Status of Cutthroat Trout Conservation Populations in the Swan Valley

Revised April 29, 2011 by the Swan Native Fish Committee

Summary Table

Populations are listed in geographic order from north to south. Values with "?" indicate low confidence values or old data

Name	Length	Total Population	Purity	Threats
Wolf	3 miles	1,700?	95-99	Some hybridization has taken place. Uncertain of barrier effectiveness
Sixmile	3.1 miles	2,000?	100%	Aging barrier on private land. No easement in place
Groom	2.9 miles	1,000?	100%?	Brook trout present in very low numbers. No barrier
Bond	2.7 miles	421?	100%?	Brook trout present. No barrier. Poor habitat on private land
N F Lost	3.8 miles	807	100%	Brook trout present in very low numbers. Insecure barrier
S F Lost	?	?	?	?
Whitetail	0.5 miles	75-300	100	Very limited spatially. Vulnerable to demographic or stochastic risks.
Soup	0.6 – 2.1 miles	Unknown	100	Uncertain of barrier effectiveness
Cedar	4.4 miles	5,570?	100	Uncertain of barrier effectiveness. Naturally limited habitat. Possible headwater lakes genetic contamination.
Lion	3.3 miles	Unknown	Unknown	None known.
Piper	4.9 miles	3,200?	Unknown	Insecure barrier. Possible headwater lakes genetic contamination
Pony	1.3 miles	1,092	99	Some hybridization has taken place. Brook trout present. No barrier.
Dog	6.2 miles	2,100?	95-100	Some hybridization has taken place. Brook trout present. No barrier.
Cooney	5.4 miles	Unknown	100	Brook trout present. Insecure barrier. Most habitat is on private land.

Kraft	11.9 miles	11,810	95-100	Brook trout present. Some hybridization has taken place. No barrier.
Herrick Run	1.8 miles	290?	100	Limited spatially, possibly exacerbated by past land mgmt. Vulnerable to demographic and stochastic risks.
Owl	1.3 miles	147	100%?	Brook trout present. Limited spatially. Vulnerable to demographic and stochastic risks.
Lindbergh-Crystal	10.4 miles	1,100?	Unknown	Rainbow and brook trout present. Naturally limited habitat.

Wolf Creek

A portion of this population is on private land and headwaters on public land. Investigation in 2009 found high gradient cascade on private land seems to be limiting brook trout invasion past that point. Cutthroat above cascade may be hybridized and it is uncertain if this cascade is truly a barrier. Minimal habitat data available suggests it has excellent conditions. Likely has a small amount of recreational fishing. Cutthroat trout are found below cascade but it is uncertain what connectivity, if any, they have to the Swan River. Tailed frogs present. Small headwater lakes presumed fishless but unverified.

- *Total length of habitat*: Approximately 3 miles (beginning at highway 83).
- *Population size*: No estimate. 1997 relative abundance in headwaters suggests population is perhaps 1,700 fish.
- *Genetic purity*: 1998 sample of 11 fish found between 95-99% pure. Unknown at time of writing what species contaminated the population. Sample size is too small to have confidence.
- *Potential Threats*: Uncertain if cascades are sufficient barrier to prevent invasion of hybrids or brook trout. Private landowner seems supportive but no conservation plan in place.
- *Potential Restoration Actions*: Strengthen barrier (if needed) and develop conservation plan with private landowner.
- *Data needs*: - Current population estimate for cutthroat trout
  - Update genetic status for cutthroat trout with more samples and more locations.
  - Monitoring of invasion by brook trout beyond cascade, if any.
  - Fisheries status of several small headwater lakes.

Sixmile Creek

Stream has relatively high gradient throughout, likely limiting factor. A historic flood control device at Sixmile Estates has served as an upstream fish barrier for decades. The device is old and in need of repairs. Currently there is no conservation easement to preserve this barrier but landowners seem open to discussion. Recreational fishing is probably non-existent. Nearly all of fish habitat is on private lands

or Stoltze Timber Company holdings and it is uncertain if any on National Forest system lands in the headwaters. No headwater lake.

- *Total length of habitat*: 3.1 miles
- *Population size*: No recent estimate. 1983 estimates 2,050 age 1+ cutthroat (no CI available). No other data.
- *Genetic purity*: Sampled in 1983 and 2008. Both samples were 100% pure.
- *Potential Threats*: Potential failure of historic barrier and subsequent invasion of non-natives.
- *Potential Restoration Actions*: Secure/rebuild barrier and obtain conservation easement.
- *Data needs*: - Current population estimate for cutthroat trout

Groom Creek

We have minimal information on this small stream. Lower 0.9 miles on private land, upper 2 miles on roadless National Forest System lands. Suspected partial migration barrier at private weir but this has likely collapsed in recent years. Stream has relatively high gradient throughout, likely limiting factor. Recreational fishing is probably non-existent. Habitat surveys suggest habitat is in excellent condition. No headwater lake.

- *Total length of habitat*: 2.9 miles. 1983 survey found distinct upper barrier.
- *Population size*: No recent estimate. 1983 estimates for both reaches total 3,640 age 1+ cutthroat (no CI available). 1996 relative abundance suggests population is perhaps just 1,000 fish.
- *Genetic purity*: 1983 sample was 100% pure. No recent data.
- *Potential Threats*: Brook trout have invaded at least a portion of the stream. 1996 relative abundance effort found about 2:1 cutthroat to brook trout ratio whereas brook trout were not detected in 1983 surveys. Current size and distribution of brook trout population is unknown. Groom Creek does not have any barriers to invasion but its naturally high gradient may hinder brook trout colonization success.
- *Potential Restoration Actions*: Unknown, needs evaluation.
- *Data needs*: - Current population estimate for cutthroat trout
  - Brook trout population size and distribution
  - Current genetic status for cutthroat trout

Bond Creek

This population exists upstream of two forks delta (near section lines 14/23) and extends to 6m waterfall about 2.7 miles upstream. Majority of watershed is unroaded public land with excellent habitat conditions. However both forks downstream of conservation population have degraded habitat conditions and may be impeding connectivity to Swan Lake. Brook trout, slimy sculpins, tailed frogs also present. Cutthroat trout gradually increase in numbers further upstream towards the falls. Bond Lake stocked with Yellowstone and westslope cutthroat trout until 1951 but uncertain if any fish persist. Trinkus Lake stocked with undefined “cutthroat trout” in 1930’s and still has fish. Stream below lakes and above waterfall appears fishless but sampling not rigorous.

- *Total length of habitat*: Approximately 2.7 miles

- *Population size*: Estimated 421 age 1+ fish (217-625 CI). 2001 sample found 12.8 per 132 meter (6.6-19 CI) in lower areas but no data near the waterfall. Better population data is desirable.
- *Genetic purity*: 16 fish in 2001 sampled 100% pure. Sample size too small for confidence.
- *Potential Threats*: Brook trout have invaded but not fully colonized the stream. Cold stream with good habitat may provide cutthroat trout capability to persist. Potential upstream genetic contamination from lakes may cause hybridization.
- *Potential Restoration Actions*: Monitor brook trout invasion and suppress if necessary. Evaluate feasibility and desirability of barrier.
- *Data needs*: -Population estimate
  -Genetic status
  -Monitor brook trout invasion
  -Genetic status of Trinkus and Bond Lakes.

North Fork Lost Creek

This population exists upstream of a high gradient, cascade reach on North Fork Lost Creek. The population is entirely on National Forest system lands. Habitat surveys suggest habitat is in excellent condition. Natural low flows may be habitat limiting factor. Stream has little or no recreational fishing. Sparse numbers of bull trout exist here, possibly resident life forms? Tailed frogs present as well. No headwater lake.

- *Total length of habitat*: Approximately 3.8 miles
- *Population size*: 807 age 1+ fish (384-1229 CI=.95) based on 2 population estimates in 2001. Upper one typifies approx 2.1 miles. Found 20.16 +/- 11.97 WCT per 116m = 587 (238-936). Lower one typifies 1.7 miles. Found 9.8 +/- 3.29 WCT per 122m = 220 (146-293).
- *Genetic purity:* 2001 sample found 100% pure.
- *Potential Threats*: Cascade reach is not capable of blocking all invasions by non-native species. Large-bodied fish appear able to negotiate past cascades. Brook trout have invaded but not fully colonized the area. Low numbers detected in lower area in 2001, similar effort in same spot in 2009 found numerous brook trout. Current distribution and size of brook trout population is unknown. Additionally, while 2001 genetic samples in the headwaters found pure fish, samples taken within the cascade area found approximately 82% pure westslope cutthroat trout (post F1 rainbow hybrids). Since some fish passage can take place through the cascades, it seems probable that hybrid fish will also infiltrate the area.
- *Potential Restoration Actions*: - Render cascades into impassable barrier. Also consider Mmanually suppress brook trout by means of electrofishing.
- *Data needs*: -Improved understanding of distribution and size of brook trout population
  -Monitoring of potential rainbow trout introgression with periodic genetic tests.
  -Feasibility of altering cascades to impassable barrier.

South Fork Lost Creek

The South Fork Lost Creek conservation population is isolated above a natural barrier, which is a small group of 5 to 15-foot waterfalls. The falls block upstream fish passage at all flows and no invasive species have moved past it. The conservation population upstream of the natural barrier may inhabit up to approximately 3.1 miles of stream on both State Trust Lands and National Forest Service lands; however, the precise extent of westslope cutthroat trout presence on National Forest Service lands is

unknown. The quality of spawning, rearing, and wintering habitats are high, and thermographs recorded during 2004, 2005 and 2006 approximately 0.2 miles downstream of the natural barrier found a seasonal mean weekly maximum temperature ranging from 11.3 to 12.3 degrees Celsius.

- *Total length of habitat*: 2.7 miles to the Forest Road 680 bridge crossing, plus an unknown distance upstream
- *Population size*: 1667 age 1+ fish (1365-1968 CI =.95). Assuming 2.7 miles, 2009 survey found 38.37 +/-6.94 WCT per 100m.
- *Genetic purity*: 2009 sample found 100% pure.
- *Potential Threats*: None known.
- *Potential Restoration Actions*: None at this time.
- *Data needs*: Determine upstream extent of WCT presence.

Whitetail Creek

This is a very small population that persists upstream of natural barrier. Population is uniquely adapted to tolerate very cold water. Habitat in good condition; limiting factors are small volume and cold temperatures. New barrier installed downstream to allow future downstream expansion. No headwater lakes. Habitat entirely on State Trust lands.

- *Total length of habitat*: Approximately 0.5 miles.
- *Population size*: Montana DNRC biologist estimates 75-300 age1+ fish.
- *Genetic purity*: 100% pure in 2006 sample
- *Potential Threats*: Demographic or stochastic risks due to very small population.
- *Potential Restoration Actions*: Remove brook trout immediately below natural cascade to allow downstream colonization. Evaluate expansion of population into adjacent tributaries and removal of brook trout.
- *Data needs*: -Brook trout distribution of adjacent tributaries.
  -Evaluation of potential additional barriers.

Soup Creek

The population is isolated above a natural barrier, which is primarily a set of small falls and cascades formed by boulder steps in Soup Creek Canyon. The population may inhabit up to approximately 2.4 miles of stream on both State Trust Lands and National Forest system lands; however, the precise extent of westslope cutthroat trout presence on National Forest Service lands is unknown. While the quality of spawning, rearing, and wintering habitats are high, a natural variable contributing to low densities for the conservation population may be the thermal regime of the stream. Thermographs recorded during 2004, 2005 and 2006 at the State Trust Lands/National Forest Service boundary found a seasonal mean weekly maximum temperature ranging from 8.8 to 10.2 degrees Celsius. Thermographs recorded during the same period near the natural barrier (approximately 1.8 miles downstream) found a seasonal mean weekly maximum temperature ranging from 10.0 to 11.1 degrees Celsius. Naturally low seasonal peak stream temperatures may occasionally and significantly reduce embryo survival for affected year classes.

- *Total length of habitat*: Estimated between 0.6 and 2.1 miles.
- *Population size*: Unknown

- *Genetic purity*: 2007 sample found 100% pure.
- *Potential Threats*: Set of small waterfalls and cascades in Soup Cr Canyon needs be assessed for risk of passing any fish at any flows – risk of EBT and RT invading upper Soup Cr.
- *Potential Restoration Actions*: None at this time.
- *Data needs*: - Determine upstream extent of WCT presence.
  -Need population estimate.
  -Risk of passage at downstream barriers needs verified.

Cedar Creek

Two waterfalls, each 2m high, appear to have isolated the upper cutthroat trout population from the rest of the stream. Mostly unroaded landscape except where Plum Creek harvested the riparian area for 0.7 miles of the stream in 1980's. Entire area is now National Forest system lands. Cedar Lake historically stocked with undefined "cutthroat trout" but has been stocked with pure cutthroat trout in recent years. Citizens report that another lake somewhere in this drainage was stocked but there are no clear records. Habitat limiting factor seems to be warm water temperatures and unstable channels (thus may also be limited in winter survival). Recreational fishing in streams is probably non-existent. Watershed may vulnerable to catastrophic wildfire.

- *Total length of habitat*: Approximately 4.4 miles
- *Population size*: No recent estimate. 1983 estimate of 5,570 age 1+ cutthroat (no CI).
- *Genetic purity*: 2006 sample of 25 fish found them to be 100% pure.
- *Potential Threats*: Needs evaluation of security of natural barrier to resist invasion. Climate change may further stress summer habitat conditions.
- *Potential Restoration Actions*: Needs periodic monitoring to verify brook trout have not invaded past barriers. If lakes are contaminated, evaluation is needed on restoration strategy. Needs consideration of reducing wildfire risk by means of prescribed fire.
- *Data needs*: - Current population estimate for cutthroat trout
  - Assessment of current invasion by brook trout, if any.
  - Fish species composition and genetic status of headwater lakes.

Lion Creek

This population exists upstream of a large waterfall. It is suspected to have been illegally introduced and the area was historically fishless. Habitat is in excellent shape but does have several locations that chronically dewater. Located entirely on unroaded public land. Landscape is vulnerable to a catastrophic wildfire. Fishing is prohibited in stream. There are three lakes in the south drainage. One of them has been stocked several times with westslope cutthroat trout. Helicopter pilots may have stocked a different lake than intended but it is still within Lion Creek basin.

- *Total length of habitat*: Approximately 3.3 miles
- *Population size*: Unknown. No data available.
- *Genetic purity*: Unknown
- *Potential Threats*: None identified
- *Potential Restoration Actions*: Unknown, needs evaluation.
- *Data needs*: -Population estimate
  -Genetic purity

-Correctly identify which lake has been stocked

Piper Creek

This population is upstream of a high gradient reach. 1996 watershed assessment by Plum Creek found fish populations gradually change from mixed species to solely cutthroat trout in the headwaters. Most of population is in wilderness and all is now on National Forest system lands. Habitat in excellent condition. Piper Lake stocked with undefined "cutthroat trout" until 1966 but low densities still persist in lake. DuCharme Lake also stocked with "cutthroat trout" in 1940s-1960's but been stocked with westslope cutthroat trout in more recent years. Upper DuCharme also reported to have fish of unknown origin. Recreational fishing in stream is probably nill but moderate levels in headwater lakes. Moore Creek tributary is presumed fishless and it has only seasonal connectivity but fisheries status has not been verified. Bull trout spawn in lower Piper Creek, although some juveniles have been observed in the transition area (the high gradient reach). Watershed is vulnerable to catastrophic wildfire.

- *Total length of habitat*: Approximately 4.9 miles
- *Population size*: No estimate available. 1996 snorkel surveys suggest approximately 3,200 age 1+ cutthroat trout.
- *Genetic purity*: Unknown
- *Potential Threats*: Brook trout have invaded into the transition area but have not yet invaded the headwaters. Climate change may improve brook trout colonization success.
- *Potential Restoration Actions*: Reduce risk of catastrophic wildfire by means of prescribed fire. Consider modifying cascade area to create a barrier.
- *Data needs*: -Cutthroat trout population estimate.
  -Genetic purity of streams.
  -Monitoring of potential brook trout invasion into headwaters.
  - Fish distribution and genetic purity of all headwaters lakes.

Pony Creek

This population exists in the headwaters but is extirpated in the lower reaches. Population is not delineated by any distinct feature and transition is gradual. Lower reaches have brook trout, slimy sculpin and tailed frogs. Headwaters have minimal brook trout invasion but they have not successfully colonized. Pony Lake emigrants are likely supplementing the population. Pony Lake initially stocked with rainbow trout but only westslope cutthroat trout in more recent years. Habitat is limited by high gradient. Entire stream is currently National Forest system lands.

- *Total length of habitat*: Approximately 1.3 miles. Neither upstream or downstream extent is clearly known at this time.
- *Population size*: Estimated at 1,092 age 1+ fish. 5 population estimates from 2007-2009 (for unrelated project). Mean estimate 52.2 fish per 100m (27.9-76.4). Expanded to 1.3 miles this equates to 1,092 (583.6-1598)
- *Genetic purity*: Found 99% pure in year 2000 sample. Slight contamination from rainbow trout.
- *Potential Threats*: Brook trout have invaded but unsuccessfully colonized headwaters. Rainbow trout introgression was noted but unsure if threat is from upstream Pony Lake or downstream invasion.
- *Potential Restoration Actions*: Needs evaluation if this is a feasible conservation population.

- *Data needs*: - Monitoring of brook trout distribution
  - Genetic status of Pony Lake

Dog Creek

Dog Creek has a modest sized cutthroat trout population that has been invaded but not fully colonized by brook trout. The Cat Creek tributary has more abundant cutthroat trout and brook trout have not yet penetrated the headwaters. Low numbers of rainbow trout have been observed in lower Dog. Bull trout also occasionally observed but no spawning is documented. Tailed frogs widespread and numerous. Habitat may have been limited by unstable channels and sedimentation in the past, although the situation appears to be improving. Recreational fishing is light. Conservation area is entirely on public lands. Cat Lake is periodically stocked with westslope cutthroat trout. Small headwater lake in Dog Creek may be large enough to support fish but unverified.

- *Total length of habitat*: Approximately 6.4 miles
- *Population size*: Estimated to be 2092 age 1+ fish. Available data is assorted quality and sample dates. 1998 estimate of upper Dog is 22 per 100 (21-23 CI). At 0.8 miles, this equates to 283 (270-296). 1971 1 pass estimate of lower Dog is 6 per 100 (no CI) and at 3.5 miles this equates to 338. Snorkel surveys in 2000 suggest population may be closer to 500. 1998 population in upper Cat has 69 per 100 (20-352 CI) and at 0.9 miles this equates to 999 (290-5,097). Several relative abundance estimates in lower Cat suggest 16 per 100m and at 1.2 miles this equates to 310 fish.
- *Genetic purity*: Year 2000 samples of Cat Creek found 98% pure in headwaters and 95% pure in lower reach. Contamination from rainbow trout. Dog Creek headwater sampling in 2003 found 100% pure.
- *Potential Threats*: Rainbow trout introgression has already taken place and may continue to expand. Brook trout have invaded but not fully colonized the headwaters of Dog and especially Cat.
- *Potential Restoration Actions*: Needs analysis if this is an appropriate conservation area. May be desirable to suppress brook trout in headwater areas.
- *Data needs*: -Need improved information on population size
  -Current distribution of brook trout.
  -Evaluation of small headwater lake in Dog Creek

Cooney Creek

This population exists upstream of the culvert on Highway 83. The culvert is at least a partial barrier but probably not a secure barrier since bull trout and brook trout make it over to some degree. But apparently rainbow trout have not gone by this yet since cutthroat trout population is still pure. The lower 52% of this stream is on private, residential land and the upper part is roadless public land. Habitat on private land appears to be somewhat limited by lack of pools and cover while on public land it is limited by high gradient. Brook trout are also widespread. Recreational fishing is probably significant on private lands and non-existent on public.

- *Total length of habitat*: Approximately 5.4 miles
- *Population size*: No data.

- *Genetic purity*: 2003 sample found 100% pure. Resampled again in 2008, also 100% pure.
- *Potential Threats*: Brook trout have invaded and colonized the watershed to some degree. Recent discussions of opening fish passage at Highway 83 to benefit bull trout may harm cutthroat trout. Unknown if private landowners will support cutthroat trout restoration.
- *Potential Restoration Actions*: Evaluate trade-offs of providing fish passage at highway 83. Develop restoration plan with private landowners.
- *Data needs*: -Cutthroat trout population size.
  - Monitoring of brook trout distribution.

Kraft Creek

This population(s) consists of upper Kraft, Hemlock, Frenchy and Red Butte Creeks. This large area probably is a blend of several stream populations, the strongest of which is Red Butte Creek. A 2003 wildfire burned much of this area. Previously had several culvert barriers but all were fixed in 2004 to allow connectivity. Diverse habitats, generally in good condition but limiting factor is warm water temperatures. Entire watershed is now on National Forest system lands. A naturally confined area just below Hemlock Creek could be a location for a constructed fish barrier. Upstream fish weir in 2004 found some invasion of rainbows and post F1 hybrids but no fluvial cutthroat trout. Kraft Creek has incidental use by bull trout extending to proposed barrier location. Hemlock Lake has recreational fishing and some recreational fishing takes place at bridges. Hemlock Lake stocked with undefined "cutthroat trout" in 1939 and 1969 but westslope cutthroat trout in more recent years. Other lakes in Hemlock and Red Butte basin may be large enough to support fish but status is unknown. Sculpins found in lower reaches (to approximately proposed barrier location) and tailed frogs present throughout.

- *Total length of habitat*: Approximately 11.9 miles
- *Population size*: Estimated at 11,810 age 1+ cutthroat, based on adding the following stream reaches. 2002 estimate of Red Butte Creek is 109 age 1+ per 100m (102-115 CI). Entire stream estimated to be 5,788 (5,415-6,106). 2003 estimate of middle Kraft is 67 age 1+ per 100m (64-70 CI). Upstream relative abundance is 16 per 100m. Entire stream estimated to be 2697 (2600-2794). In 2010, Hemlock Creek had 14.3 age1+ per 100m, thus 3,275 fish (2267-4260 CI). Frenchy is mostly intermittent and assumed to support approximately 50 fish.
- *Genetic purity*: 2003 samples of upper Kraft and Red Butte are 100% pure. 2003 sample in middle Kraft is 95% pure. 2004 sample at proposed barrier location was mixed pure and post F1 hybrids with rainbow.
- *Potential Threats*: Brook trout have invaded but not fully colonized stream. Current distribution is fairly well mapped and has not increased since 2003. Post F1 hybrids have invaded lower areas.
- *Potential Restoration Actions*: Installation of barrier to block further introgression and also to block further brook trout colonization. If brook trout begin to overwhelm populations, may need to suppress.
- *Data needs*: -Population estimate and brook trout distribution in Hemlock Creek
  -Trade off analysis for potential barrier
  - Monitoring of brook trout population expansion
  -Fish distribution and genetic status of headwaters lakes.

Herrick Run

This small population is situated in a tributary stream to Lindbergh Lake. Very high gradient in lower reach seems to have blocked non-native invasions. Population is confined to 0.4 mile low gradient area with access to roughly 1 mile of spawning habitat. Limiting factor is small area and low flows in spawning area. Some habitat restoration may be needed on former Plum Creek land. There are many headwater lakes, of which at least two get recreational fishing. No stocking records available. Probably no fishing takes place in stream.

- *Total length of habitat*: Approximately 1.8 miles
- *Population size*: None available. 2007 relative abundance suggests 290 age 1+ fish.
- *Genetic purity*: 100% pure.
- *Potential Threats*: Small population vulnerable to demographic or stochastic risk.
- *Potential Restoration Actions*: Habitat restoration in headwaters may help recover summer flows.
- *Data needs*: -Population estimate
  -Fish status and genetic status of headwater lakes.

Owl Creek

This is a small population upstream of a culvert barrier on FSR 9558. Culvert appears to be total barrier but not confirmed and some brook trout are found above culvert. Near the culvert ratio is 1:1 brook trout to cutthroat trout but brook trout thin out about half mile upstream. Population is entirely on public land and probably has no recreational fishing. No headwater lakes. Habitat in marginal condition in that is lacks deep pools and experiences substantial bedload movement. Beetle outbreak may continue to stress watershed.

- *Total length of habitat*: Approximately 1.3 miles
- *Population size*: Estimated 147 age 1+ (81.2-211.5 CI). Based on 2003 sample of lower half mile of 16.7 age 1+ (8.52 to 24.81). Upper 0.8 miles estimated at 1 per 100m, based on relative abundances.
- *Genetic purity*: 10 individuals in 2004 tested pure but in sufficient sample size to have confidence.
- *Potential Threats*: Brook trout have invaded but not fully colonized the stream. Brook trout Mmay overwhelm cutthroat trout due to climate change or poor habitat conditions. Small population size is also vulnerable to demographic or stochastic risks.
- *Potential Restoration Actions*: Confirm culvert barrier is effective or modify to be certain. Eradicate brook trout by means of electrofishing.
- *Data needs*: -Evaluation of effectiveness of culvert barrier
  -Monitoring of Brook trout distribution
  -Improved genetic sampling.

Lindbergh - Crystal

This area consists of several possible adfluvial and resident stocks. Little is known about population(s) size and exact distribution. Other than Lindbergh Lake itself, the entire conservation population is within wilderness. Lindbergh and Crystal Lakes receive recreational fishing but rest of area has very little fishing pressure. Primary habitat limitation is high gradient. Rainbow trout and brook trout have been

observed in the river between Lindbergh and Crystal Lakes. This river is also utilized by bull trout, mountain whitefish, sculpin spp. and northern pikeminnow. Gray Wolf Lake and Lost Lake stocked once with undefined "cutthroat trout" in 1954 and lakes still have fish. High Park Lake stocked with westslope cutthroat trout. Crystal Lake stocked with rainbow trout (as recently as 2001) as well as kokanee salmon and undefined "cutthroat trout" in prior years. Many other lakes in headwaters may or may not have fish.

- *Total length of habitat*: Approximately 10.4 miles (excluding lakes)
- *Population size*: None available. 1998 snorkeling of river between lakes suggest 215 age 1+ cutthroat total in this river. Assuming other stream reaches have similar population size, this equates to 1,116 fish total.
- *Genetic purity*: Unknown
- *Potential Threats*: Brook trout have invaded but not fully colonized the river upstream of Lindbergh. They have potential to spread, especially up to Pasture Lake. Rainbow trout have also invaded the river and could potentially hybridize.
- *Potential Restoration Actions*: Needs analysis if this is an appropriate conservation area and feasibility study for restoration.
- *Data needs*: -Population distribution and size estimation for various streams
  -Genetic purity of populations
  - Monitoring of brook trout and rainbow trout population expansion
  -Fish distribution and genetic status of headwater lakes

Synopsis of Data Needs and Potential Restoration Actions

Name	Data Needs	Priority	Restoration Actions	Priority
Wolf	Population Estimate Genetic Status Brook Trout Monitoring Fish status of headwater lakes	Low High Low Medium	Evaluate and secure barrier Private landowner agreement	Medium Low
Sixmile	Population Estimate	Low	Rebuild barrier and secure easement	High
Groom	Population Estimate Genetic Status Brook Trout Distribution	High High High	Needs evaluation	Medium
Bond	Population Estimate Genetic Status Brook trout Distribution Fish status of headwater lakes	Low Medium High Medium	Evaluate barrier feasibility Brook trout suppression, if needed	Low Low
N F Lost	Brook trout distribution Genetic Status Feasibility of creating barrier	High Medium Medium	Create secure barrier Suppress brook trout, if needed	Medium Low
S F Lost	Extent of upstream population	Low	None	
Whitetail	Brook trout distribution nearby Feasibility of additional barriers	High Medium	Brook trout eradication immediately downstream Expand to additional tributaries	High Medium
Soup	Security of natural barrier Extent of upstream population Population Estimate	High Low High	None	
Cedar	Population Estimate	Medium	Evaluate and secure barrier	Medium

	Brook trout distribution Fish status of headwater lakes	Low High	Reduce risk of wildfire	Low
Lion	Population Estimate Genetic Status Fish status of headwater lakes	Medium High Low	None	
Piper	Population Estimate Genetic Status Fish status of headwater lakes Brook trout distribution	Medium High High Low	Reduce risk of wildfire Secure barrier	Low High
Pony	Brook trout distribution Fish status of Pony Lake	Low Medium	Needs evaluation	Medium
Dog	Population estimate Brook trout distribution Fish status of headwater lake	Medium High Low	Needs evaluation	Medium
Cooney	Population estimate Brook trout distribution	Medium Medium	Decision about Hwy 83 culvert Private landowner agreement	High Low
Kraft	Pop estimate in Hemlock Ck Brook trout distribution Feasibility of barrier Fish status of headwater lakes	Medium High High High	Install barrier Suppress brook trout, if needed	High Medium
Herrick Run	Population estimate Fish status of headwater lakes	Medium High	Habitat restoration	Low
Owl	Effectiveness of barrier Genetic status Brook trout distribution	High High High	Secure barrier Eradicate brook trout	High High
Lindbergh-Crystal	Population distribution and size estimates Genetic status Brook and rainbow distribution Fish status of headwater lakes	High High Medium High	Needs evaluation	High