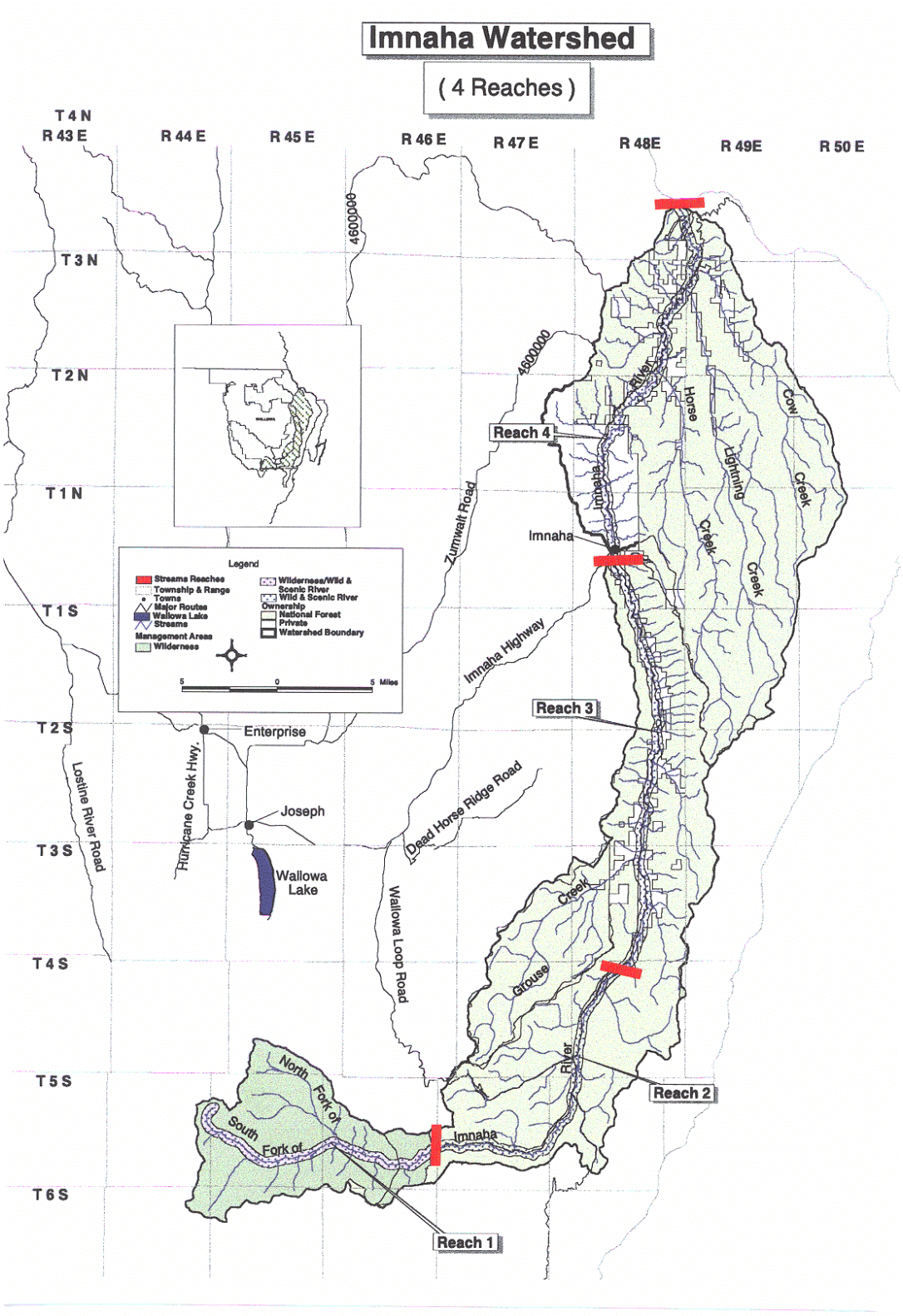
Imnaha Watershed
(4 Reaches)
T 4 N
R 43 E
R 44 E
R 45 E
R 46 E
R 47 E
R 48E
R 49E
R 50 E
T 3 N
T 2 N
T 1 N
T 1 S
T 2 S
T 3 S
T 4 S
T 5 S
T 6 S
4600000
Legend
Streams Reaches
Township & Range
Towns
Major Routes
Wallowa Lake
Streams
Management Areas
Wilderness
Wilderness/Wild & Scenic River
Wild & Scenic River
Ownership
National Forest
Private
Watershed Boundary
5
0
5 Miles
Reach 4
Reach 3
Reach 2
Reach 1
Imnaha
Enterprise
Joseph
Wallowa Lake
Zumwalt Road
Imnaha Highway
Dead Horse Ridge Road
Wallowa Loop Road
Hurricane Creek Hwy.
Lostine River Road
Imnaha River
Horse Creek
Lightning Creek
Cow Creek
Grouse Creek
North Fork of
South Fork of

IMNAHA RIVER[2]

The Imnaha River was analyzed in four reaches:

1. Headwaters to boundary of Eagle Cap Wilderness
2. Wilderness boundary to private lands
3. Private lands to Imnaha store, and
4. Imnaha store to confluence with the Snake River

The Imnaha River is nearly 80 miles long. A maximum discharge of 20,000 cubic feet per second (cfs) was recorded on January 1, 1997. The previous 60-year recorded high was 10,100 cubic feet per second recorded on January 17, 1974. A minimum discharge of 25 cfs was recorded on November 22 and 23, 1931. These were measured at the gauging station near the town of Imnaha, about 19.3 miles from the confluence with the Snake River. The headwaters of the Imnaha are in the Eagle Cap Wilderness below Cusick Mountain and Sentinel Peak. The Imnaha River is part of the National Wild and Scenic Rivers system. It is classified as (1) a Wild River for a 15-mile reach from the headwaters to Indian Crossing, (2) a Recreational River for the 58-mile reach from Indian Crossing to the Cow Creek Bridge and (3) a Scenic River for the lower 4 miles through the Hells Canyon National Recreation Area.

Resource uses along the Imnaha River include recreational use of trails and backcountry in the wilderness area at the head of the river and in the Hells Canyon National Recreation area at the bottom, sheep grazing in the wilderness area, timber harvest on private and National Forest lands, cattle grazing on private lands and National Forest lands along all reaches below the wilderness boundary, and limited feedlot, haying, and orchards in the next to lowest reach. Cattle graze the high country above the Imnaha Canyon in the summer, move down into the canyon area in the fall and winter, and move out again in the spring. Most Feedlots are a year-round operation.

The Imhaha River (together with the Wenaha and Lostine Rivers) historically had the largest runs of spring chinook in Wallowa County. The Imnaha River spring chinook salmon are distinctive in northeast Oregon due to their elongated anal fin and parr marks which are similar to coho. These fish also exhibit spring and summer run timing characteristics when they pass Bonneville Dam and Lower Granite Dam and also spring and summer chinook spawning time characteristics. However, there is no break in the spawning from start to finish, and the fish are managed as one population. Spring chinook spawn from Freezeout Creek to a mile up the South Fork, a distance of 35.2 miles. The run size has declined significantly since the mid-1960's as measured in the index area from the Blue Hole downstream to Mac's Mine, a distance of 9.7 miles. The average redd count in this area from 1964 to 1973 was 281.8 redds. The average redd count from 1979 to 1988 was 97.0 redds. The average redd count from 1989 to 1998 was 61.5 redds.

Fall chinook historically spawned in the lower Imnaha River, possibly as far upstream as

[2]See also Watershed Management - Approaches to Implementing Solutions

the town of Imnaha. The first spawning ground surveys were conducted in 1964 when 9 redds were counted. By 1968, 0 redds were counted. The survey in 1973 again showed no redds. Surveys were reinitiated in 1987, and counts went from 0 in 1987 to 4 in 1991 and 13 in 1998. This increase corresponds to an overall increase in fall chinook returns to the Snake River. Most of the redds have been observed in the lower ten miles.

An active ODFW hatchery program captures migrating chinook adults at the Imnaha River fish weir 30 miles upstream from the town of Imnaha. Some of the fish are used for hatchery egg take while others are released to spawn in the wild. Fertilized eggs are hatched and reared at the Lookingglass Hatchery on Lookingglass Creek, near the Grande Ronde in Union County. Smolts from the hatchery are returned to the Imnaha fish weir for about 4 weeks of acclimation prior to release into the Imnaha River.

Wild fish in the Imnaha have decreased dramatically since the mid-1970's, even though the habitat has remained relatively stable, and subbasin harvest rates have been near zero according to a draft report[3] on the Imnaha River.

In general, the Imnaha watershed is in good condition. However, there are some significant problems with water quality and overall habitat, especially in the lower two reaches. Feedlots are one of the factors that contribute to water quality and habitat problems in the lower 2 reaches. Temperatures recorded at the mouth of Fence Creek reached 74 degrees F. A landslide in the wilderness area headwaters contributes fine sediment to the stream. This excess fine sediment adversely affects gravels for anadromous spawning and has resulted in salmonid kills (possibly due to gill abrasion, which was noted on some of the recovered carcasses). A USFS geotechnical engineer and other employees determined that the landslide that contributed sediment was a natural phenomena not related to human or livestock use (see Appendix F).

Imnaha River--Headwaters to the Wilderness Boundary

Water Quantity

There are no major problems with water quantity on the Imnaha River, but the committee discussed two possible ways to augment water quantity on this reach.

Tree Density (Low Priority)[4]--*Dense thickets of trees resulting from past fire suppression can prevent much of the rain and snow from reaching the ground, and consequently the moisture is lost to the drainage through evaporation or sublimation.*

> Maintenance of healthy watershed conditions, by reducing tree density will provide an optimal, sustainable supply of water. Healthy watershed and forest

[3]Columbia Basin Fish and Wildlife Authority, 1989, Imnaha River Subbasin Salmon and Steelhead Plan, Public Review Draft

[4]This salmon recovery analysis does not advocate increasing water with large-size clearcuts, seed cuts or seed tree cuts. For further discussion of tree density see the forest management approaches in the chapter "Watershed Management - Approaches to Implementing Solutions."

conditions will also supply the water at the optimal times for salmon through snowpack and groundwater recharge and release.

Compaction (Low Priority).--*Compaction from livestock and recreational trails, especially in riparian areas, may result in increased surface runoff and decreased groundwater recharge (i.e. poor timing of streamflow for salmon).*

Manage the recreational and livestock trail systems to maintain and enhance fisheries habitat by reducing compaction and devegetation in the riparian and upland areas which cause surface runoff and prevent infiltration and groundwater recharge.
NOTE: Since the original plan was completed in 1993, the grazing permit that allowed domestic sheep to graze this area has been cancelled.

Water Quality
Excess Fine Sediment (High Priority and Study).--*This problem results from landslides in the headwaters that were caused by heavy rain, soil saturation, and slope failure. Injury to migrating salmon (fish with abraded gills) has been noted.*

Nothing could have prevented the landslides, but there are several possible mitigation measures. One measure would be to stabilize the toes of the slides by planting native and desirable non-native vegetation (the plant mix should include species that can rapidly establish on newly exposed soil and that can form root systems that will stabilize the soil). A supply of seeds for native and desirable non-native vegetation should be kept on hand for planting to stabilize any future slides in the wilderness areas. Other measures include study and management of recreational, livestock, and wildlife trail systems (and their overall use) to ensure that they do not result in further excess sedimentation.

Fuel Density (High Priority)-- *Parts of this reach have high levels of fuels and pose a risk of catastrophic fire and consequent salmon habitat destruction. These levels are in part a natural occurrence and in part due to past fire suppression practices in the wilderness. It is a high priority for treatment but a low probability for accomplishment.*

Prescribed burning in the wilderness, done judiciously, can help reduce the fuel levels and provide fire breaks to prevent large uncontrollable fires. Riparian areas and fuel rearrangement (piling or putting the fuels near the ground to facilitate rotting, judiciously placing fuels to protect streambanks, or placing large woody debris in stream to add to stream structure) may be preferable to burning. Such methods would also keep the organic material as part of the ecosystem, help improve fish habitat, and help prevent sedimentation. Well managed grazing may also help to reduce light "flash" fuels. A prescribed burning plan has been prepared by a local fire control manager for the Wallowa/Whitman National Forest.
NOTE: Since the original plan was completed in 1993, a Wildland Fire Use Program has been completed for the Eagle Cap Wilderness. Several wildfires have been managed for resource benefits under this program.

Herbicides/Pesticides (High Priority).—See County Issues, above.

Other Chemicals (High Priority Study).--*High levels of mercury have been recorded near the gauging station located downstream from this section. This source may be from a naturally occurring cinnabar.*
(See Studies Appendix P)

Sample the water again to test for mercury, and if it reappears do systematic sampling to identify and mitigate the source if possible.

Stream Structure
No problems were identified.

Substrate
Excess Fines (High Priority)
See the solutions for excess fine sediment in the Water Quality Section.

Habitat Requirements
Harassment (Low Priority).--*The only problem the committee has identified for this reach is possible harassment of spawning salmon by recreational users.*

The solutions include education of recreational users and seasonal sport fishery closures.
NOTE: Since the original plan was completed in 1993, an educational program has been conducted through the campground hosts and through the school system.

Imnaha River--Wilderness Boundary to Private Lands

Water Quantity
Tree Density (Possible future problem, Low Priority).--*Dense thickets of trees resulting from past fire suppression can prevent much of the rain and snow from reaching the ground, and consequently moisture is lost to the drainage through evaporation or sublimation.*

Maintenance of healthy watershed conditions by managing fuel loads will provide an optimal, sustainable supply of water. Healthy watershed and forest conditions will also supply the water at the optimal times for salmon through snowpack and groundwater release and recharge.

Compaction (Low Priority).--*Compaction (and devegetation) from livestock trails and grazing, recreational trails, campgrounds, skid trails, and roads (especially in riparian areas) may result in increased surface runoff and decreased groundwater recharge and release (i.e. poor timing of streamflow for salmon).*

Manage trail, campground, and road use to maintain and enhance fisheries

habitat by avoiding compaction and devegetation in riparian and upland areas which cause surface runoff and prevent infiltration and groundwater recharge.
NOTE: Since the original plan was completed in 1993, several campsites in the riparian area have been moved away from the river. Riparian vegetation has been planted, and an educational program has been useful in educating campground users.

Minimum flow (Low Priority).--*Minimum flow is not a problem in this reach at this time, but the committee discussed it because of possible future downstream demands.*

Preserve adequate snowpack shading (tree cover) to maintain flows later into the summer. This will help promote infiltration and groundwater recharge instead of surface runoff.

Water Quality

Temperature (Study, Low Priority).--*There is a concern about temperature on this reach because many of the riparian spruce trees have died due to the spruce bark beetle (Dendroctonus rufipennis).*

Study temperatures and make it a high priority if there is a problem. Preserve existing riparian shading and plant if necessary. Move campgrounds away from river so that dead trees are left to provide shade and large woody debris instead of being removed as hazard trees.
See Compaction.

Excess Fine Sediment (High Priority).--*This problem results from landslides in the headwaters that were caused by heavy rain, soil saturation, and slope failure (see Appendix F on analysis of slides by Forest Service Personnel). Injury to migrating salmon (fish with abraded gills) has been noted.*

Address the landslides as noted above. The committee discussed additional ways to reduce sediment input to the river. One way would be to limit dust from the roads with lignosulfonate, water, chip seal, or asphalt. Roads should be designed and maintained to prevent direct runoff from the road to the river. Use of some roads could be limited (seasonal use and closure). Roads could be revegetated (with limited use) or be closed if necessary. Skid trails should be water barred and revegetated. Lighter skidding equipment or off-ground skidding/decking equipment could also be used to limit erosion. Livestock use should be managed to reduce sediment input. The number of visitors to riparian campgrounds could be limited (by initiating a permit system) to limit sediment input from streamside activities. Campground design could be improved to limit sediment input, and campers and fishermen could be educated to limit riparian compaction, devegetation, and erosion.
NOTE: Since the original plan was completed in 1993, several campsites in the riparian area have been moved away from the river.

Fuel Density (Low Priority).--*Parts of this reach have high levels of fuels and pose a risk of catastrophic fire and consequent salmon habitat destruction. These levels are in part a natural occurrence and in part due to past fire suppression practices in the wilderness.*

Precommercial and commercial thinning could be used to remove fuels as saw logs or chip material. In some cases, especially in riparian areas, fuel rearrangement (piling or putting the fuels near the ground to facilitate rotting, judiciously placing fuels to protect the streambank, or placing large woody debris in stream to add to stream structure) may be used in order to keep the organic material as part of the ecosystem, preserve shade, and prevent sedimentation. Well managed grazing may also help to reduce light "flash" fuels.
NOTE: Since the original plan was completed in 1993, prescribed fire has been introduced into the area to control fuel densities.

Herbicides/Pesticides (High Priority).—See Countywide Issues

Stream Structure
Woody Debris (Low Priority).--*Lack of large woody debris has been a problem in this reach.*

Add or preserve existing large woody debris in the river. Protect and/or plant trees in the riparian area to supply future large woody debris.

Pool/Riffle Ratio (Low Priority).--*Could be improved in this reach.*

Add large woody debris, as mentioned above.

Bank Form (High Priority).--*Bank form has deteriorated along some portions of this reach.*

Move campgrounds away from river, and restrict vehicle access to river in campgrounds. Manage grazing and livestock use to protect the bank form. Educate campers and fishermen about how their actions can create problems with the bank form and overall salmon habitat. Manage recreational use of roads, trails, and campgrounds to protect the bank form.
Reduce compaction as described previously.
NOTE: Since the original plan was completed in 1993, several campsites in the riparian area have been moved away from the river. Riparian vegetation has been planted, and an educational program has been useful in educating campground users.

Substrate
Excess Fine Sediment (High Priority).--*Excess fine sediment in the substrate from the upstream landslides appears to be a problem in this reach.*

The solution to this problem is described in water Quality, above.

Habitat Requirements

Harassment (High Priority).--*Harassment of spawning salmon is a problem in this reach.*

Move campgrounds back from spawning areas. Close sport fishing during spawning season. Plant thorn bushes such as Hawthorn (*Crategus columbiana*), which is native to most elevations in the County, in riparian areas to keep people and livestock away from spawning areas. Educate river users about effects of harassment on spawning fish.

Imnaha River--Private Lands to Town of Imnaha

Water Quantity

Tree Density (Possible future problem, Low Priority).--*Dense thickets of trees resulting from past fire suppression can prevent much of the rain and snow from reaching the ground, and consequently moisture is lost to the drainage through evaporation or sublimation.*

Maintenance of healthy watershed conditions, by managing tree density will provide an optimal, sustainable supply of water. Healthy watershed and forest conditions will also supply the water at the optimal times for salmon through snowpack and groundwater release and recharge.

Irrigation withdrawals (Possible Future Problem, Low Priority).--*There is a possibility of increased irrigation requirements for row crops. This possibility is slight because of the limited area of tillable lands.*

Use efficient methods of irrigation. ODFW has filed instream water rights to maintain optimum flow for salmon habitat (ODFW's instream water rights are junior to most irrigation rights and may not be effective in providing water during low flow periods).

Compaction (Low Priority).--*May result in some habitat problems in this reach.*

Limit bank erosion and destruction by livestock by using physical or electric fencing. Use water corridors or supply alternative water source for livestock. Make sure compaction and devegetation in the riparian (and upland) areas do not cause surface runoff and prevent infiltration and groundwater recharge.

Future demand (Possible future problem, Low Priority).--*Future demands for water may impact water quantity needed for salmon habitat.*

Use efficient methods of irrigation. File instream water rights on the water necessary to maintain optimum flow for salmon habitat. Use zoning and the land use planning process to limit future demands on water, for agricultural or domestic purposes, which would adversely affect salmon habitat.

Water Quality

Temperature (Possible Future Problem, Low Priority).--*There is a concern about temperature on this reach.*

Study temperature and make it a high priority if there is a problem. Preserve existing riparian shading and plant if necessary. Plant or protect conifers in the riparian area to provide thermal cover in the winter.

Excess Fine Sediment (High Priority).--*This problem results from landslides in the headwaters that were caused by heavy rain, soil saturation, and slope failure. Injury to migrating salmon (fish with abraded gills) has been noted. Grazing, logging, road building, and runoff from cropland also contribute some sediment to this reach.*

See "Feedlots" in this section. Manage grazing, logging, road building, and croplands to minimize sediment input.

Fuel Density (Possible Future Problem, Low Priority).--*Fires may destroy vegetative cover and consequently result in sediment input to the river.*

Well managed grazing may help to reduce light "flash" fuels.

Septic (Study).--*Study effects of leakage from septic systems on water quality and salmon habitat.*

If there is a problem with septic systems, limit future development in the County's comprehensive land use plan and improve current systems (ODEQ approved septic systems are required prior to building in Wallowa County).
NOTE: Since the original plan was completed in 1993, septic systems are being moved away from the river on a case by case basis as reviewed by the NRAC Technical Committee.

Feedlots (High Priority).--*Feedlots and other areas of heavy livestock concentration contribute to water quality problems by adding contaminants (sediment, turbidity, nitrates, etc.) to the river. The input from feedlots also decreases dissolved oxygen in the water which stresses or even kills fish.*

Prevent bank erosion and destruction by livestock by fencing livestock away from river and providing water corridor or alternate stock water. Provide filter strip, settling ponds, and/or wetlands to improve quality of feedlot runoff. Monitor wildlife and herd them away from domestic feedlots if they became a problem.
NOTE: Since the original plan was completed in 1993, many feedlots have been moved away from the river and/or at least 35 feet buffer strips have been fenced off. Many improvements were damaged in the January 1, 1997, flood.

Herbicides/Pesticides (High Priority).—See Countywide Issues

Stream Structure

Bank Form (High Priority).--*Heavy livestock use and road fords result in river bank destruction.*

Prevent bank erosion and destruction by livestock through physical or electric fencing. Provide a water corridor or alternate water for livestock. Protect bank in livestock water corridor or road ford with rock of appropriate size.

Ice Flows (Low Priority).--*Ice jams in the river scour the streambed, removing woody debris, etc.*

Preserving or somehow establishing large trees on the bank could possibly help slow the ice flow, and the banks would be somewhat resistant to being wiped out by an ice flow. Dynamiting small ice jams before they get larger and more destructive might be possible.

Substrate

Excess Fine Sediment (High Priority).--*Excess fine sediment in the substrate from the upstream landslides appears to be a problem in this reach.*

See "Imnaha River--Wilderness Boundary to Private Lands" and "Feedlots" in this section.

Habitat Requirements

Harassment (Low Priority).--*Harassment of spawning salmon could be a problem in this reach.*

Close sport fishing during spawning season. Avoid using road fords and engaging in other instream activities during spawning and incubation (August 15-June 1).

Imnaha River--Town of Imnaha to Snake River

Water Quantity

Flushing Flow (Possible Future Problem, Low Priority).--*Increased demand for irrigation upstream may reduce available flushing flow.*

Do not impound or divert needed flushing flow. See "Imnaha River--Wilderness Boundary to Private Lands" and "Feedlots" in this section.

Water Quality

Temperature (Possible Future Problem, Low Priority).--*This reach is at lower elevations, and the climate is hotter than the upper reaches. Lack of shade may allow warming of the water.*

Preserve riparian shading. Plant trees or bushes to create shade where temperature problems are found.

Excess Fine Sediment (Low Priority).--*This problem results from landslides in the*

headwaters that were caused by heavy rain, soil saturation, and slope failure (see Appendix F). Injury to migrating salmon (fish washed up with abraded gills) has been noted. Grazing, logging, road building and runoff from plowed cropland also contribute some sediment to this reach.

See "Imnaha River--Wilderness Boundary to Private Lands" and "Feedlots" in this section. Manage grazing, logging, road building, and croplands to minimize sediment input.

Septic (Study).--*Study effects of leakage from septic systems on water quality and salmon habitat.*

If there is a problem with septic systems, limit future development in the county's comprehensive land use plan, and improve current systems (the Oregon Department of Environmental Quality [ODEQ] has information on improving septic systems).
NOTE: Since the original plan was completed in 1993, septic systems are being moved away from the river on a case by case basis as reviewed by the NRAC Technical Committee.

Feedlots (High Priority).--*Feedlots contribute to water quality problems by adding contaminants (sediment, turbidity, nitrates, etc.) to the river. The input from feedlots can also decrease dissolved oxygen in the water and stress (or even kill) fish.*

Prevent bank erosion and destruction by livestock through fencing livestock away from river and providing water corridor or alternate stock water. Provide filter strips, settling ponds, and/or wetlands to improve quality of feedlot runoff. Monitor wildlife and herd them away from domestic feedlots if they became a problem.
NOTE: Since the original plan was completed in 1993, many feedlots have been moved away from the river and/or at least 35 feet buffer strips have been fenced off. Some of the improvements were damaged by the January 1, 1997, flood.

Herbicides/Pesticides (High Priority).—See Countywide Issues

Stream Structure
Ice Flows (Low Priority).--*Ice flows through the river scour the streambed, removing woody debris, etc.*

Dynamiting small ice jams before they get larger and more destructive might be possible.

Substrate
Excess Fine Sediment (High Priority).--*Excess fine sediment in the substrate from the upstream landslides appears to be a problem in this reach.*

See "Imnaha River--Wilderness Boundary to Private Lands" and "Feedlots" in

this section.

Habitat Requirements

No problems were identified.