

## MANAGEMENT INDICATOR SPECIES

Expected precision - Moderate  
Expected Reliability - Moderate  
Reporting Time - 5 years

Management Indicator Species (MIS) for the Gallatin National Forest include pine marten, goshawk, elk, grizzly bear, bald eagles, and wild trout (Table 1) (FP p. II-18-19).

Table 1. MIS on the Gallatin National Forest.

| Species      | Indicative of                                       |
|--------------|---|
| Grizzly Bear | Threatened species                                  |
| Bald Eagle   | Endangered species                                  |
| Elk          | Big Game species                                    |
| Goshawk      | Old growth dependent species, dry Douglas fir sites |
| Pine Marten  | Old growth dependent species, moist spruce sites    |
| Wild Trout   | Coldwater fisheries                                 |

After the Forest Plan was written (1987), the bald eagle was downlisted from endangered to threatened under the Endangered Species Act and is expected to be delisted soon. The delisting process for the threatened grizzly bear has also started in 2007. The bald eagle will continued to be protected under the Bald and Golden Eagle Protection Act (1940) and the Migratory Bird Treaty Act (1918, supplement 1972, <http://permits.fws.gov/ltr/ltr.shtml>) and as a Forest Service sensitive species (which may change with Forest Plan revision). The USFWS is also publishing Bald Eagle Management Guidelines (draft 2006) to help guide management after delisting. The grizzly bear will also become a sensitive species prior to our Forest Plan revision and will be managed under the Forest Plan amendment for Grizzly Bear for the GYA Forests.

### **Bald Eagle**

Bald Eagle populations have rebounded in the last 40 years, largely due to the banning of DDT in 1972 and Endangered Species Act protections. Based on the most recent population figures from each state, the Service estimates that there are at least 7,066 nesting pairs of bald eagles in the contiguous U.S.

The bald eagle breeding population continues to grow in MT, productivity continues to be good and has held fairly steady across time. At least 357 occupied territories were monitored in MT last year (Pils, pers. comm.).

Bald eagles are rapidly increasing in Region 1 of the Forest Service and the population has met recovery criteria (800 pairs), in the seven western states including Montana.

The Montana Bald Eagle Management Plan (1994, pp. 12-20) provides direction for recovery of this species. Recovery standards are met by monitoring nesting pairs and

nest production to ensure that populations are increasing and meeting recovery goals, and ensuring that the Montana Bald Eagle Management Plan nest protection is applied to all active nests. In the Yellowstone area, the Greater Yellowstone Bald Eagle Management Plan (GYE Bald Eagle Working Team 1983) is also used for direction.

Recovery criteria have been exceeded at all scales (Youmans 2002 to Hillis personal communication). There are currently about nine nesting pairs on the Gallatin National Forest. All nests lie within Zone 18 (Greater Yellowstone), although portions of the Forest fall within Zone 38 (Missouri Headwaters) and Zone 40 (Bighorn). The actions of the Gallatin National Forest are consistent with and promote bald eagle recovery.

All known bald eagle nests on the Forest are monitored, usually multiple times each year. Bald eagle nests are monitored to determine if they are active that year, if young are being incubated, if young hatch, how many hatch, and if they fledge, how many fledge. The current known nests on the Forest are associated with Quake and Hebgen Lakes (Table 2). One nest occurred on the Forest near Gardiner but has not been occupied in the last 8 years. The Forest now has up to 8 nests occupied in any one year.

Although the monitoring report covers only 2004-2006, the statistics are provided from 1977 to 2006 so that trends may be observed.

Table 2. Bald Eagle Nest monitoring results, 1977-2006.

| <b>Year</b> | <b># Occupied</b> | <b># Fledged</b> | <b>#Fledged/Occupied</b> |
|-------------|-------------------|------------------|--------------------------|
| 1977        | 1                 | 2                | 0.5                      |
| 1978        | 2                 | 4                | 2                        |
| 1979        | 2                 | 2                | 1                        |
| 1980        | 2                 | 3                | 1.5                      |
| 1981        | 2                 | 0                | 0                        |
| 1982        | 2                 | 0                | 0                        |
| 1983        | 2                 | 0                | 0                        |
| 1984        | 3                 | 7                | 2.3                      |
| 1985        | 3                 | 2                | 0.7                      |
| 1986        | 3                 | 5                | 1.7                      |
| 1987        | 3                 | 4                | 1.3                      |
| 1988        | 3                 | 3                | 1                        |
| 1989        | 2                 | 3                | 1.5                      |
| 1990        | 5                 | 6                | 1.2                      |
| 1991        | 4                 | 4                | 1                        |
| 1992        | 4                 | 9                | 2.25                     |
| 1993        | 5                 | 4                | 0.8                      |
| 1994        | 5                 | 7                | 1.4                      |
| 1995        | 6                 | 6                | 1                        |
| 1996        | 6                 | 10               | 1.7                      |
| 1997        | 6                 | 4                | 0.7                      |
| 1998        | 6                 | 2                | 0.3                      |
| 1999        | 6                 | 5                | 0.8                      |

|             |          |          |             |
|-------------|----------|----------|-------------|
| 2000        | 5        | 5        | 1           |
| 2001        | 6        | 8        | 1.3         |
| 2002        | 6        | 8        | 1.3         |
| 2003        | 8        | 12       | 1.5         |
| <b>2004</b> | <b>8</b> | <b>4</b> | <b>0.5</b>  |
| <b>2005</b> | <b>8</b> | <b>7</b> | <b>0.88</b> |
| <b>2006</b> | <b>8</b> | <b>3</b> | <b>0.38</b> |
|             | 132      | 139      | 0.35        |

Figure 1 and Table 1 show a gradual increase in the number of territories occupied annually.

Figure 1. Number of occupied territories from 1977 to 2006.

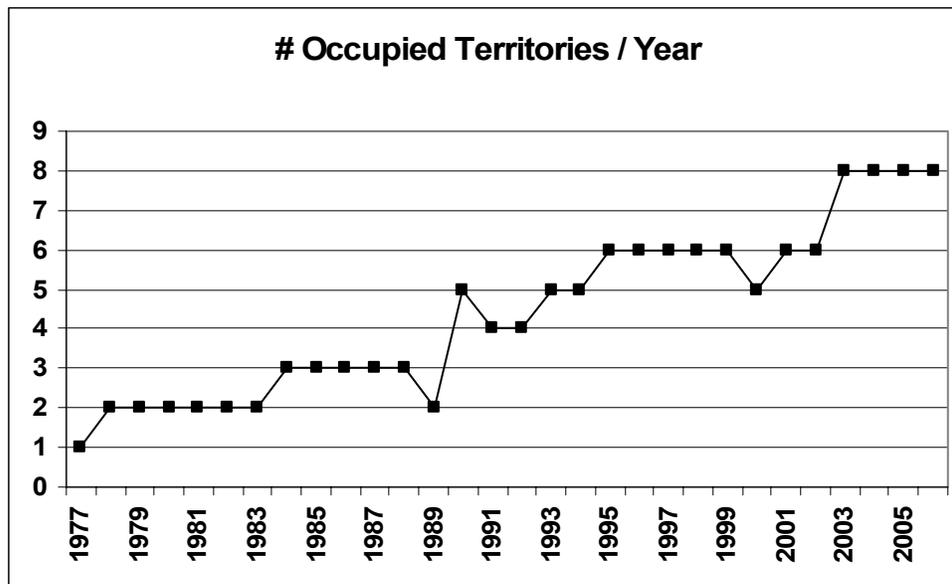


Figure 2 shows the fledgling success per year which varies greatly from year to year. Figure 3 shows the fledgling success per nest. These two figures have fairly similar appearances indicating that there is a strong relationship between chicks fledged/year and chicks fledged/nest.

Figure 2. Number of chicks fledged per year from 1977-2006.

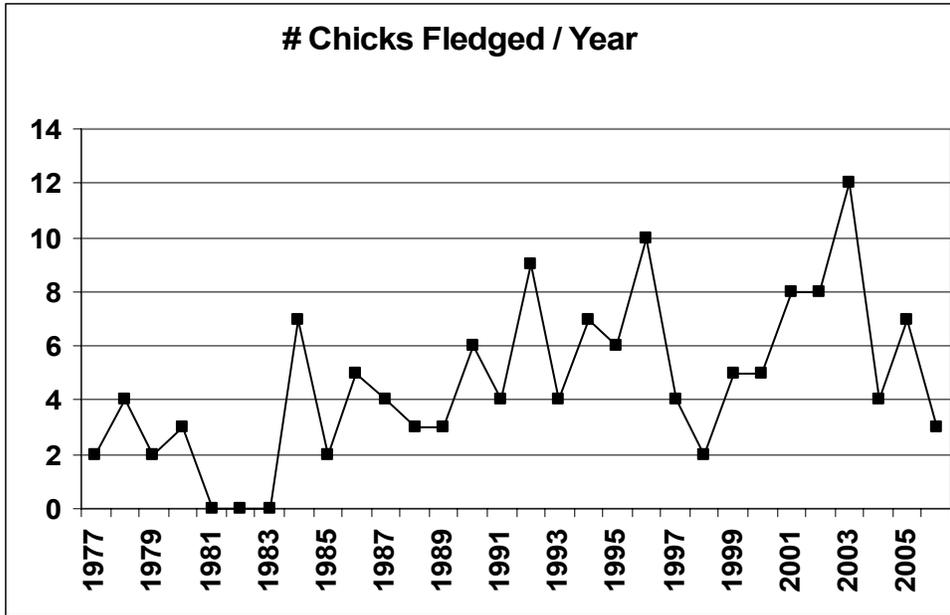
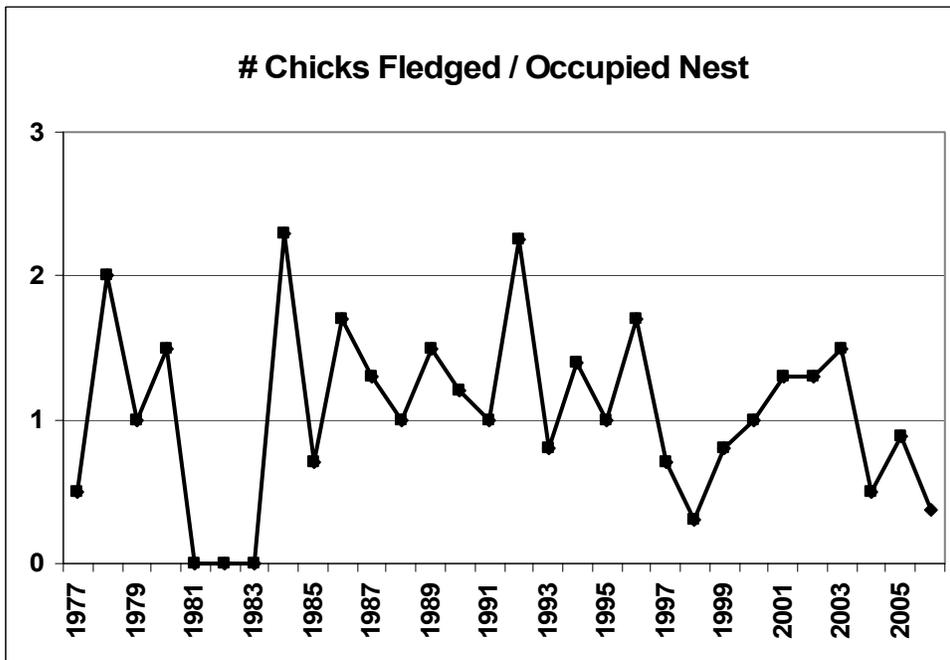


Figure 3. Number of chicks fledged/nest from 1977-2006.

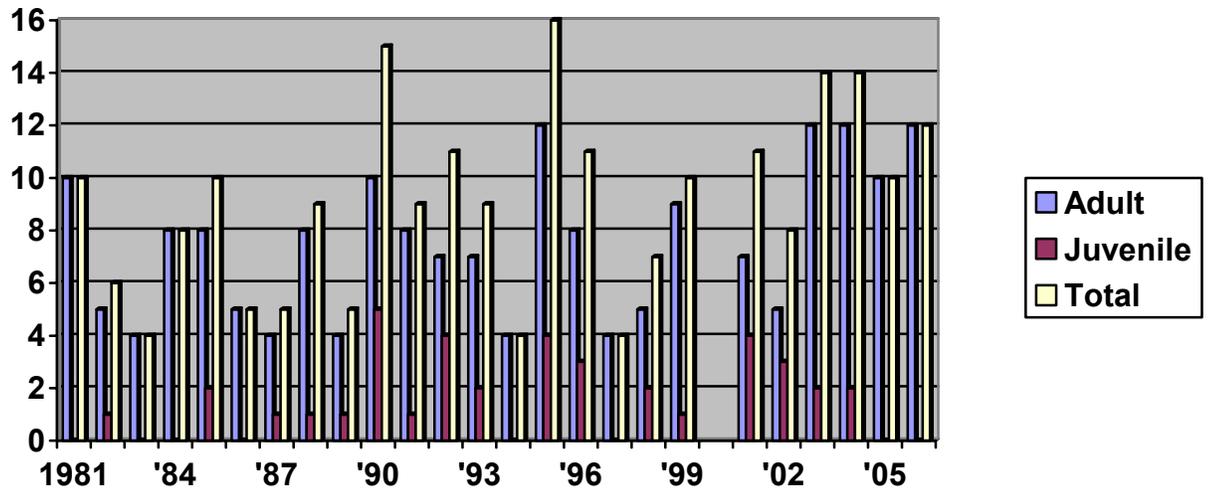


The number fledged per year and per occupied nest appears to be below average during the last 3 years. Causes for nest or fledgling failures are uncertain and can be due to many things such as weather, predation, human disturbance, infertility, sibling rivalry, environmental contaminants, abundance of food, and competition, etc.

In addition, some of the Districts of the Gallatin National Forest participate in the mid-winter bald eagle count on various pre-determined routes on the Forest. The survey

route bald eagle count on the Hebgen Lake Ranger District has been run since 1981 with the exception of 2000 (Figure 4). Numbers of adult bald eagles and total bald eagles are a little more consistent in the last few years. Juvenile numbers are erratic and range from zero to four in the last several years. Overall, the number of bald eagles wintering locally has risen over the time that this information has been collected.

Figure 4. Numbers of adult, juvenile and total bald eagles observed on mid-winter bald eagle counts on the Hebgen Lake Ranger District.



### Northern Goshawk

The northern goshawk is both an MIS and a sensitive species for the Gallatin National Forest. It is also a Sensitive Species for Region 1 at this time.

Northern goshawks are large raptors occupying most forested habitats. They commonly nest in mature and old growth conifer stands. Nest site selection depends upon the availability of trees with large enough branches to support a nest. Goshawks tend to forage in a variety of open and forested communities (Hillis et al. 2003).

A Forest Service Region 1 analysis (Hillis et al. 2003) used data from 328 known goshawk nests to model habitat for 6<sup>th</sup> code hydrologic units (HUCs). They found that 68 percent of the HUCs had sufficient habitat to host one or more goshawk nest. This appears to be an underestimate of the number of actual nests based on the Nature Conservancy database. The inference is that on a regional scale, the availability of nesting habitat is not limiting for goshawk abundance (Hillis et al. 2003). It is also unlikely that the availability of foraging habitat is a population determinant.

The goshawk has a Nature Conservancy rank of G5T5, which represents the species as globally secure, including the subspecific taxon, *atripicaulis*. The Montana Heritage Program rank for the goshawk is S3, indicating vulnerability at the state level.

Ranger Districts on the Forest continue to conduct goshawk surveys prior to project implementation in goshawk habitat and modify the project as needed to protect nests or other habitat. This information is available at the district level. Most surveys are new surveys with only occasional monitoring conducted of nests discovered in previous years unless there is an ongoing project in the area. **ADD MORE??**

The Northern Region conducted a one-year survey of goshawk presence in the spring and summer of 2005, using the recently developed “Northern Goshawk Bioregional Monitoring Design” (Woodbridge and Hargis 2006) grid-based protocol on National Forest System lands (Kowalski 2006). The Gallatin National Forest participated in the goshawk detection survey for the Northern Region of the Forest Service. Six plots surveyed on the Forest met the R1 protocol. Of these 6 plots, goshawks were detected on 3 plots. **REFERENCES**

Results verified that goshawks are widely distributed across the Region and a baseline has been established for documenting goshawk presence. The frequency of goshawk presence in the accessible portion of Region 1 suggests the goshawk is relatively common and well-distributed in the Northern Region (Kowalski 2006).

Information gleaned from this work includes some basic vegetation characteristics of vegetation where there were goshawk nests or detections (Table xx). In this part of the Region, lodgepole pine and Doug fir predominate these stands with relatively small diameter trees (5-9”). Most of the nests (4 out of 5) were in PSUs with noticeable mosaic (natural openings).

**Table xx.** Characteristics of vegetation in PSU’s with detections or nests.

| Ecological section                  | Forest Unit (s)     | Dominant tree species present on the plots in order of occurrence | Median canopy class of dominant trees | Median size class of dominant trees | Median size class of co-dominant trees | Median canopy class of co-dominant trees | Understory description   |
|-------------------------------------|---------------------|---|---------------------------------------|-------------------------------------|--|--|--|
| Yellowstone Highlands (M331A) (N=5) | Gallatin and Custer | Lodgepole Pine<br>Douglas fir                                     | 10-24%                                | 5-9”                                | 5-9”                                   | <10%                                     | Shrub, grass and forb cover low; Down Woody Debris (DWD) present |

There is definitely goshawk habitat available and goshawks are present on the Gallatin National Forest. Goshawks are not especially rare in the proper habitats, and *the population in this area seems to be stable and cycling at low numbers.*

**Pine Marten**

The pine marten is listed in the Gallatin Forest Plan as an MIS for old growth (moist spruce) forests (Forest Plan, p. II-19). Population trends for MIS are supposed to reflect the efficacy of forest management practices. The pine marten is closely associated with late succession stage mesic forests with abundant woody debris and snags.

A Forest Service Region 1 model indicated that recent changes in patch size and habitat connectivity did not have a significant effect on the pine marten population (Hillis and Lockman 2003). This analysis also found that existing habitat is comparable with historic levels. A similar analysis was conducted of pine marten habitat on the Gallatin National Forest (Backus 2003). Results indicate that potential habitat for this species is abundant, with the exception of burned areas, the Deer Creeks, and the east side of the Bridger and Crazy Mountains.

The Montana Department of Fish, Wildlife and Parks (MFWP) annually conducts snow track surveys in western Montana to monitor population trends of several furbearer species, including pine marten (Giddings 2003 personal communication). Representative habitats and land uses characteristic of the ecoregion are sampled. The Gallatin Forest is located within the southwest montane ecoregion (Montana Trapping District 3). Pine marten detections per 100 transect miles have varied over a 10-year period (1990-2000) in southwest Montana (MFWP Region 3). Detections ranged from 34.7 per 100 miles (1991-92) to 123.4 per 100 miles (1994-95), while the detection rate in 2000-2001 was 60.2 per 100 miles. The average was 75 per 100 miles for the 10-year period.

*The long-term* population trend for pine marten populations in Montana is stable. Pine marten populations appear to be healthy enough to sustain a trapping harvest in Montana and adjacent states. This is the most abundant predator of those monitored by MFWP in southwest Montana (Giddings personal communication).

Although this species was selected as a MIS and is being monitored, there are many other factors influencing populations besides habitat change. Because it is a harvested furbearer, fur market prices, accessibility to populations by humans, and other factors related to trapping may be the most important population level determinants.

In the early 1990s, the Forest and MFWP sponsored three M.S. degree pine marten studies in the West Yellowstone area, which increased our understanding of the behavior and ecology of this species. The results of these efforts are summarized in Coffin et al. 2002. In their abstract, the authors state that martens select the most mesic and structurally complex habitat types available during winter on the study areas (p. 13). In southwest Montana, marten in the winter select forests with high canopy cover, but are not obligate to climax forests (p. 14). They do select areas with large live trees, good canopy cover, lots of larger diameter deadfall, and well abundant vegetation in the ground stratum (Ibid.). They concluded that ‘marten populations in our study areas were relatively secure despite high apparent harvest [trapping] rates in the west Yellowstone study area.’ Each of their study areas had sustained trapping pressure and logging for at least 50 years and marten were still present (p.28), indicating that the population may fluctuate, but is stable overall.

In addition, the Forest has been conducted winter track surveys for furbearers with and without partners. Dixon and Wold (2003) have conducted forest carnivore surveys from 1999 to the present on the Bozeman Ranger District. One of the furbearers encountered

on their surveys is pine marten. The primary technique is camera stations that are baited to attract carnivores. In 1999-2000, martens were detected at about 80% of the 14 camera stations (Dixon, B. 2000). In 2000-2001, martens were photographed at 9 of 16 camera stations (56%), but were tracked at 11 of 16 stations (69%) (Dixon and Wold 2001). Again in 2001-2002, there were 16 bait stations (Dixon and Wold 2002). Martens were photographed at 10 of 16 sites (63%). Tracks indicated that martens had visited 11 of 16 sites (69%). In 2002-2003, there were 12 bait stations (Dixon and Wold 2003). Martens were photographed at 10 of 12 sites (83%). Although this information does not represent population trend data, it is an indicator that pine martens are relatively common at the baited sites and are the most common of the furbearers upon which these efforts are focused. Weasels and coyotes are two of the nonfocal species that are also quite common.

Since 1997, Steve Gehman and Betsy Robinson have conducted furbearer surveys on parts of the Gallatin National Forest. In 1998, they were affiliated with Yellowstone Ecosystem Studies and worked in the western part of the Forest (Bozeman and Hebgen Lake Ranger Districts) (Gehman and Robinson 1998). They used remote camera systems at 20 different locations, and did a number of snow track transects. Pine martens were detected on 70% of the camera stations and 81% of the transects. The only more common furbearer was coyote with 91% and 95% detection rates, respectively. Weasels (both long-tailed and short-tailed) were next at 62% and 76%, respectively. In 1998-1999, surveys were conducted in the Madison, Gallatin, Bridger and Crazy Mountain Ranges. Pine martens were detected by tracks and cameras in the Madison and Gallatin Ranges. They were detected by track only in the Bridgers (Gehman and Robinson 1999). In 1999-2000, efforts included the Madison and Gallatin range and moved into the Bridger and Crazy Mountains (Gehman and Robinson 2000). Hair snares were added to the techniques used. Pine martens were detected on 35% of the transects and 22% of the camera sites. On other transects, pine martens were detected on 25% (vehicle) to 22% (foot) of the transects. In 2000-2001, surveys were conducted in the Bridger, Crazy and Bangtail Mountains (Gehman and Robinson 2001). This was a year of apparent extremely low pine marten numbers and/or detectability in this area. In 2001-2002, surveys were conducted in the Gallatin, Bridger, Bangtail, and Crazy Mountain ranges (Gehman et al. 2002). Martens were detected on 12% (vehicle) and 31% (foot) transects. Pine martens were present and detected in the Gallatin Range, but not by cameras and track transects in the Bridgers, Bangtails or Crazy Mountains. In 2002-2003, efforts were concentrated in the Bridger Mountains. Pine martens were detected in one drainage by tracks in the Bridgers during this season (Gehman et al. 2003). The pine marten detections seem to be lower in the Bridgers and Crazy Mountains than other parts of the Forest. This may be due to lack of the mesic mature and old growth habitats used by martens or that the access routes into these mountains do not coincide with these habitats.

From 1998-2004 the Gardiner Ranger District monitored pine marten distribution among cover types in the Bear Creek drainage. The intent was to assess pine marten habitat selection in an environment with a diversity of forest types, including disturbances of various ages and a variety of coniferous forests. Available cover types consist of a variety of successional stages of lodgepole pine, Douglas fir, spruce-fir, and whitebark

pine dominated forests. These data also provide an index of pine marten population trends. The project is ongoing.

To monitor pine marten abundance and distribution we used track-intercept transects along 15 miles of road, 15 baited track plate boxes, 4 camera bait stations, baited hair snare stations, and 50 1-mile-long linear track transects. These indices indicate that pine marten are ubiquitous and abundant in the Bear Creek drainage and widely distributed among cover types. Moreover, although these methods do not allow for a population survey, as indices they *reveal that pine marten numbers are stable*. This information will soon be available in a Master's thesis at Montana State University by Jeremy Zimmer.

*MFWP data indicates that the long-term population trend for pine marten populations in Montana is stable, and other survey and monitoring efforts indicate that this is a relatively common furbearer on the Gallatin National Forest.*

## **Grizzly Bear**

There are several grizzly bear recovery areas in Region 1 of the Forest Service, and population recovery goals and criteria are different for each. Gallatin National Forest grizzly bears are part of the Greater Yellowstone Area (GYA) or Ecosystem population. Population recovery criteria for the Yellowstone grizzly are addressed in a Conservation Strategy completed in March 2003 and Grizzly Bear Recovery Plan (1993). The Amendment to the Forest Plans for the GYA Forests was completed in 2006, and the grizzly bear is currently being considered for delisting in 2007.

### Recovery Criteria

Rather than using a specific bear population size as the determinant for delisting the Yellowstone ecosystem grizzly bear, the following criteria are used to determine population recovery. They must be met for delisting to occur.

1. Fifteen females with cubs-of-the-year (COY) must be observed over a 6-year running average inside the Recovery Zone and within 10 miles of the Recovery Zone.
2. Females with young must occupy 16 of 18 Bear Management Units on a 6-year sum of verified sightings and evidence, and no adjacent Bear Management Units (BMUs) can be unoccupied.
3. Known human-caused mortality cannot exceed 4 percent of the population estimate based on the most recent 3-year sum of females with COY (discussed for the Gallatin NF in Monitoring Item #16 on grizzly bear mortality).
4. No more than 30 percent of the mortality can be females. Mortality limits cannot be exceeded during any consecutive years.

The number of females with COY has exceeded the recovery criterion for a number of years (ICST 2000 p. 11). Female human-caused mortality levels have been higher than allowed by the recovery criterion in most recent years (2004-2006).

### Population Size and Distribution

The exact size of the grizzly bear population in the Yellowstone area is not known, but it is probably between 400 and 600. The best information suggests that the Yellowstone population is stable or increasing, and this distinct population segment has been proposed for delisting by the USFWS.

In the last 3 years (2004-2006), the number of unduplicated sows with COY was 49, 31, and 47, respectively. Mean litter size was 2.0 (Table xx). The 6 year running average was 40-41 for these 3 years. The average number of COY is remaining steady across recent years (2004-2006) at 1.9 cubs per litter. The numbers of unduplicated females with COY has shown an upward trend as has the 6 year running average. Unduplicated sows with COY is a good indicator of population trend.

Table xx. Number of unduplicated females with cubs-of-the-year (COY), number of COY, and average litter size at initial observation for the years 1973-2006 in the Greater Yellowstone Ecosystem (GYE). Six-year running averages were calculated using only unduplicated females with COY observed in the Recovery Zone and 10-mile perimeter.

| Year              | GYE     |     |                     | Recovery Zone and 10-mile perimeter<br>6-year running averages |     |             |
|-------------------|---------|-----|---------------------|--|-----|-------------|
|                   | Females | COY | Mean litter<br>size | Females  | COY | Litter size |
| 1973              | 14      | 26  | 1.9                 |  |     |             |
| 1974              | 15      | 26  | 1.7                 |  |     |             |
| 1975              | 4       | 6   | 1.5                 |  |     |             |
| 1976              | 17      | 32  | 1.9                 |  |     |             |
| 1977              | 13      | 25  | 1.9                 |  |     |             |
| 1978              | 9       | 19  | 2.1                 | 12   | 22  | 1.8         |
| 1979              | 13      | 29  | 2.2                 | 12   | 23  | 1.9         |
| 1980              | 12      | 23  | 1.9                 | 11   | 22  | 1.9         |
| 1981              | 13      | 24  | 1.8                 | 13   | 25  | 2.0         |
| 1982              | 11      | 20  | 1.8                 | 12   | 23  | 2.0         |
| 1983              | 13      | 22  | 1.7                 | 12   | 23  | 1.9         |
| 1984              | 17      | 31  | 1.8                 | 13   | 25  | 1.9         |
| 1985              | 9       | 16  | 1.8                 | 13   | 23  | 1.8         |
| 1986              | 25      | 48  | 1.9                 | 15   | 27  | 1.8         |
| 1987              | 13      | 29  | 2.2                 | 15   | 28  | 1.9         |
| 1988              | 19      | 41  | 2.2                 | 16   | 31  | 1.9         |
| 1989 <sup>a</sup> | 16      | 29  | 1.8                 | 16   | 32  | 1.9         |
| 1990              | 25      | 58  | 2.3                 | 18   | 36  | 2.0         |
| 1991 <sup>b</sup> | 24      | 43  | 1.9                 | 20   | 41  | 2.0         |
| 1992              | 25      | 60  | 2.4                 | 20   | 43  | 2.1         |
| 1993 <sup>a</sup> | 20      | 41  | 2.1                 | 21   | 45  | 2.1         |
| 1994              | 20      | 47  | 2.4                 | 21   | 46  | 2.1         |
| 1995              | 17      | 37  | 2.2                 | 22   | 47  | 2.2         |
| 1996              | 33      | 72  | 2.2                 | 23   | 50  | 2.2         |
| 1997              | 31      | 62  | 2.0                 | 24   | 53  | 2.2         |
| 1998              | 35      | 70  | 2.0                 | 26   | 55  | 2.1         |
| 1999 <sup>a</sup> | 33      | 63  | 1.9                 | 28   | 58  | 2.1         |
| 2000 <sup>c</sup> | 37      | 72  | 2.0                 | 31   | 62  | 2.0         |
| 2001              | 42      | 78  | 1.9                 | 35   | 69  | 2.0         |
| 2002 <sup>c</sup> | 52      | 102 | 2.0                 | 38   | 73  | 1.9         |
| 2003 <sup>d</sup> | 38      | 75  | 2.0                 | 38   | 74  | 1.9         |
| 2004 <sup>d</sup> | 49      | 96  | 2.0                 | 40   | 77  | 1.9         |
| 2005 <sup>c</sup> | 31      | 57  | 1.8                 | 40   | 76  | 1.9         |
| 2006 <sup>c</sup> | 47      | 96  | 2.0                 | 41   | 80  | 1.9         |

<sup>a</sup> One female with COY was observed outside the 10-mile perimeter.

<sup>b</sup> One female with unknown number of COY. Average litter size was calculated using 23 females.

<sup>c</sup> Two females with COY were observed outside the 10-mile perimeter.

<sup>d</sup> Three females with COY were observed outside the 10-mile perimeter.

The distribution of grizzly sows with young is tracked each year. In the last few years, the number of BMUs occupied by sows with young has ranged from 16 to 17 (IGBST 2006 draft).

Dispersion of reproductive females throughout the ecosystem is represented by verified reports of female grizzly bears with young (COY, yearlings, 2-year-olds, and/or young of unknown age) by BMU. The population recovery requirements (USFWS 1993) include occupancy of 16 of the 18 BMUs by females with young on a running 6-year sum with no 2 adjacent BMUs unoccupied. In 2004, 17 of 18 BMUs were occupied with verified females with young. The BMU lacking these was Hellroaring/Bear. In 2005, all 18 BMUs were occupied by females with young. During 2006, 16 of 18 BMUs had verified observations of female grizzly bears with young (Table xx). Females with young were not documented in the Boulder/Slough or Plateau BMUs. These two unoccupied BMUs are not adjacent to one another. Eighteen of 18 BMUs contained verified observations of females with young in at least 5 years of the last 6-year (2001–2006) period.

**Table xx.** Bear Management Units in the GYA (located entirely or in part on the Gallatin NF) occupied by females with young (cubs-of-the-year, yearlings, 2-year-olds, or young of unknown age), as determined by verified reports, 2001-2006.

| Bear Management Unit           | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Years occupied |
|--------------------------------|------|------|------|------|------|------|----------------|
| 1) Hilgard                     | X    | X    | X    | X    | X    | X    | 6              |
| 2) Gallatin                    | X    | X    | X    | X    | X    | X    | 6              |
| 3) Hellroaring/Bear            | X    | X    | X    |      | X    | X    | 5              |
| 4) Boulder/Slough              | X    | X    | X    | X    | X    |      | 5              |
| 5) Lamar                       | X    | X    | X    | X    | X    | X    | 6              |
| 6) Crandall/Sunlight           | X    | X    | X    | X    | X    | X    | 6              |
| 11) Madison                    | X    | X    |      | X    | X    | X    | 5              |
| 12) Henry's Lake               | X    | X    |      | X    | X    | X    | 5              |
| 13) Plateau                    | X    | X    | X    | X    | X    |      | 5              |
| Totals for the entire GYA BMUs | 18   | 18   | 16   | 17   | 18   | 16   |                |

For the last 3 years (2004-2006), the known and probable mortality limit (human-caused) for female grizzlies in the GYA has been exceeded. From 1998-2003, mortality was below the limit for the GYA (IGBST Annual Report Draft 2006).

A documented increase in mortality is not unexpected, given that the grizzly bear population is increasing in numbers and distribution. The Conservation Strategy ensures that important measures are in place to protect the bear after delisting. The actions of the Gallatin National Forest are consistent with and promote grizzly bear recovery on the Forest and in the GYA. The Forest Plan Amendment for the GYA Forest Plans was completed in 2006 and will be the way grizzly bears are managed on the National Forests after delisting.

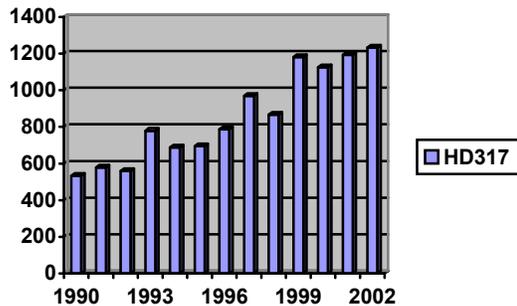
*The population trend for grizzly bears in both the Greater Yellowstone Area and Gallatin National Forest is increasing. This is indicated by the number of unduplicated sightings of sows with COY, and the distribution across the GYA. Mortality limits have been exceeded in recent years, but is logical given the increase in bear numbers and areas used by grizzly bears. US Fish and Wildlife Service has proposed this population of grizzly bears for delisting.*

## **Elk**

Montana Fish, Wildlife and Parks conducts numerous counts of big game herds in this area each year. Counts include trend counts, bull/cow ratios and cow/calf ratios. The State FWP is meeting elk herd population objectives for virtually all Elk Hunting Districts. Statewide, elk trends are up and recruitment is down (Hamlin, personal communication). Elk numbers are counted in the winter and these yield trend information. The winter count is only a sample of the total population, and is not a population count. Weather, both during the flight counts and for the winter, can have a major effect on the count for that year. For instance, in a mild winter, elk may be widely dispersed and yield lower counts although the population may actually be up. Each Elk Hunting District has its own characteristics. Some contain primarily summer range and therefore yield poor winter counts. In general elk populations are at an all time high at the present (Hamlin, personal communication).

The following is one example of one of the Elk Hunting Districts on the Forest. The elk population trend for Elk Hunting District 317 is and has been steadily increasing since the 1970's (Lemke 2002 and Figure 1). At present, the cow elk harvest is insufficient to limit the population and prevent private land. In addition, the cow/calf and bull/cow ratios for HD 37 are within expected levels. A large number of branch antlered bulls that exit the Yellowstone Park area winter on or near the face of Emigrant Peak in HD 317, and this is taken into account when counting and analyzing count results. In 2002, HD 317 had its highest elk count since annual counts commenced in 1974 (Lemke 2002). There was also a record high count for the animals considered resident elk in HD 317. The number of resident elk has tripled since 1990 (Lemke 2002).

Figure 1. Elk Hunting District 317 (Emigrant) population trend winter count (Lemke, MFWP).



For hunting districts covering the Gallatin National Forest, elk populations in all but one (HD 310), are at or exceed State Elk Plan objectives. Hunting District 310 is located in the Taylor Fork area in the Madison Range, south and west of HD 301. The shortfall in this area has been determined to be due to poor recruitment and not Forest Service activities (Alt, personal communication). Poor recruitment can be caused by a number of factors. Elk populations and ratios naturally vary from year to year, and in some cases, the variation is quite significant. There are numerous factors that can influence an elk population and bull/cow cow/calf ratios including weather, predation, previous year effects, and hunting success. There are also numerous factors that can influence the winter trend data. It is difficult to determine which factor may have primary responsibility for a trend in the population numbers or ratios.

Alt and Hamlin (personal communication) agree that the cumulative effects of Forest activities such as timber sales and associated roads are not a factor limiting elk populations in the Madison and Gallatin mountain ranges. Lemke (personal communication) also believes this is true in HD 317 in the Absaroka-Beartooth Range. *With the exception of HD 310, these herds exceed elk population objectives in the State Plan and are at high numbers.* The Gallatin National Forest has generally high security (good cover) and has good bull/cow ratios.

In 1983, the Interagency Northern Yellowstone Cooperative Wildlife Working Group was formed with members including the Gallatin National Forest, MFWP, and Yellowstone National Park. This group is now called the Northern Yellowstone Cooperative Wildlife Working Group (NYCWWG) and includes the National Biological Survey (NRS). This group cooperates to conduct elk surveys including cooperative winter elk counts, elk migration surveys, late winter elk classification surveys, late hunt statistics, spring elk carcass counts, and counts for other big game species. Winter elk counts show fluctuations from 1976 to 2003 between approximately 9,000 and 18,000 with an average of about 12,000-13,000 (Lemke 2003). The number of elk north of YNP from 1989 to 2003 vary between about 1,500 and 8,500. The number of elk north of Dome Mountain was quite low from 1975 to 1988, and in 1989 made a dramatic jump to over 3,000 animals. Since 1989 it has varied from about 800 to 4,500. The calf/cow ratio for the northern Yellowstone elk herd from 1968 varies from 5 to about 48

calves/100 cows. The full/cow ratio since 1968 varies from about 12 to 65 bulls/100 cows. The Gardiner late hunt since 1976 (in years there was a hunt) varies from almost zero to about 2,300 elk harvested. The percent hunter success in this same time period ranges from 10% to about 95%. The numbers of elk in this area are quite variable, and shows a slight downward trend in recent years (since 1998), but at least one of these years had poor survey conditions. There is an increase in elk numbers north of Dome Mountain since 1988. There seems to be a downward trend in calf/cow ratios in this herd since 1992. The bull/cow ratio is quite variable, but has had its highest proportions in 1998 and 2001 since this information was recorded in 1968. The Gardiner late hunt is quite variable as is the hunter success rate for this hunt with no obvious discernable trend.

*Data collected by the agencies indicates that, for the most part, the elk population on the Gallatin National Forest is generally stable or increasing, and has met State herd objectives.*

### **Wild Trout**

The Gallatin National Forest (GNF) fisheries program conducted three categories of monitoring during 1998-2003: effectiveness, implementation, and validation. Of these, effectiveness monitoring was most common (Table 1). Effectiveness monitoring was conducted for GNF Management Indicator Species (MIS - wild trout). Among MIS, effectiveness monitoring focused on gathering information about GNF sensitive species, Yellowstone and westslope cutthroat trout. In general, populations of these species maintained existing status during this monitoring period. Remaining MIS effectiveness monitoring largely focused on important sport fisheries at Hyalite and Hebgen Reservoirs.

Validation monitoring evaluated habitat restoration and enhancement activities (Table 1). Habitat complexity increased in all of the validation monitoring projects that occurred during 1998-2003. Population responses were variable, although often increasing. However, the duration of this monitoring period was likely insufficient to determine long-term trends.

Implementation monitoring largely evaluated grazing impacts to the MIS that are also considered sensitive species (Table 1). This monitoring resulted in part from guidance in the Westslope Cutthroat Trout Land-use Strategy (Strategy) adopted by the GNF for both westslope and Yellowstone cutthroat trout. The strategy directs management of cutthroat habitats at 90% habitat capability. To achieve this level of habitat capability, the strategy contains, among other things, guidelines for grazing impacts such as hoof shear. Therefore, most grazing implementation monitoring was conducted to evaluate implementation of the Strategy. Needed changes to current operating procedures on the monitored allotments are being incorporated into Annual Operating Plans (AOP) and Allotment Management Plans (AMP) as appropriate.

Table 6. Fisheries monitoring on the Gallatin National Forest, 1998-2003.

| <b>Project</b>                         | <b>Type of Monitoring</b>                                | <b>Date</b>          | <b>Species</b>   | <b>Measure</b>                                     | <b>Results</b>  |
|--|--|----------------------|--|--|---|
| <b><i>Effectiveness Monitoring</i></b> |  |                      |  |  |   |
| WF Hyalite Creek                       | Population estimation                                    | 2001-2003            | Yellowstone cutthroat; brook trout                                   | Abundance, population size and structure           | Populations are maintaining or increasing                     |
| WF Hyalite Creek                       | Habitat survey   | 2001-2002            | Arctic grayling; Yellowstone cutthroat; brook trout                  | Fish Habitat                                       | Identified limiting habitat factors                           |
| Hyalite Reservoir Trap Pond            | Fish stranding   | 2000-2003            | Arctic grayling; Yellowstone cutthroat; mottled sculpin; brook trout | # fish stranded                                    | 200-500 fish stranded annually; identified mitigation measure |
| East Fork Hyalite Creek                | Spawning Adult Survey                                    | 1998-2003            | Arctic grayling; Yellowstone cutthroat                               | Number of spawning adults                          | Annually variable, but stable                                 |
| Eldridge Creek                         | Fish distribution  | 2003                 | Unknown  | Presence   | No fish present   |
| Cache Creek Bridgers                   | Population estimation                                    | 1999<br>2000<br>2003 | Yellowstone cutthroat; brook trout                                   | Abundance, population size and structure           | Short-term trend appears stable                               |
| Elkhorn Creek                          | Fish Distribution  | 2003                 | Unknown  | Presence   | No fish present   |
| Lizard Lake                            | Presence/Absence   | 2003                 | Unknown  | Presence   | No fish present   |
| Buck Creek                             | Species distribution; genetic purity; relative abundance | 2003                 | Westslope cutthroat; brook trout; rainbow trout                      | Abundance, population size and structure; genetics | Populations maintaining; genetics pending analysis            |
| Bangtail Creek                         | Population estimation<br>Presence/absence                | 1999<br>2000<br>2002 | Yellowstone cutthroat  | Abundance, population size and structure           | Short-term trend appears stable                               |
|  |  |                      |  |  |   |

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|---------------------------|---|--|--|--|---|
| Cache Creek (Taylor Fork) | Population Estimation<br>Habitat              | 1998<br>1999<br>2000<br>2001<br>2003           | Westslope cutthroat                              | Abundance, population size and structure; genetics | Populations maintaining at high densities; genetics maintaining as of 1999; identified limiting habitat factors |
| Dead Horse (Taylor Fork)  | Population estimation<br>Presence/absences    | 2003   | Westslope cutthroat; rainbow X cutthroat hybrids | Abundance, population size and structure; genetics | Populations exist at high densities; genetics pending analysis  |
| Fairy Creek               | Population Estimation /<br>presence / absence | 1998<br>1999<br>2003                           | Yellowstone cutthroat; brook trout               | Abundance, population size and structure; genetics | Short-term trend appears stable   |
| Main Brackett Creek       | Population estimate<br>Habitat survey         | 2000   | Yellowstone cutthroat; brook trout               | Abundance, population size and structure           | Populations exist at moderate densities   |
| Middle Fork Brackett      | Population Estimation<br>Habitat survey       | 1998(habitat)<br>1999<br>2001<br>2002(pop.est) | Yellowstone cutthroat; brook trout;              | Abundance, population size and structure           | Identified limiting habitat factors; short term population trends appear stable                                 |
| North Fork Brackett Creek | Population Estimation<br>Habitat survey       | 1998(habitat)<br>1999<br>2000                  | Brook Trout                                      | Abundance, population size and structure           | Identified limiting habitat factors; short term population trends appear stable                                 |
| South Fork Brackett       | Population Estimation                         | 2000   | Brook trout                                      | Abundance, population                              | Populations exist at  |

|                                     |  |           |   |  |  |
|-------------------------------------|--|-----------|---|--|--|
| Creek                               | Habitat survey                             |           |   | size and structure                                   | moderate densities; identified limiting habitat factors                              |
| Moose Creek                         | Presence / absence                         | 2002      | Westslope cutthroat X rainbow trout hybrids | Abundance, population size and structure; genetics   | Populations exist at moderate densities  |
| Wally McClure Creek                 | Population Estimation / presence / absence | 2002-2003 | Westslope Cutthroat                         | Abundance, population size and structure<br>Genetics | Found new population of pure westslope cutthroat; exist at moderate densities        |
| North Fork of West Fork of Gallatin | Population Estimation presence / absence   | 2002      | Unknown                                     | Presence<br>Abundance, population size and structure | Found population of brook trout; high quality habitat but low fish densities         |
| Rat Lake                            | Spawning Observations                      | 1998-2003 | Yellowstone cutthroat                       | Number of spawning adults                            | Annually variable, but maintaining   |
| Rocky Draw                          | Presence / absence                         | 2003      | Unknown                                     | Presence   | No fish present  |
| Lizard Lake Creek                   | Presence / absence                         | 2003      | Unknown                                     | Presence   | No fish present  |
| Trib to Buck Creek (T8S R3E SEC 13) | Presence / absence                         | 2003      | Unknown                                     | Presence   | Found population of westslope cut; moderate populations densities; appear hybridized |
| Deer Lake                           | Population estimation                      | 2002      | Arctic grayling                             | Abundance, population                                | Population maintaining   |

|                            |  |                      |  |  |  |
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|                            |  |                      |  | size and structure                                 |  |
| Taylor Fork                | Population estimation<br>Presence / absence  | 2003                 | Westslope cutthroat;<br>cutthroat X rainbow trout hybrid | Abundance, population size and structure; genetics | Populations maintaining in low densities               |
| Wild Horse Creek           | Relative abundance                           | 2002                 | Westslope cutthroat                                      | Abundance, population size and structure; Genetics | Population maintaining; genetics pending analysis      |
| Elf Lake                   | Presence / absence                           | 2003                 | Yellowstone cutthroat                                    | Presence   | No fish present  |
| Trapper Creek              | Habitat inventory (2003)<br>Redd count 02,03 | 1999<br>2002<br>2003 | Rainbow trout  | Fish habitat                                       | Identified spawning distributions and limiting factors |
| Watkins Creek              | Habitat inventory<br>Redd count              | 2002<br>2003         | Rainbow trout  | Fish habitat                                       | Identified spawning distributions and limiting factors |
| Ruoff Ditch                | Habitat inventory<br>Redd count              | 2002<br>2003         | Rainbow trout  | Fish habitat                                       | Identified spawning distributions and limiting factors |
| Rumbaugh Creek             | Habitat inventory<br>Redd count              | 2002<br>2003         | Rainbow trout  | Fish habitat                                       | Identified spawning distributions and limiting factors |
| Cherry Creek (Hebgen Lake) | Habitat inventory<br>Redd count              | 2002<br>2003         | Rainbow trout  | Fish habitat                                       | Identified spawning distributions and limiting factors |
| S. Fork Madison River      | Habitat inventory<br>Redd count              | 2002<br>2003         | Rainbow trout  | Fish habitat                                       | Identified spawning distributions and limiting factors |
| Black Sand Spring          | Habitat inventory<br>Redd count              | 2002<br>2003         | Rainbow trout  | Fish habitat                                       | Identified spawning                                    |

|                     |   |                      |                               |  |   |
|---------------------|---|----------------------|-------------------------------|--|---|
| Creek               |   |                      |                               |  | distributions and limiting factors                                |
| Madison River       | Habitat inventory<br>Redd count                       | 2002<br>2003         | Rainbow trout                 | Fish habitat                                       | Identified spawning distributions and limiting factors            |
| Duck Creek          | Habitat inventory<br>Redd count                       | 2002<br>2003         | Rainbow trout                 | Fish habitat                                       | Identified spawning distributions and limiting factors            |
| Cougar Creek        | Habitat inventory<br>Redd count                       | 2002<br>2003         | Rainbow trout                 | Fish habitat                                       | Identified spawning distributions and limiting factors            |
| Grayling Creek      | Habitat inventory<br>Redd count                       | 2002<br>2003         | Rainbow trout                 | Fish habitat                                       | Identified spawning distributions and limiting factors            |
| Red Canyon Creek    | Habitat inventory<br>Redd count                       | 2002<br>2003         | Rainbow trout                 | Fish habitat                                       | Identified spawning distributions and limiting factors            |
| Cabin Creek         | Population estimation<br>Presences / absence          | 1999<br>2002         | Westslope cutthroat           | Abundance, population size and structure; genetics | Population maintaining, but introgression is progressing upstream |
| S. Fork Cabin Creek | Population estimation<br>Presences / absence          | 1999                 | Unknown                       | Population size and structure                      | No fish present   |
| Buffalo Horn Creek  | Habitat inventory                                     | 1999                 | Rainbow trout;<br>brook trout | Habitat  | Identified limiting factors                                       |
| Bacon Rind Creek    | Habitat and macroinvertebrate inventory<br>Population | 1999<br>2001<br>2002 | Unknown                       | Fish habitat;<br>Abundance, population size and    | Identified limiting factors<br>No fish                            |

|                               |   |              |             |   |  |
|-------------------------------|---|--------------|-------------|---|--|
|                               | estimation<br>Presence / absence  |              |             | structure of<br>fish; macro-<br>invertebrates   | present  |
| Upper Squaw Creek             | Habitat and<br>macroinvertebrate<br>inventory<br>Population<br>estimation<br>Presence / absence | 2001<br>2002 | Unknown     | Fish habitat;<br>Abundance,<br>population<br>size and<br>structure of<br>fish and<br>macro-<br>invertebrates    | Identified<br>limiting<br>factors;<br>Found<br>populations<br>of rainbow<br>and brook<br>trout       |
| Levinski Creek                | Habitat and<br>macroinvertebrate<br>inventory<br>Population<br>estimation<br>Presence / absence | 2001<br>2002 | Unknown     | Fish habitat;<br>Abundance,<br>population<br>size and<br>structure of<br>fish and<br>macro-<br>invertebrates    | Identified<br>limiting<br>factors;<br>Found<br>populations<br>of rainbow<br>trout                    |
| Upper West Fork Hyalite Creek | Habitat and<br>macroinvertebrate<br>inventory<br>Population<br>estimation<br>Presence / absence | 2001<br>2002 | Known       | Fish<br>Habitat;<br>Abundance,<br>population<br>size and<br>structure of<br>fish and<br>macro-<br>invertebrates | Identified<br>limiting<br>factors;<br>No fish<br>found   |
| Jack Creek                    | Presence/absence  | 1999<br>2000 | Unknown     | Abundance,<br>population<br>size and<br>structure   | Identified<br>population<br>of brook<br>trout  |
| Yankee Creek                  | Presence/absence  | 1999<br>2000 | Unknown     | Abundance,<br>population<br>size and<br>structure   | Identified<br>population<br>of brook<br>trout  |
| Little Bear Creek             | Habitat<br>Presence/absence   | 1999<br>2000 | Unknown     | Fish habitat;<br>Population<br>size and<br>structure  | Identified<br>limiting<br>factors;<br>Found<br>population<br>of<br>Yellowstone<br>cutthroat<br>trout |
| Mystic                        | Population Size   | 2002         | Brook Trout | Population  | Identified   |



|                                  |                                      |           |  |  |   |
|----------------------------------|--------------------------------------|-----------|--|--|---|
|                                  |                                      |           |  |  |   |
| <b>Implementation Monitoring</b> |                                      |           |  |  |   |
| Bear Canyon Creek                | Sedimentation<br>Habitat degradation | 2003      | Rainbow x<br>Cutthroat<br>hybrids<br>Brook<br>Rainbow<br>Brown | Abundance,<br>population<br>size and<br>structure;<br>Fish habitat | Populations<br>are<br>maintaining<br>at moderate<br>to high<br>densities;<br>habitat<br>limited in<br>some<br>locations |
| NF/MF Willow Creek               | Grazing Impacts                      | 2003      | Yellowstone<br>cutthroat                                       | Streambank<br>stability;<br>riparian<br>vegetation                 | Locally high<br>livestock<br>impacts;<br>working on<br>AOP<br>revision  |
| Bangtail Creek                   | Grazing Impacts                      | 2003      | Yellowstone<br>cutthroat                                       | Streambank<br>stability;<br>riparian<br>vegetation                 | Locally high<br>livestock<br>impacts;<br>working on<br>AOP<br>revision  |
| Wildhorse Creek                  | Grazing Impacts                      | 2003      | Westslope<br>cutthroat   | Streambank<br>stability;<br>riparian<br>vegetation                 | Grazing<br>impacts<br>insignificant   |
| Taylor Creek                     | Grazing Impacts                      | 2002      | Westslope<br>cutthroat   | Streambank<br>stability;<br>riparian<br>vegetation                 | Locally<br>moderate<br>livestock<br>impacts;<br>working on<br>AOP<br>revision   |
| Cache Creek<br>(Taylor Fork)     | Grazing Impacts                      | 2002-2003 | Hybridized<br>westslope<br>cutthroat                           | Streambank<br>stability;<br>riparian<br>vegetation                 | Locally high<br>livestock<br>impacts;<br>working on<br>AOP<br>revision  |
| SF Sixteenmile Creek             | Grazing Impacts                      | 2002      | Hybridized<br>Westslope<br>cutthroat                           | Streambank<br>stability;<br>riparian<br>vegetation                 | Locally high<br>livestock<br>impacts;<br>working on   |

|                                    |   |           |  |   |   |
|------------------------------------|---|-----------|--|---|---|
|                                    |   |           |  |   | AOP revision  |
| <b>Validation Monitoring</b>       |   |           |  |   |   |
| WF Hyalite Creek                   | Spawning habitat mitigation                                   | 1998-2003 | Arctic grayling; Yellowstone cutthroat                               | Number of spawning adults                   | Annual variability but trend is positive  |
| WF Wilson Creek                    | Post-fire rehab   | 2001-2003 | Westslope Cutthroat  | Abundance, population size and structure    | Populations depressed after fire; survivors are maintaining and reproducing           |
| Cache Creek (Taylor Fork)          | Habitat inventory<br>Population estimation                    |           | Westslope cutthroat  | Fish habitat<br>Size and structure          | Banks are stabilizing<br>Populations are maintaining                                  |
| WF Hyalite Creek restoration reach | Habitat changes   | 2002-2003 | Arctic grayling; Yellowstone cutthroat; mottled sculpin; brook trout | Habitat attribute quantity; quality         | Increased spawning habitat; increase rearing habitat; Spawning fish trend is positive |
| Fairy Lake                         | Spawning fish surveys   | 2001-2003 | Yellowstone cutthroat  | # redds                                     | Low numbers but spawning is occurring   |
| NF Willow Creek                    | Habitat inventory; streambank stability; population abundance | 2002-2003 | Yellowstone cutthroat  | Fish habitat; population size and structure | Streambanks are stabilizing in places; fish abundance low                             |
| WF Hyalite Creek @ Langhor         | Habitat inventory<br>Population estimation                    |           | Rainbow Brook<br>Mottled sculpin                                     | Fish habitat; Population size and structure | Increased habitat complexity; positive trend in fish populations                      |
| Cherry                             | Fish presence   | 2003      | Yellowstone  | Fish  | Fish appear   |

|                             |                                     |  |  |          |   |
|-----------------------------|-------------------------------------|--|--|----------|---|
| Creek<br>(Madison<br>River) | (after application<br>of piscicide) |  | cutthroat;<br>Rainbow<br>trout;<br>brook trout | presence | successfully<br>removed<br>from upper<br>Cherry<br>Creek and<br>Cherry Lake |
|                             |                                     |  |  |          |   |
|                             |                                     |  |  |          |   |
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