPBH WSA are affected by mountain pine beetle infestations, dwarf mistletoe, spruce budworm, and white pine blister rust. Riparian areas within the HPBH WSA support wetland vegetation and are influenced by high soil moisture. These areas are highly productive and provide protection against erosional forces.

The variety of HPBH WSA habitats provide for a wide range of wildlife species. Important species found within the WSA include bighorn sheep, elk, grizzly bear, moose, wolverine, Arctic grayling, westslope and Yellowstone cutthroat trout, and whitebark pine.

The 1985 Hyalite Porcupine Buffalo Horn Wilderness Study Report indicated that visitor uses primarily included hiking, camping, hunting, snowmobiling, motorcycle riding, horseback

riding, collecting specimens from the Gallatin Petrified Forest, and cross-country skiing (USDA 1985). Big game hunting, trout and grayling fishing, and activities provided by outfitters, guides, and dude ranches were also popular. By 2003, HPBH WSA recreation uses had shifted, mirroring changes seen elsewhere on the Gallatin National Forest and in the Northern Rockies. Combined with population increases in Gallatin and Park Counties, this shift resulted in notable increases in mountain biking, motorcycle and ATV use, snowmobiling, and ice climbing (Schlenker 2003). With increased use, the potential for invasive species increases as well. Thus, mapping invasive species could prove very informative and beneficial to local land managers.

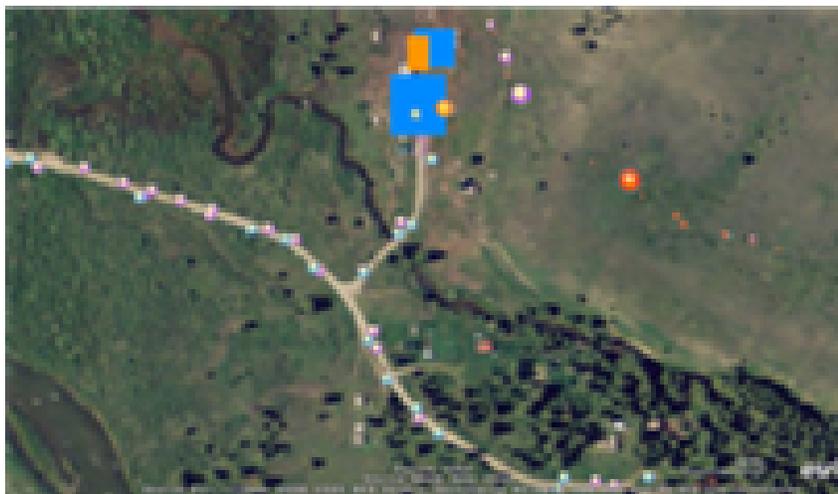
Joining Jennifer and Nancy to lead student mapping groups were Mike Jones, assistant coordinator/foreman of the Gallatin County Weed District, and Shantell Frame-Martin with the Montana Statewide Noxious Weed Education & Awareness Campaign.

The day began with an explanation of the GPS units the class was using. Thankfully, all the GPS units were the same model (one was the Committee's newly purchased GPS unit, two were Gallatin County Weed District's, and the final one was Nancy's). Then the class went outside to identify noxious weeds they will encounter. Sadly, almost all species were easily found on the south side of the bus parking lot.



Students broke into 4 groups and began mapping. One group focused on the road leading to the Porcupine trailhead, and 3 others headed directly to trails. Students mapped for two hours, then convened at the trailhead to discuss what they experienced and learned. The group headed back to the classroom to download data from the GPS units.

The students would process the data and create maps during regular classroom hours. Nancy provided the Committee with the map (below) and plans to conduct future mapping excursions are being discussed.



Nancy Sheil's class continues to work on producing a higher resolution map.

Ophir School Weed Education Event and Pull September 28

Since 2008, the Gallatin/Big Sky Noxious Weed Committee has worked with Brittany Ellis of Ophir School to educate second graders about noxious weeds and their impact on natural resources.

Prior to the field trip, Jennifer procured a “What’s In Your World?” field kit from MSU Extension Publications, containing the resources and tools for kids to explore the environment. The kits were delivered to Ophir School a week before the field trip. Each activity tool kit contains: canvas Pouch, What’s In Your World? student booklet, Zero Spread: Identifying Montana's Greatest Weed Threats, biological control information cards (set of 12), aspirator and insect collection containers, sketchbook, hand lens, safety scissors, ruler, pencil sharpener, and tweezers.

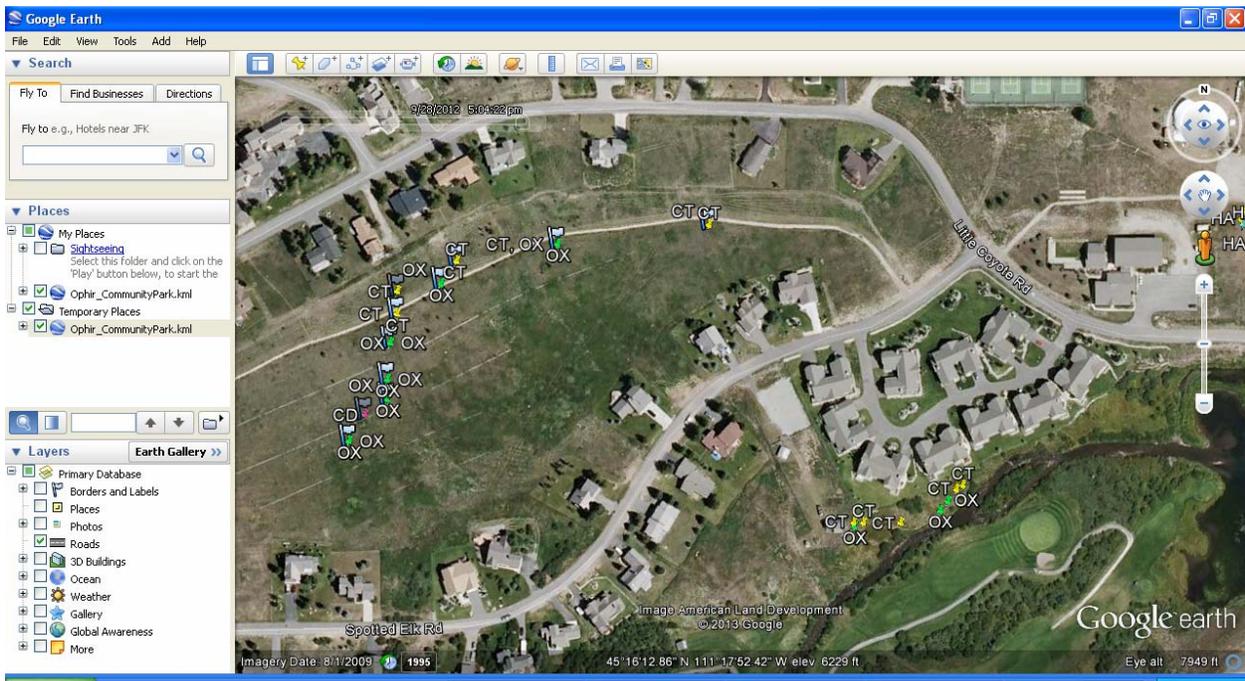
This year’s field trip was held on Friday, September 28. Twenty Ophir School second grade students, along with teachers and parents, participated in a field trip to Big Sky Community Park. The objectives of the field trip were to educate the students about noxious weed identification, the impacts of noxious weeds, weed mapping using GPS technology, and noxious weed management options.

Joining Jennifer and Brittany in leading student mapping groups were Shantell Frame-Martin with the Montana Statewide Noxious Weed Education & Awareness Campaign and Jessie Wiese from the Big Sky Community Corporation.

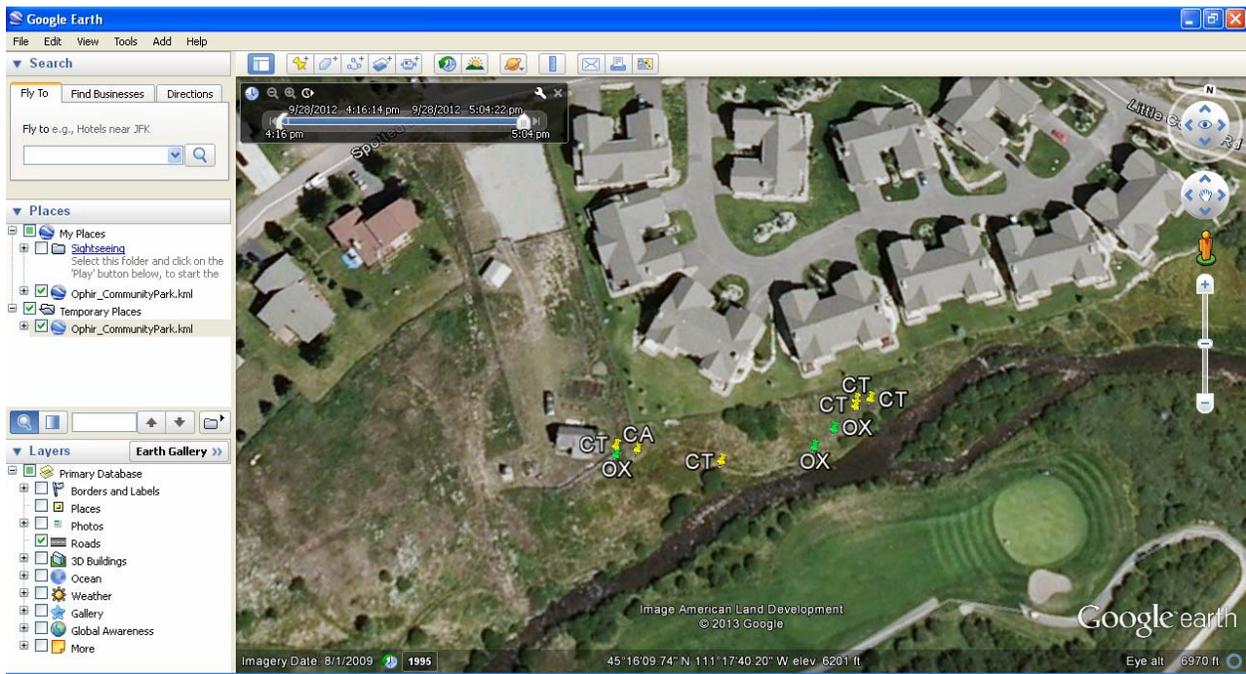
Both kids and adults enjoyed the field trip and learned to identify several species of noxious weeds, use the GPS units to map noxious weeds, and utilize the “What’s in Your World?” field kits. After mapping weeds, kids were challenged to identify noxious weeds from weed mounts (samples of noxious weeds mounted in a case) in which they did very well. The final activity was to pull noxious weeds around the picnic area, primarily hoary alyssum, and dispose of them into garbage bags. In all, 9 large garbage bags full of weeds were collected.



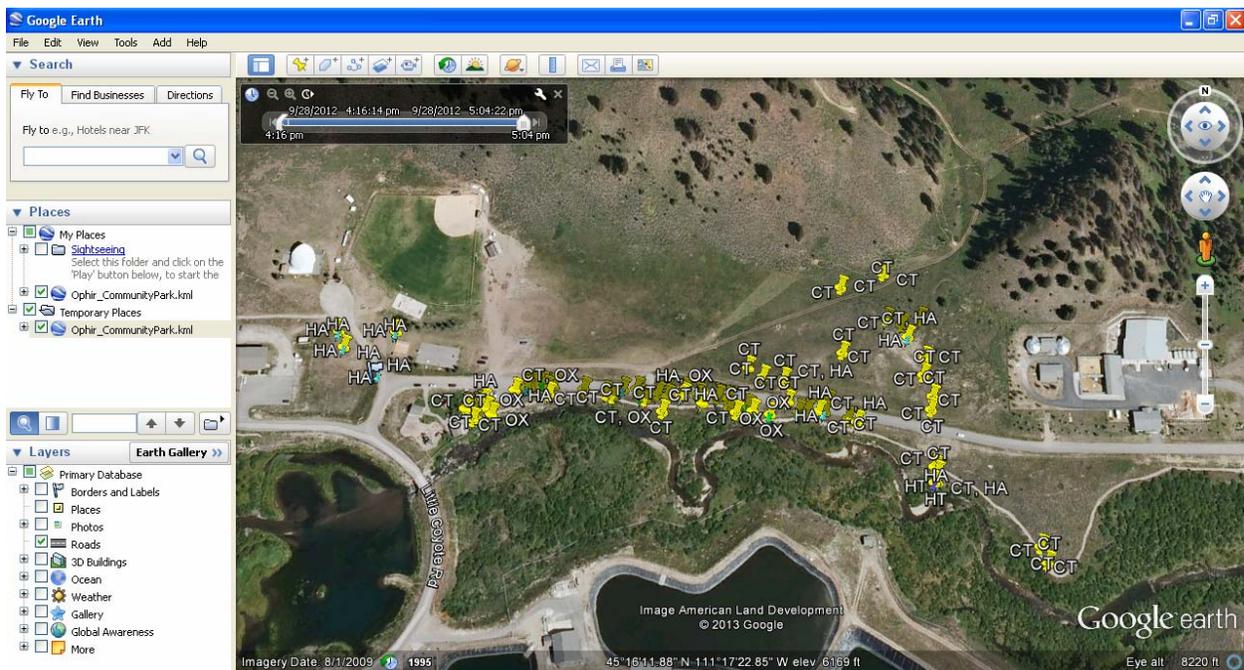
Jennifer compiled mapping data collected by the kids and created a map in google earth, which was emailed to Brittany.



Group 1: Mapped the Crail Ranch Trail



Group 2: Mapped Crail Ranch



Group 3 & 4: Mapped in the Community Park

CD = Curly Doc CT = Canada Thistle HA = Hoary Alyssum
 HT = Houndstounge OX = Oxeye Daisy

An article about the event appeared in the Big Sky Weekly, Ophir School Classes Map Noxious Weeds in Big Sky (October 2, 2012).

Website Update

In 2011, Elizabeth Galli-Noble, the Director of the Center for Invasive Plant Management at Montana State University, offered to provide free assistance to the committee to re-design and update the committee’s website. Kitty Weiss, the E-Communications Coordinator, met with Jennifer several times and the website was revamped.

Every effort was made to create a simple, functional, and easy to navigate website. Jennifer got permission from the Montana Weed Control Association for Weed ID to link directly to their weed ID section to reduce duplication of efforts. Links to local websites and natural resource agencies and non-profits were included. Finally, efforts were made to facilitate landowners looking for direct assistance and information by incorporating a “Why Should I Care” tab and a link to “Tips for Fighting Weeds.”

Kitty continued to assist the Committee with the website throughout the year, updating it frequently with events and news links.



Past Projects Not Pursued in 2012

In 2012, the budget for the Committee saw reduced support in the amount of \$15,560. Thus, Committee work was streamlined to achieve maximum results with the limited budget.

Post card mailer

Post Card Mailer: For multiple years, the Committee produced and sent roughly 3,800 postcards to landowners in the project area. The postcard urged them to become educated and manage their noxious weeds. The ads featured a vigilante theme with the text: “Be a Vigilante! Take justice in your own hands!” Also included on the postcard was a list of committee sponsors for that year. In 2011, it cost \$1,755 to print and mail. Due to budget constraints, the post card mailer was dropped from the Committee’s 2012 efforts.



Wildflower & Weed Hikes

In 2009, 2010, and 2011, the Committee volunteers and coordinator have lead wildflower and weed hikes on local trails in the Big Sky area. Wildflowers are abundant in the Big Sky area and hike participants learn to identify both native plants and noxious weeds. The discussion of noxious weeds includes impacts to the ecosystems and management options. After the event, educational materials are handed out to interest participants. The hikes have been well attended and provide a unique opportunity for locals and visitors to the area to learn more about the Greater Yellowstone ecosystem and the impacts of invasive species. Regrettably, no hikes were conducted in 2012. The events in prior years were free and open to the public.



Cost Share Program

In 2010 & 2011, the Committee initiated a cost share program to provide monetary incentive for landowners in the project area (within Gallatin County) to work together in stopping the spread of invasive weeds. Through strengthening on-the-ground management, the major economic and environmental impacts of weeds can be more effectively mitigated.

Multiple reasons exist for the focused and aggressive assistance for property owners in the Project area:

- a large number of undeveloped/vacant lots
- many property owners are not full time residents
- high volume of traffic in the Gallatin Canyon due to tourism and recreation
- many subdivisions in the Gallatin Canyon do not have a homeowners association

In 2011, 33 landowners submitted completed applications for a total reimbursement of \$4682.42. The cost share program was funded from the Big Sky Resort Area District and Gallatin Conservation District grants.

Table 2. Cost Share: funds distributed to landowners

2004-2009		2010		2011	
No program		Coverage: ½ up to \$500		Coverage: ½ up to \$250	
----	----	Total distributed = \$2,123.21		Total distributed = \$4682.42	
----	----	10 landowners		33 landowners	
----	----	122.40 acres		224.75 acres	
----	----	5 miles of roadsides		28.78 miles of roadsides	
----	----	Amount Submitted	Amount Paid	Amount Submitted	Amount Paid
----	----	High	High	High	High
----	----	\$972	\$486	\$3991	\$250
----	----	Low	Low	Low	Low
----	----	\$139	\$69.25	\$65.50	\$31.25
----	----	Average	Average	Average	Average
----	----	\$424.64	\$212.32	\$497.31	\$141.89

The Committee applied for cost share funds from both the Gallatin Conservation District and the Big Sky Resort Area District. Unfortunately, no cost share funds were awarded to the Committee in 2012.

Mapping & Monitoring

Due to limited funding, mapping and monitoring efforts were reduced to the bare minimum.

The main weed patch the Committee monitored was a leafy spurge patch next to the fishing pond in the Meadow Village. After confirming the infestation on July 25, 2011, the property owner, Big Sky Owners Association was immediately notified. They responded quickly and had their contracted applicator treat the site. The coordinator revisited the site on September 13 and found several of the patches were treated and were dead, but a patch next to the water's

edge looked healthy and untreated (shown in picture, below right). Again, BSOA was notified and had their applicator treat the site.



The photo above left shows the largest patch of leafy spurge at the pond, with Big Sky Chapel in the background. The photo on the right shows the patch located next to the pond that was missed by the first application. Both photos were taken on 7-25-11.

The coordinator visited the site several times over the growing season, keeping in communication with BSOA. At one of the last visits during the growing season on 9-5-12, no green stems were found and almost all existing skeletons were curled and looked like they had been treated with herbicide.

Landowner Assistance

Land Owner Assistance Field Season to date

A total of 49 site visits were conducted in 2012, with the first site visit conducted on May 29, and the last on October 18. Site visits entail meeting with landowners on their property to identify noxious weeds, providing information and materials regarding noxious weed management, and assisting landowners with land management questions. A summary of property inspections for the 2012 field season is presented in Table 3.

Table 3. Property Inspection Summary for 2011

Inspection Category	# Properties Inspected	Total Acres Inspected
Requested by Property Owner	27	525*
Complaint	15	78**
Observation	7	14
Follow Up	0	0
Total	49	617

* Database indicates 899.1 acres. Large # of acres is due to Black Butte Ranch @ 560 acres. Approximately a third of the ranch was inspected, and that acreage is included above.

**Database indicates 818.8 acres. Large # of acres is due to property south of Corral Bar @ 746 acres. Only land adjacent to road was inspected.

Table 4. Property Inspection Summary 2008-2012

Inspection Category	2008		2009		2010		2011		2012	
	# Properties Inspected	Total Acres Inspected								
Requested by Property Owner	28	1965	16	351	21	89	47	592	27	525
Complaint	16	64	68	340	30	93	70	172	15	78
Observation	76	--	--	--	46	167	45	143	7	14
Follow Up	--	--	--	--	1	20	8	50	0	0
Total	120	2026	84	691	98	369	170	957	49	617

*Please note that in 2008 and 2009, inspection categories were slightly different. Every effort was made to place inspections into the corresponding category per the categories developed for the database in 2010.

The lower number of properties inspected (primarily in the observation category) is a direct result of reduced funding, which limits the ability of the Committee to be proactive in searching for and identifying properties of concern (with noxious weed infestations), notifying the landowner, and providing assistance in weed management. The overall lower number could also be related to reduced outreach efforts, specifically that there was no post card mailer sent out in 2012, which directly contacts landowners and explains the assistance the Committee offers.

Table 5. Properties to be contacted in 2013

Reason for Contact	2012 # Properties	2013 # Properties
Weed Problem	99	24
Assistance	1	1
Cost share	56	0
Total	168	25*

*Lower number is related to no GBSNWC cost share program to promote services available and reduced funding, which limited ability to conduct observations.

Table 6. Number of Property Inspections by Month

	2008	2009	2010	2011	2012
May	27	2	0	3	2
June	30	23	1	6	4
July	28	31	10	14	3
August	19	23	10	79	25
September	14	5	55	46	12
October	0	0	22	22	3
November	2	0	0	0	0
Total	120	84	98	170	49

Table 7. Percentage of Properties Inspected with Noxious Weed Species 2008-2012

	2008	2009	2010	2011	2012
bull thistle		5		5	4
canada thistle	60	58	78	76	73
common tansy	9	5	35	5	2
curly dock				4	31
dalmation toadflax			1	1	
field bindweed		1			2
hoary alyssum	25	39	75	51	80
houndstongue	48	41	45	27	39
leafy spurge				1	
musk thistle	8	43	27	35	47
orange hawkweed					2
oxeye daisy	17	27	48	48	43
poison hemlock				1	16
scotch thistle					6
spotted knapweed	53	49	51	30	43
sulfur cinquefoil		7		3	4
tall buttercup				1	2
tansy ragwort				1	
yellow toadflax	9	7	3	11	14

Canada thistle continues to be identified on a high percentage of properties, and the presence of hoary alyssum is increasing rapidly. 2012 marks the first time orange hawkweed was identified on a property on Spanish Peaks. Spotted knapweed, houndstounge, musk thistle, and oxeye daisy continue to be common noxious weeds identified during site visits.

Table 8. Inspections by Area

Area	2008	2009	2010	2011	2012
Big Sky	89	51	46	122	36
191	23	12	38	10	9
Four Corners	0	14	3	0	0
Gallatin Gateway	8	7	11	38	4
Total	120	84	98	170	49

As illustrated in the above table, the overwhelming majority of inspections occur in the Big Sky area.

Partnership Efforts

The Gallatin Big Sky Noxious Weed Committee has a goal of coordinating efforts and working cooperatively with various federal, state, and local agencies in noxious weed education and control within in the project area.

A large part of Committee efforts included working and cooperating with a number of State, Federal, local, and private organizations. Personnel from these organizations assisted with community events, education and outreach, noxious weed treatments, logistical support, and funding. Cooperators this field season included:

Big Sky Community Corporation

- Assisted with the Ophir School Weed Education Event and Pull
- Cooperated with the Committee on noxious weed issues in the community park and local trails
- Obtained noxious weeds signs from the Committee and will place those signs at the trailheads and the community park

Big Sky Natural Resource Council

The Big Sky Natural Resource Council formed in the spring of 2010 and aims to provide sustainable solutions for natural resource issues in the Big Sky community through a collaborative ecosystem approach. The Big Sky Natural Resource Council began with local businesses, landowners, and organizations in the Big Sky area taking action and addressing their forest health issues as a whole. The Big Sky Natural Resource Council is made up of landowners, resort managers, businesses, and local organizations. There are eleven voting members and over 100 non-voting members and technical advisors. The technical advisors are from various agencies and organizations that specialize in natural resource issues. In 2011, the coordinator from the Committee became a council member.

The Big Sky Natural Resource Council is a sub-committee of the Northern Rocky Mountain Resource Conservation & Development's (NRM-RC&D) Natural Resource Committee. The council works under the umbrella of the NRM-RC&D's bylaws and 501c3

status. Crystal Hagerman, Gallatin County Extension Natural Resource Agent, is the project coordinator.

Big Sky Owners Association

The BSOA is Big Sky's oldest and largest home owner's association comprising over 8,000 acres; 29 condominium associations; 14 subdivisions; multiple certificate-of-surveys and other land tracts. BSOA's membership consists of 2,350 property owners - 85% of which are not full-time Big Sky residents. Mary Jane McGarity, Executive Director of BSOA, and Michele Geppert, Big Sky Architectural Committee Coordinator, continue to work closely with Jennifer all year to tackle invasive plant species in BSOA's territory. **BSOA:**

- Treats right of ways in subdivisions under their jurisdiction
- Alerts the Committee to noxious weed infestations on properties in their management area
- Provides information on ongoing projects in the area
- Displays Committee ads and literature

Big Sky Resort Area District

The Big Sky Resort Tax is a 3% sales tax passed in 1992 to improve the community of Big Sky, Montana. The revenue derived from the Resort Tax is appropriated annually by the District Board for the funding of services and programs including tourism development, infrastructure facilities, post office services, ambulance and emergency services, public transportation systems, parks and trails, community library, and other services that provide for the public health, safety, and welfare within the Big Sky Resort Area District.

- Since 2004, the District's funding has been the foundation of this Committee.

Gallatin County Extension

- Worked cooperatively to assist landowners in natural resource issues.

Gallatin County GIS Department

- Provided expertise with GPS and GIS technology
- Produced Maps for use in presentations and at events
- Assisting with providing data to GYCC Weed Subcommittee & EDDMaps

Gallatin County Weed District

- Provided critical assistance and support
- Provided personnel and equipment for the 4th Annual Weed Pull
- Assisted with the Bighorn Winter Range Noxious Weed Treatment
- Assisted with Lone Peak High School's weed mapping project
- Cooperated with landowner assistance in project areas to reduce duplication of efforts

Greater Yellowstone Coordinating Committee, Weed Subcommittee

- Provided expertise and educational materials

Montana Department of Agriculture, Montana Noxious Weed Program, Shantell Frame-Martin

- Assisted with Lone Peak High School's weed mapping project
- Assisted with the Ophir School Weed Education Event and Pull

Montana Department of Transportation

- Provided information on various noxious weed infestations
- Assisted with the Bighorn Winter Range Noxious Weed Treatment

Montana Fish Wildlife and Parks

- Provided expertise
- Provided a first aid kit & hats for 4th Annual Weed Pull
- Assisted with the Bighorn Winter Range Noxious Weed Planning

Montana Noxious Weed Control Association

- Provided educational information
- Allowing links from GBSNWC's website to theirs to reduce duplication of efforts

Montana State University

- Provided expertise and educational information

Montana Statewide Noxious Weed Campaign

- Provided educational materials for Ophir School

MSU Extension

- Provided expertise and educational information

Natural Resources Conservation Service

- Provided expertise and technical knowledge

Tout Unlimited

- Provided resources, funding and volunteers for the 4th Annual Weed Pull

U.S. Forest Service, Gallatin National Forest

- Provided expertise and technical knowledge
- Assisted with the 4th Annual Weed Pull
- Assisted with the Bighorn Winter Range Noxious Weed Treatment & Planning

Volunteers

- Provided expertise
- Assisted with the 4th Annual Weed Pull
- Assisted with the Bighorn Winter Range Noxious Weed Treatment
- Conducted noxious weeds treatments on 225 acres in the Gallatin Canyon

Committee Efforts

Volunteer Treatment of Noxious Weeds

Committee volunteers treated previously identified and mapped noxious weed infestations. Over 225 acres were sprayed with a backpack sprayer and chemical, which were provided by the Forest Service. Areas targeted were:

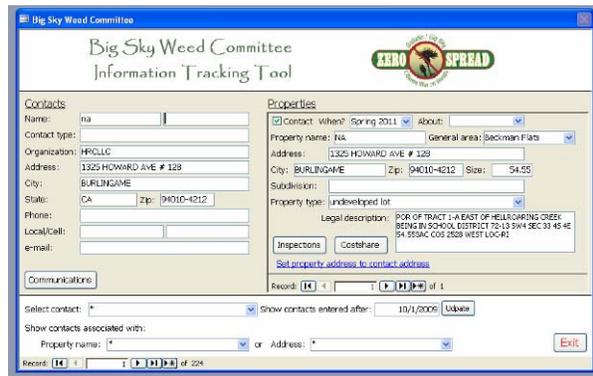
- Twin Cabin trailhead and areas on the east side of the river, north to the MDOT maintenance property.
- The horse trails east of the trail head. Approximately 1.5 miles on one trail, 0.75 miles on the other. These trails were treated twice.
- Areas north and south of the Half Moon Saloon, approximately 20-25 acres. This area was mapped by the Committee in 2009 where large patches of yellow toadflax were identified. This area was treated twice.
- Approximately 2 miles of Doe Creek road (both sides).
- Approximately 1 mile of Rainbow Ranch Road (both sides).
- Trail leading out of the parking lot south of the Corral Bar, approximately 1.25 miles.
- Areas within the Bighorn Sheep Winter Range, which lies northwest of US Highway 191 and Big Sky Spur Road.

Table 9. Volunteer Treatment by Committee Volunteers

	2010	2011	2012
Estimated # of Acres Treated by Committee Volunteers	235	175	225

Database

In 2008, a database with landowner information was created. In 2010, the database was improved to manage ongoing communications with landowners and property inspections, while tracking the efforts of prior years. In 2011, the database underwent further refinement, including the ability to search by name or property address, include and track landowners enrolled in the cost share program, and allow for multiple names for one property. All landowner visits and communication in 2012 were entered into the database, furthering the Committee’s efforts to maintain a comprehensive database. With most data management systems, it is likely that the database will routinely be improved upon to better facilitate the management of data collected by the Committee.



Grants

In addition to funding from the Big Sky Resort Area District, the Committee was awarded two of the grants for which it submitted applications.

The first grant received was for \$2490 from the Gallatin National Forest to treat 50 acres of weeds within the Bighorn Sheep Winter Range Project. The project area is northwest of US Highway 191 and Big Sky Spur Road. The Committee was joined by its partners, the Gallatin/Big Sky Noxious Weed Committee, Montana Department of Transportation, Gallatin National Forest Service, and Gallatin County Weed District to treat noxious weeds on the winter range. For two days, crews climbed steep slopes with backpack sprayers and used 300 foot long hoses to reduce the amount of noxious weeds that dominate the winter range. The Committee is dedicated to continued efforts on the winter range with its partners.

The second grant awarded to the Committee was \$9,000 from the Charitable Cross Foundation. This grant was awarded toward the end of the 2012 season and will help the Committee continue its work during 2013. The Cross Charitable Foundation is organized exclusively for charitable, educational, scientific, and other non-profit purposes, including, but not limited to:

- Assisting organizations actively engaged in promoting education to enable our youth to become productive, contributing members of our society;
- Assisting those organizations actively engaged in assisting the homeless and the oppressed;
- Assisting those organizations actively engaged in promoting the conservation and preservation of our wildlife in our country and the world;
- Assisting those organizations actively promoting conservation of the environment, with particular emphasis on conserving wildlife habitat and wildlife migratory routes; and
- Assisting those organizations promoting the health, care, and welfare of dogs, including the training of dogs to assist and benefit in improving the quality of life for humans and other animals.

Every effort will be made to use funds wisely and produce quality work in order to continue receiving grant funding from this organization.

Quickbooks

The coordinator continues to maintain a GBSNWC quickbooks account, which began in 2011, in order to facilitate the accessibility of financial information, especially in regards to preparing grants. All information is shared with NRM RC&D in order to ensure accuracy.