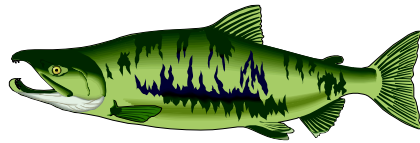


SIXES RIVER WATERSHED

ACTION PLAN



Prepared for

The Sixes River Watershed Council

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September 2001

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ABSTRACT

The *Sixes River Watershed Action Plan* was prepared for the Sixes River Watershed Council whose members are dedicated to sustaining the health of their watershed. This document utilizes detailed information about the Sixes River watershed from the *Sixes River Watershed Assessment* which followed guidelines described in the *Governor's Watershed Enhancement Board's 1999 Draft Oregon Watershed Assessment Manual*. Funding was provided by the Oregon Watershed Enhancement Board, Oregon Department of Environmental Quality, United States Bureau of Land Management, Oregon Department of Agriculture, Curry County Soil and Water Conservation District and Oregon State University Extension Service.

ACKNOWLEDGEMENTS

The completion of the Sixes River Watershed Action Plan was accomplished through the combined effort of private citizens, watershed council members, contracted technical specialists, and local state and federal government agencies. The South Coast Watershed Council would like to thank the following people who generously provided time and energy to improve the quality of this Action Plan. Additional people helped whose names are not included below. We also acknowledge them.

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SIXES RIVER WATERSHED ASSESSMENT SUMMARY

The following is an abbreviated summary of a much larger, in-depth watershed assessment available from the South Coast Watershed Office.

INTRODUCTION

The Sixes River watershed drains approximately 85,645 acres or 134 square miles of land. Sixes River is situated almost entirely within Curry County except for a small area of the Upper Sixes Mainstem subwatershed that extends into Coos County. The Sixes is among the larger watersheds on the southern Oregon coast. Flowing in a westerly direction Sixes River crosses Highway 101 and drains into the Pacific Ocean just north of Cape Blanco. Elevations in the watershed range from sea level to approximately 3,315 feet. Major tributaries include the North Fork, Middle Fork, South Fork, Dry Creek, Edson Creek, and Crystal Creek. The upper portion of the basin is characterized by steeply sloped forested areas with narrow valleys and tributary streams that have moderately steep to very steep gradients. Grazing, rural residential development and other agricultural uses are dominant in the lower portion of the basin. Approximately 69% of the watershed is in private ownership.

History

Most Curry County watersheds have received varying impacts from Euro-American populations during the past 150 years (1850 – 2000). The general landscape pattern for Curry streams and rivers is: timber in the uplands (on public & private industrial timberlands) flowing into broader floodplains in the lowlands, where agriculture and some rural residential use predominates. The period of extensive logging in the Sixes River area was the 1950's and 60's, when for a time the harvest reached a million board feet a day. At one time there were 16 active sawmills in the Sixes River area to process the logs coming off the forest.

Placer mining for gold and minerals has also continued for nearly 150 years, with extensive mining in the upper basin early in the 20th century. In the lowlands, historic reports indicate large spruce/swamp bottomlands, with multiple braided channels and extensive wetlands. Many of the lower portions of the Sixes River and its tributaries were ditched, straightened and channelized to keep standing water off pasturelands. Early settlers also burned timber to clear land for pasture and agriculture.

Watershed Issues

Watershed issues identified by the Sixes River Watershed Council include forestry - timber harvest and weed management. Roads, culvert failures and mining are also of concern.

Ecoregions

Coastal Lowlands make up 8 percent of the basin. Gradients are fairly low, fog and strong winds are common, and rainfall averages 60-85" per year. Strong beaver populations, especially beaver dams, are expected in Coastal Lowland streams.

Southern Oregon Coastal Mountains make up 92 percent of the basin, with steep to very steep gradients, high rates of erosion, and high stream densities. Rainfall averages 79-140" per year. High winds, land slides and fires are expected natural disturbances.

Channel Habitat Types

The Sixes River watershed has the greatest diversity of channel habitat types in the South Coast as well as the greatest length of high response channel types (low gradient moderately confined - LM, and moderate gradient moderately confined - MM). LM and MM channels are scattered throughout the watershed, with the exception of Crystal and Middle Fork Sixes. Estuary and floodplain channels make up 8 percent of the surveyed stream length, and provide many opportunities for protection. Seventeen percent of the stream channels are a low gradient confined type (LC). The confining features are unknown; floodplain terraces vs. bedrock/hillslope walls.

Fish and Fish Habitat Assessment

Stream survey data in Beaver Creek, Middle Fork, Carlton, North Fork, Sugar Creek and the upper half of the mainstem indicate that large conifers in the riparian area are scarce and large wood is generally lacking. Shade is good for all but North Fork Sixes Trib #2. Bank stability is good, with low percentages of active erosion.

Ten barriers to fish passage are reported in the assessment; with three adult barriers, three juvenile barriers, two uncertain juvenile barriers, one adult restricted and one uncertain adult restricted.

Distribution of chinook, steelhead and cutthroat are very similar to historic patterns (see maps within the assessment document). Coho distribution is reduced from historic, likely due to habitat modification in the lower reaches and tributaries. Hatchery influence is minimal, with no stocking since 1963.

Water Quality Assessment

Sixes river water quality is moderately impaired for nitrate, phosphates, and fecal coliform bacteria. The mainstem is 303(d) listed for temperature from mouth to headwaters, and is being investigated for sedimentation. The South Fork is also listed for temperature. Rusty Creek is being investigated for habitat modification and Benson Creek for sedimentation. Water quality is generally moderate to poor.

Water temperatures (7-day maximums) are "warm to very warm". The warmest temperature is on the mainstem above Dry Creek at 76.3 degrees. The coolest temperature for private lands, at the South Fork, is 64.8 degrees.

Riparian (Shade) Assessment

The shade assessment has been completed, but is not fully analyzed.

Wetland Characterization and Functional Assessment

Forty-four wetlands were identified in the Sixes River watershed, with a total of 1373 acres estimated. Three of the wetlands have high restoration potential. Nearly half of the

wetlands are buffered by forest/open space, and most of the remainder by agricultural land. Forty-three percent of the wetland area is connected to another water body, while 30 percent is not connected. Over 80 percent of the wetland areas are in the Lower Mainstem subwatershed. All assessment was done with aerial photos and field visits are needed.

Hydrologic Condition Assessment

This assessment is based on runoff estimates for various landuses and soil cover conditions. Peak flow enhancement is an increase in the strongest, and potentially most destructive, part of the flood curve.

The Sixes River hydrologic assessment determined that risk of peak flow enhancement was low for timber harvest/rain-on-snow event combination, and also for forest roads. There was moderate risk of peak flow enhancement due to agriculture/range use and condition. The Dry Creek subwatershed ranked moderate risk due to rural roads. All other subwatersheds ranked low or N/A.

All of the roads rankings need to be re-assessed to incorporate revised road data. Flow alteration (road drainage and ditched/drain wetlands) is not addressed in this assessment.

Water Use

Water is consistently over-allocated from May to October. Otter, Sugar, and Hayes Creeks are over-allocated year-round. Approximately a third of all water rights are junior to the 1964 in-stream right. The in-stream right is not usually met even in wet years.

The Lower Mainstem Sixes and Crystal Creek are rated as priority stream flow restoration areas. These two subwatersheds also have the highest potential for stream flow restoration through conservation measures.

Sediment

The assessment of sediment process in the Sixes River focuses on the density for roads built on slopes greater than 50 percent, and the density for stream/road crossings. Lower density rankings are assumed to have less potential for contributing sediment than high. These rankings are relative to all South Coast subwatersheds.

Six subwatersheds ranked low density for roads on steep slopes, two rank low/moderate density and two rank moderate density. Dry Creek subwatershed ranked as the highest density of all South Coast subwatersheds for roads on steep slopes, and the Lower Sixes Mainstem subwatershed ranked as second lowest.

Three subwatersheds ranked low or low-moderate density for road crossings; four ranked moderate, and three (Elephant Rock, Dry and North Fork Sixes) ranked moderate-high density. The Big and Otter area ranked high for density of road crossings.

SIXES RIVER WATERSHED SYNTHESIS

The Sixes River Watershed is contained mostly in the Southern Oregon Coastal Mountains with high natural erosion rates and steep slopes. The lower end of the watershed is within the Coastal Lowlands ecoregion and has very gentle gradients and low erosion rates. The watershed is 93 percent forest and 7 percent agriculture/rural use. National Forest lands cover about a quarter of the watershed, primarily in the Dry Creek (Grassy Knob Wilderness Area), South Fork Sixes, and the Big and Otter Area. The southern half of the watershed has topography similar to the Elk watershed, with steep slopes and less stable sediments. The northern half is more like Floras/Coquille topography, with more moderate slopes.

The Big and Otter Area has a high density of road crossings. Elephant Rock, Dry and North Fork Sixes are moderate-high density for crossings. Crystal Creek, Edson Creek, the Middle Fork, and South Fork Sixes are moderate density of crossings. In density of roads on steep slopes, Dry Creek is ranked high, and the South Fork Sixes and Big and Otter Area are ranked moderate.

Risk of peak flow enhancement (PFE - increased stream power) due to agriculture in the Beaver Area, Crystal Creek, and the Lower Sixes Mainstem is rated as moderated to low. Risk is rated as moderate in Dry Creek due to rural roads, though it is only on 208 acres. Risk of PFE due to timber harvest, and forest roads is low in all sub-watersheds.

Channel habitat types were the most diverse of any South Coast watershed, with a high amount of low/moderate gradient moderately confined channels (the best for restoration). These high response channel types are located throughout the watershed.

Coho distribution is spread widely through the watershed, with only the South Fork Sixes blocked by natural falls. Chinook distribution is similar, with more limited use in the upper watershed. Steelhead distribution is very widespread, including the entire mainstem and all significant tributaries. An area of coho habitat in the upper Sixes Mainstem may have good potential for restoration. Dry Creek is very high quality spawning habitat, especially in the lower portion. The Sixes estuary is the most complex of any on the South Coast, with large wood, large size and a variety of habitats available.

Riparian vegetation is strong in Sixes watershed, with lots of mature forests to contribute large woody material to the stream and provide high quality shade. Expansion of gorse populations are a large concern. In some areas riparian stream cover seems to be receding, possibly due to high sediment loads and channel movement.

Water use in the Sixes watershed is a concern. Crystal and Edson Creeks do not meet their in-stream water rights in July, August, and September. The Mainstem Sixes water right of 25 cfs is usually not met, either. Many out-of-stream rights are junior to the in-stream right or are storage/time limited rights. Cranberries are the largest users of water in the system, and typically have storage rights. Two "mining" rights in the South Fork total 75 cfs.

Water quality is a concern in the Sixes watershed. The Mainstem Sixes and the South Fork Sixes are 303(d) listed by the Department of Environmental Quality (DEQ) for temperature concerns. The Mainstem and Benson Creek are being investigated for sedimentation issues, and Rusty Creek is under investigation for habitat modification. Measurements of chemical water quality at the Highway 101 bridge show moderate impairment for nitrate, phosphate and fecal coliform bacteria. Dissolved oxygen levels are low in the summer months. Heavy metals contributed by mining activities are a concern, especially near the Sixes River recreational mining site. High turbidity (compared with Elk river) is a result of both soil clay content and more intensive land management. Channel dimensions may be changing with present sediment load.

Temperatures are warm to very warm. The highest measurement was 76 degrees F, taken in the mainstem above the confluence with Dry Creek. Water temperatures in the mainstem increase considerably in the reach between Elephant Rock and Dry Creek, and again between Edson Creek and Highway 101.

The Sixes watershed has 44 different wetland areas, containing about 1,372 acres. Nearly all are in the lower watershed, with roughly a third having low alteration and good restoration/protection potential. A number of opportunities exist for reconnecting wetlands to the mainstem for providing better off-channel coho rearing habitat.

Limiting factors to fish production and water quality in the Sixes watershed appear to be water use and water quality (temperature and chemistry, possibly pollution), as well as a lack of large pools and wood in the mainstem for fish habitat. Sediment transport/storage and noxious weed invasion are also of concern.

SUBWATERSHED SUMMARIES

Lower Sixes Mainstem

The Lower Sixes Mainstem is contained within the Coastal Lowlands ecoregion and is primarily used for forestry (46%) and agriculture/rural residential (51%). Most of the subwatershed is in private ownership, with the exception of Cape Blanco State Park. Most (36 of 44) of the wetlands within the Sixes watershed are within this subwatershed. Conditions and buffers are mixed, and several wetlands have potential for either restoration or protection.

Channel habitat typing revealed more than 12 miles of floodplain and estuary channels and less than a quarter-mile of low-gradient confined channel. The Sixes River estuary is the most complex of any on the South Coast. Anadromous fish distribution is shown in the mainstem Sixes only for chinook, coho and steelhead. Two uncertain barriers to juvenile migration exist in the subwatershed, as well as one certain barrier to adult migration.

Water quality is moderately impaired for nitrates, phosphate and fecal coliform bacteria. The Sixes River from the mouth to headwaters is on the DEQ 303(d) list as limited for water temperature and is being investigated for sediment listing. The upper end of the subwatershed is identified as a heating reach with 7-day maximum temperatures reported in the low 70's. Mature and/or high reproduction riparian forest for shade and large wood values is very limited.

Risk of peak flow enhancement (increases in stream power due to landuse) is rated as moderate to low for agricultural/range use. Risk is low for timber harvest, forest roads and rural roads. Considerable areas of low infiltration soils exist in the floodplain and lower end of the subwatershed.

The lower Sixes River mainstem is listed by ODFW and OWRD as a Streamflow Restoration Priority Area. Considerable water is allocated for cranberry and mining use. Thirty-four percent of out-of-stream water rights are junior to the in-stream water right.

Sediment analysis rated this subwatershed low density for roads on steep slopes and low density for stream crossings.

Crystal Creek

The Crystal Creek subwatershed is contained within the Southern Oregon Coastal Mountains (87%), and the Coastal Lowlands (13%). Forestry is the dominant land use, and ownership is almost entirely private. Three wetlands are located within this subwatershed, all with moderate to high degrees of alteration.

Channel habitat typing results show less than a mile in low-gradient confined reaches and more than 2 miles in floodplain reaches. Most of the 18 miles assessed are moderate to steep gradient and confined by hillslopes.

Coho and chinook use the lower half of the Crystal Creek mainstem and steelhead use the entire mainstem. No barriers to fish migration are reported.

Water temperatures (7-day maximums) are recorded from the high 60's to low 70's. Mature or high reproduction riparian timber is scarce in Crystal Creek, with some spruce noted in the middle subwatershed. Water is over-allocated from April to November. Crystal Creek is listed as a Streamflow Restoration Priority Area by ODFW and OWRD.

Hydrologic assessment rated Crystal Creek moderate risk of peak flow enhancement (increased stream power) due to agricultural use and low risk for timber harvest, forest roads and rural roads.

Sediment analysis ranked Crystal Creek as low density for roads on steep slopes and moderate density for stream crossings when compared to all South Coast subwatersheds.

Beaver Area

The Beaver Area subwatershed is contained within the Southern Oregon Coastal Mountains (91%) and the Coastal Lowlands (9%). More than 80 percent of the subwatershed is managed for forestry uses. Channel habitat typing shows nearly six miles of highly responsive/sensitive channels. Nearly 2 miles are within floodplain reaches. One mile is listed as low-gradient confined. Four wetlands are identified in this subwatershed.

Aquatic habitat surveys of Beaver Creek in 1997 show a lack of large riparian conifers, good shade levels and little bank erosion. Pools are fairly common with considerable area, but have shallow residual depths and little complexity. Gravel habitat for spawning is common, but of moderate quality. Large wood is scarce.

Coho and chinook use the Sixes mainstem and part of Beaver Creek. Steelhead use the Sixes mainstem and all of Beaver Creek mainstem. Four barriers to fish migration are reported. Three are barriers to juvenile migration (one uncertain), and one has restricted passage for adults.

Temperatures (7-day maximums) are recorded in the low 70's. The lower half of this subwatershed is identified as a heating reach on the Sixes mainstem. Large riparian conifers for shade and large wood values are very limited. Unrestricted cattle use of the river is a concern.

Hydrologic assessment of the risk of peak flow enhancement (increases in stream power due to landuse) rated the Beaver Area moderate for agricultural use and low risk for timber harvest, forest roads and rural roads.

Sediment assessment ranked the Beaver Area as having a low density for roads on steep slopes and low density for stream crossings.

Edson Creek

The Edson Creek subwatershed is contained entirely within the Southern Oregon Coastal Mountains with mostly forestry landuse (96%). Channel habitat typing shows that all but one mile of stream is confined by hillslopes.

Coho, chinook and steelhead use the lower third of the Edson mainstem. One barrier to juvenile fish migration is identified at the lower end of the subwatershed.

Temperatures (7-day maximums) are reported in the mid 60's. Upper reaches have mature and/or high reproduction conifer forests in the riparian area for shade and large wood values. Mining, mercury, and turbidity are concerns to water quality in this subwatershed. Stream flow is over-allocated from April to October.

Edson Creek subwatershed is low risk for peak flow enhancement (increases in stream power due to landuse) for timber harvest, forest roads, and rural roads. Sediment assessment ranked Edson Creek as low to moderate density for roads on steep slopes and moderate density for stream crossings.

Dry Creek

The Dry Creek subwatershed is entirely within the Southern Oregon Coastal Mountains ecoregion and contains a portion of the Grassy Knob Wilderness Area. Channel habitat typing on the few miles of private land below the National Forest Boundary shows one mile of low-gradient moderately confined stream, and nearly three miles of low-gradient confined stream.

Chinook, coho and steelhead use the lower half of the Dry Creek mainstem. Spawning counts of chinook salmon are very high in this stream. No barriers to fish migration are reported.

Water temperatures (7-day maximums) are in the mid to high 60's. Nearly the entire upper 80 percent of the basin has high reproduction and mature conifer forests for high quality shade and large wood recruitment.

Risk of peak flow enhancement (increases in stream power due to landuse) is listed as moderate for rural roads, though only a small number of acres are affected. Risk is rated as low for timber harvest and forest roads.

Sediment analysis ranked Dry Creek as high density for roads on steep slopes and moderate to high for stream crossings. Only the non-National Forest land was considered. Section 36, within the National Forest boundary was harvested in the past and is still contributing considerable amounts of sediment.

Elephant Rock

The Elephant Rock subwatershed is within the Southern Oregon Coastal Mountains and is almost entirely privately owned. Forestry is the dominant (99%) landuse.

Most of the stream reaches in the Elephant Rock subwatershed are confined by hillslopes. Of the remaining reaches, more than six miles are low-gradient confined reaches, less than a quarter mile has an active floodplain, and 1.8 miles are identified as low- or moderate-gradient moderate confinement (high response reaches).

Chinook and coho use the mainstem Sixes and a short length of one tributary. Steelhead use the mainstem Sixes and the two larger tributaries within the subwatershed. Two barriers to adult migration are identified.

Temperatures (7-day maximums) are recorded in the high 60's and low 70's in the mainstem below Elephant Rock, and in the mid 70's above Dry Creek. The lower half of the mainstem Sixes in this area is a heating reach. The upper end of the subwatershed has some high reproduction and/or mature forest within the riparian area with shade and large wood values.

Risk of peak flow enhancement (increases in stream power) though landuse rated low for timber harvest, forest roads and rural roads.

Sediment analysis of the Elephant Rock area rated low to moderate density for roads on steep slopes and moderate to high density for stream crossings. An existing slide on the mainstem Sixes in this subwatershed was re-activated in 1996. The BLM recreational mining site and Inman Mine are located in the upper end of this subwatershed.

Big and Otter Area

The Big and Otter Area is within the Southern Oregon Coastal Mountain ecoregion and is entirely managed for forestry. The federal government, mostly the Forest Service, manages over forty percent of the subwatershed.

A 1993 ODFW survey of the mainstem showed low numbers of riparian conifers in the riparian zone, good stream shade, moderate pool conditions, and moderate spawning habitat. Levels of large wood were low. Channel habitat typing on the private sections, show 4.5 miles in low-gradient confined reaches, and less than a half mile in highly responsive/sensitive reaches.

Coho and chinook distribution include the mainstem, and for steelhead, the mainstem and north tributaries. No barriers to fish migration are reported. Stream flow in Otter Creek is over-allocated for the entire year.

The lower end of the Sixes mainstem in this subwatershed has high reproduction and/or mature riparian forest to provide shade and large wood.

A hydrologic assessment shows low risks of peak flow enhancement (increases in stream power due to landuse) for timber harvest and forest roads. Agricultural use and rural roads were not an issue in this subwatershed.

When compared to all South Coast subwatersheds, Big and Otter Area ranked moderate density for roads on steep slopes and high density for stream crossings. Both rankings are of concern for sediment sources.

North Fork Sixes

The North Fork Sixes is within the Southern Oregon Coastal Mountains ecoregion and is almost exclusively managed for forestry. The North Fork subwatershed is almost entirely privately owned, with a very small number of acres in state management.

Channel habitat typing shows one mile as highly responsive/sensitive, and almost 6 miles as low-gradient confined. ODFW surveys of Carlton, the North Fork and its tributary in 1993, show a lack of riparian conifers, good to moderate pool conditions, and moderate to good riffle conditions. Carlton Creek had desirable levels of wood, while the other surveyed reaches did not.

Chinook use the mainstem North Fork and some area above the forks, in the lower third of the subwatershed. Coho use all of the mainstem and a greater extent of the northern upper fork. Steelhead use the mainstem as well as extensive lengths in both upper forks. No barriers to migration are reported. No mature and/or high reproduction conifer forest is recorded in the North Fork.

Risk of peak flow enhancement (increases in stream power due to landuse) is rated low for timber harvest, forest roads and rural roads.

Sediment analysis showed a moderate to high density for stream crossings and a low density for roads on steep slopes, when compared to all South Coast subwatersheds.

Upper Sixes Mainstem

This subwatershed is within the Southern Oregon Coastal Mountains ecoregion and is mostly managed for forestry uses (92%). The Upper Sixes subwatershed is almost entirely privately owned.

Nearly half of the stream miles assessed are within steep confined reaches, with almost eight miles in low-gradient confined reaches, and 1.5 miles in moderate gradient, moderately confined reaches. According to 1993 ODFW surveys on the upper Sixes and 1994 surveys of Sugar Creek, large riparian conifers are absent, shade is good, and bank erosion is minimal. Surveys rate pool conditions as undesirable in Sugar Creek and moderate in Sixes Reach 2. Riffle habitats are rated as moderate, and large wood levels undesirable. Low gradient sections in this subwatershed may have good potential for coho habitat improvement.

Chinook use the mainstem, coho use the mainstem and the east tributaries, and steelhead use the mainstem, east tributaries and west tributaries. No barriers to fish migration are reported. Mature and high reproduction conifer forests are lacking.

Risk of peak flow enhancement (increases in stream power due to landuse) is ranked low for timber harvest, forest roads and rural roads.

Sediment assessment shows a low density for roads on steep slopes in the Upper Sixes, and a low to moderate density for road crossings.

Middle Fork Sixes

The Middle Fork Sixes is contained within the Southern Oregon Coastal Mountains and is all managed for forestry use. More than 2,200 acres are managed as National Forest in the upper portions of the subwatershed. Nearly all of the miles of stream assessed for channel type are confined with moderate or steep gradients. Of the remainder, 0.6 mile is low-gradient confined.

A 1993 survey of channel habitat conditions by ODFW showed low number of large riparian conifers, good stream shade, undesirable pool conditions, and moderate riffle conditions. Levels of large wood were low.

Chinook use the lower mainstem Middle Fork, steelhead use most of the Middle Fork mainstem, and coho use all of the Middle Fork mainstem and lower tributary. No barriers to fish migration are reported.

Peak flow enhancement risks (increases in stream power due to landuse) are rated low for timber harvest and forest roads. Agricultural use and rural roads were not an issue.

The Middle Fork Sixes is ranked as low density for roads on steep slopes and moderate density for stream crossings.

South Fork Sixes

The South Fork Sixes is contained within the Southern Oregon Coastal Mountains ecoregion and is entirely managed for forestry values. Most of the subwatershed is within the National Forest.

Of the 2.4 miles assessed for channel habitat type, less than a quarter mile is moderately confined. All other reaches are confined by hillslopes.

Steelhead use the mainstem South Fork. Coho and chinook do not. No artificial barriers to fish migration are reported.

The South Fork Sixes is DEQ 303(d) listed as water temperature limited. Rusty Creek is being investigated for habitat modification and Benson Creek for sediment concerns. Water temperatures (7-day maximums) were recorded in the low 60's until 1999, and then in the low 70's for 2000. The coolest section, in the lower end, is 64.9 degrees. Most of the South Fork has high reproduction/mature forests for shade and large wood recruitment.

Risk of peak flow enhancement (increased stream flow) is rated as low for timber harvest and forest roads. Agricultural use and rural roads were not an issue.

The South Fork has two very large water rights for mining that are senior to most all others. Actual use is not known.

Sediment analysis ranks the South Fork as moderate density for roads on steep slopes and moderate density for stream crossings. Two upper tributaries contribute considerable amounts of sediment to the South Fork. The Cinnabar Mine is located in this subwatershed.

ACTION ITEMS

This list is a product of a synthesis process by natural resource specialists with extensive experience on the South Coast, who reviewed and discussed the watershed assessment for Sixes River. Input from watershed councils is also incorporated. Actions are focused on addressing limiting factors and are listed in order of relative importance, based on the impressions of the resource specialists. For a more complete list of restoration, protection, outreach and assessment activities, refer to the Curry Action Plan. All action items are voluntary, with complete respect for private property rights.

1. Wetland connectivity in lower watershed.

Field check wetlands for functionality and where possible, reconnect to another waterbody.

2. Build partnerships among ranches, timber companies, cranberry farmers, artists, environmental groups, and other interested parties.

3. Water quality monitoring.

Institute broad spectrum water quality measurements, including mercury, to identify limiting factors and provide feedback on restoration efforts.

4. Riparian silviculture.

Plant riparian vegetation for shade and large wood values, where appropriate and with proper protection.

Encourage natural conifer regeneration where possible

5. Outreach/education for water quality and sediment – small woodland, big ranches, cranberry farms.

Work with landowners and residents on protecting water quality and sediment issues.

6. Road surveys for Big Otter, Dry Creek, Elephant Rock and North Fork Sixes.

Assess subwatershed roads and crossings for suitability, design, and risk of failure.

7. Ranches – potential for coho habitat.

Explore wetlands/riparian improvement potential of agricultural areas in upper watershed for coho habitat.

8. Protect/enhance/restore estuary habitat.

Obtain conservation easements or property ownership where possible.

Expand estuary size and increase complexity, mimicking natural processes of saline water exchange and deposition as much as possible.

9. Modified stream survey to document channel widening for riparian stabilization.

Identify stream reaches where sediment is stored.

Use a simplified stream survey method to document channel changes, relative to riparian planting and sediment stabilization projects.

10. Protect existing private riparian forests.

Where possible, protect high reproduction, mature and old growth riparian conifer forests for shade and large wood values.

11. Forfeiture/enforcement of water rights.

12. Forage/range management plans in upper watershed.

Work with landowners in the upper watershed on fish friendly range and forage management plans, where necessary.

13. Uncontrolled livestock access.

Identify reaches where livestock have uncontrolled access to riparian vegetation. Work with landowner/managers on alternatives, where needed. Encourage off-stream watering wherever possible.

14. Add large wood on tributaries.

Identify reaches that are appropriate for large wood additions, considering sediment stabilization and fish habitat concerns.

15. Fix fish passage problems.