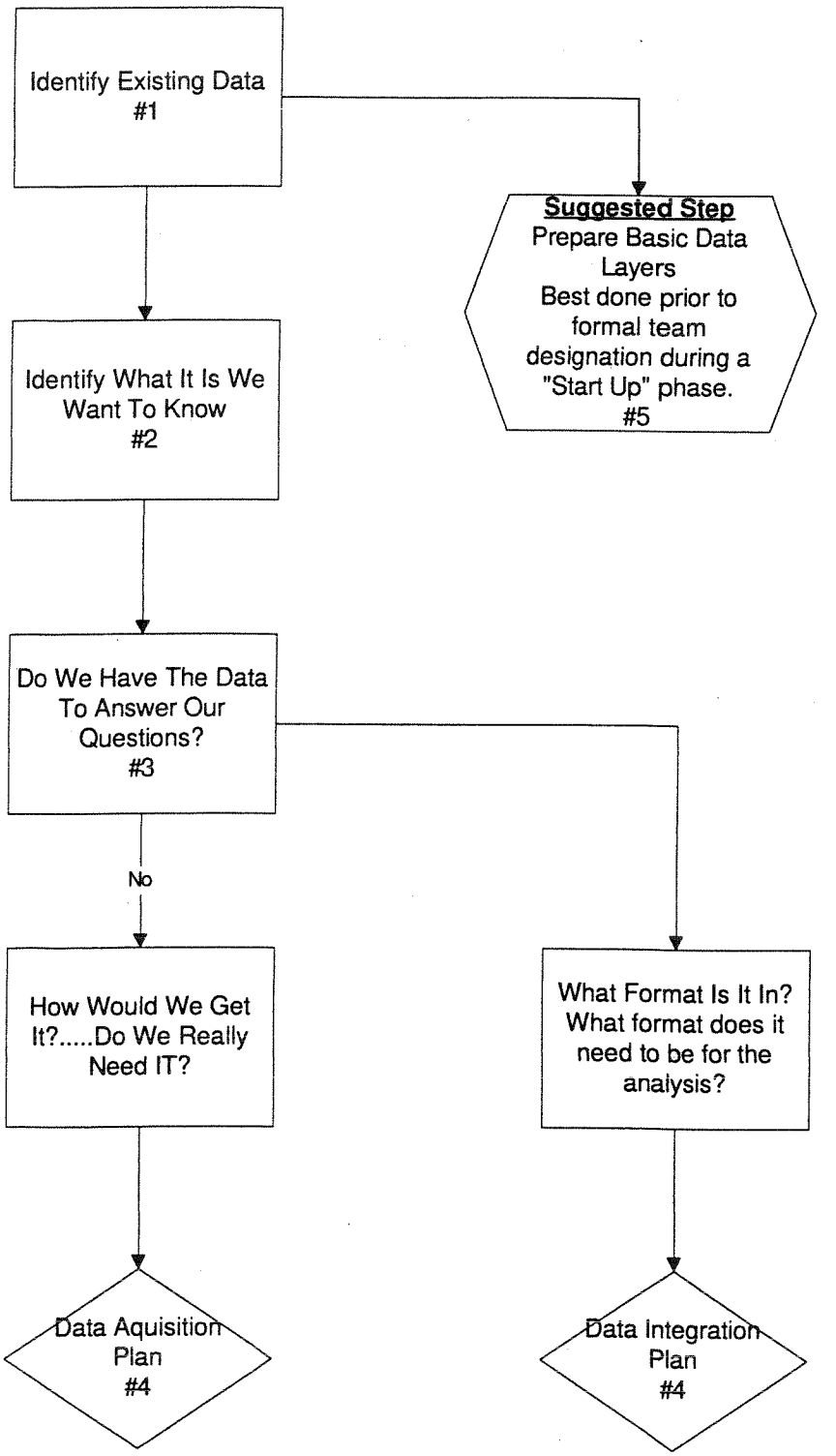
Process & Analytical Tools

(Process)

South Fork Watershed Analysis Information Needs Assessment



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South Fork WA Information Process
Outline of Information Needs Assessment

I. Information Management Structure:

- Information Manager/Analyst
- 2 GIS persons (one 70+%, and one 30%)
- We had a single user Arc/Info station that one GIS person ran.
- MOSS
- SO support with Arc/Info

⇒ Information Manager/Analyst
The information manager may have played a unique role in the in the WA process so to give you an idea of the duties.

- Provide a central contact to the core team.
- Interpreting and scheduling GIS information requests
- Determine what resources would be needed (Was this something we could handle outside A/I, complete on the PC, who would do it)
- Look out for possible inconsistencies with data requests. (Were individuals utilizing different stratification layers for similar objectives, etc.)
- Facilitate the INA process and oversee the data acquisition.

II. The Process

- Step 4 in the Watershed Analysis guide calls for assembling analytical information. The South Fork team accomplished this step through a scaled down but structured INA process . The process is represented in simplified form on the flowchart in this package.

#1 Identify Existing Data

- We accomplished this through the team filling out a form that ask for:

I. Type of information
II. The source of that information (aerial photo, stream survey)
III. Main contact for that information
IV. What media did it currently reside on (PC database, paper, etc.)
V. Integrity and a couple more

- This information was assembled into a database and indexed.
- A couple of things about this process:

  We documented 115 data sources that were at least pertinent to our watershed and very little of those data sources were GIS layers.
  Secondly this part of the process did not take that much time or effort.

#2. Identify What It Is We Want To Know

- This was accomplished by identifying key questions. (See WA guidebook)

#3 Identify What Data We Need

- This part was the crux of the process. Step 2 in the Blue Book leads you to an analytical process and eventually data needs through the identification of key processes, functions and conditions. We had great difficulty going down that avenue so created a form that took us from the key question to the data needed to answer it and a rough outline of what we would do with the data.
- The form included the key questions boldly printed at the top of the page followed by a table that lists the data needed to answer that question, whether the data existed, if not the data collections needed to acquire the data, and finally what media was needed for that data.
- Below that was a very rough outline of the analytical process.
- This process was very beneficial to us because:

I. It got us seriously thinking about the key questions as a team and exactly what it would take to answer those key questions.

II. It was the beginning of a tracking process that would document how we did our analysis.

- This process took longer that we anticipated

  Partly we were struggling on how much detail to include
  We were reviewing our key questions as we went along
  And we found that doing the homework needed before coming together as a group was crucial to moving the process along.

#4. Data Acquisition Plan

With the INA completed the information manager was able to sit down and:

* identify exactly what data was needed
* what was needed to make the data come alive (correct media)
* what was the high priority data (if several questions relied on a particular piece of information it received a high priority)

#4 Data Integration Plan

- Included in the Data Acquisition Plan

#5. Suggested Step

We started the whole information process at the same time as step 1 but soon realized that was not soon enough. After going through the process we recognize that there are some layers that are so essential to any analysis of this scale that they should be prepared during a formally recognized Startup Phase which would occur before step 1. We identified vegetation, soils, and streams as those layers that would be a part of the Startup Phase .

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
DISTRICT PROJECT INPUT	R SEITZ	TMBR SALES, FISH PROJECTS,	DISTRICT FILES	VARIES	DISTRICTWIDE	MOD		Project input ranges from very general to site-specific	A001	
VEGETATION CONDITION	M MCSWAIN	AERIAL PHOTOS	9X9 PHOTOS	1 10 - 1 12,000	FORESTWIDE	HIGH	Good integrity	Photos for 1930, 1959, 1967, 1972, 1988, 1990 Resolution varies from 1 10,000 to 1 12,000	A002	
OLD FIRE MAPS 1914	D HOWELLS	STATE OF OREGON GIS, SALEM	ARC/INFO	1" /MILE	WESTERN OR	MOD	Low to moderate integrity Good for province level analysis and historical context	Contains stand conditions Contact Dan Howells works for the Eugene District of the BLM Also Dean Vendrasco on McKenzie RD Has some registration problems	A003	
OLD FIRE MAPS 1900	C MCCAIN	STATE OF OREGON	PAPER	1/2 /MILE	STATEWIDE	MOD	Low integrity used as reference Good for province level analysis and historical context	Disturbance maps from 1900 May be digitized by the BLM state office Additional contact is Dan Howls of BLM and Dean Vendrasco of McKenzie RD Has some registration problems	A004	
AUGUSTA FIRE MAPS	J CISSEL	AUGUSTA FIRE HISTORY STUD	ARC/INFO	APPROX 100 AC	AUGUSTA	HIGH	Excellent integrity		A005	
FIRE EVENTS (TEENSMA/MORI	G LIENKAE	Ph D DISSERTATION	ARC/INFO		HJA, DEER CK	MOD	May be useful for fire regimes	Intrepretation of fire events from dendrochronology and tree ages George Lienkaemper at FSL phone # 750 7343 Mapped tree ages, fire scars to generate 30 event maps	A006	
SLOPE, ASPECT, ELEVATION	K ADEE	USGS DIGITAL ELEVATION MOI	ARC/INFO	30 METERS	FORESTWIDE	HIGH			A007	
VEGETATION CONDITION	G MARSH	ORTHO PHOTOS HALF QUADS	MYLAR	1 24000	FORESTWIDE	HIGH	Good integrity		A008	
1930 FIRE MAPS	D HOWELLS		PAPER MAP	1" MILE	STATEWIDE	MOD	Low, used as a reference Good for province level analysis and historical context	BLM may be digitizing	A009	
F SEIS FOR SP OWL ET AL	N FORREST	FEMAT	PAPER	N/A	REGION 5&6	HIGH	Moderate		A010	
FIRE HISTORY								Thesis done by Constance	A011	
REAP DATA	J MARTIN	AREA ECOLOGISTS FROM R6	PAPER		REGION 6	HIGH	Moderate	Data was completed by teams of specialists from each forest Timelines were tight and did not leave time for detail analysis	A012	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
UATERTOWNSHIPS	K ADEE	PRIMARY BASE SERIES?	ARC/INFO	QUATERTOWNSI	FORESTWIDE	HIGH	Good		A013	
TREAM HABITAT	FISH BIOS	SMART & WRITTEN REPORTS	ORACLE	1' FOOT	CLASS I&II		1990 SURVEYS OF LESSER QUALITY 1991-1993 SURVEYS OF BETTER QUALITY	Includes length, area, pool/riffle/glide/slide channel area, in-channel wood, gradient, valley width, substrate and bank material, temp, and more Lacking Critical information on width depth and substrate in some cases (because what was collected was not precuse ir didn't provide total cover	F001	
TREAM HABITAT	S GREGORY	RAW DATA TABLES & PC DATA	PC DISCS & BOOK	1/10 METER	S FORK		Data good, though parameters differ slightly from USGS (e g size classes of instream wood)	Contains stream characteristics for S Fork McKenzie May be available for Augusta Contacts can be reached at Stan Gregory 737-1951 and Linda Ashkenes 737-1966	F002	
ISH DISTRIBUTION	FISH BIOS	1974 SURVEYS	PAPER	STREAM MILE	VARIES		ID of speicies good, however only game species (trout % salmon) covered	Significant gaps in space or time	F003	
ISH DISTRIBUTION	FISH BIOS	LEVEL II SURVEYS	PAPER & SMART	STREAM MILE	VARIES		ID of speicies good, however only game species (trout % salmon) covered	Significant gaps in space or time No fish distribution in SMART Still on paper Jim Capuraso may have latest fish surveys in SMART	F003	
ISH DISTRIBUTION	FISH BIOS	ODFW	PAPER	STREAM MILE	VARIES		ID of speicies good, however only game species (trout % salmon) covered	Significant gaps in space or time	F003	
ISH DISTRIBUTION	FISH BIOS	OSU SURVEYS	PC DATA	STREAM MILE	VARIES		ID of speicies good, however only game species (trout % salmon) covered	Significant gaps in space or time	F003	
TREAM HAIBITAT	FISH BIOS	PNW 1937 SURVEYS	PAPER	STREAM MILE	VARIES		ID of speicies good, however only game species (trout % salmon) covered	Significant gaps in space or time	F003	
TREAM CHANNEL	M MCSWAIN	USFS "G-P METHOD" SURVEYS	PC & PAPER	1' FOOT	VARIES		Good integrity	Some extra time needed to analyze it for fish subject area versus hydrology, i e to make it compatible with USFS II survey Covers mostly class I &II, some III'S possible	F004	
IO PROBES		F S SURVEYS	PAPER					Covers 1990 - 1991	F005	
AM PROJECTS REPORTS			PAPER						F006	
TATE BASIN REPORTS			PAPER						F007	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
TEMPERATURE & BIOLOGICAL			PAPER						F008	
WSTCS REPORT 1987			PAPER						F009	
LITHOLOGY, STRATIGRAPHY	D SHANK	PUBLICATIONS	ARC/INFO	R BASIN - QUAD	WEST CASCAI	HIGH	Sufficient detail for good overview High degree of reliablilty	Provides geologic history at proper scale Example publications Landforms of the McKenzie, Geology of Oregon, Geology Map of the McKenzie Bridge Quadrangle, DOGAMI Geology Map of Oregon, Additional contact M Long Also covers Geomorphology	G001	
SOIL, BEDROCK & LANDFORM	D SHANK	FOREST SRI (1973)	PAPER	PHOTO RECON	FORESTWIDE	HIGH	Data is acceptable for broad scale forest level assessments, not suitable for anlysis level efforts	Provided in a forest database.	G002	
SOIL, BEDROCK & LANDFORM	D SHANK	FOREST SRI (1990)	ARC/INFO	PHOTO RECON	FORESTWIDE	HIGH	Data is acceptable for broad scale forest level assessments, not suitable for anlysis level efforts		G002	
LANDFORMS	J CISSEL	JOHN CISSEL & GORDON GRAI	ARC/INFO	1 625000	AUGUSTA	HIGH	Integrity not known, needs to be field verified	Arbitrarily delineations of areas Built from contour lines	G003	
DSRI	D SHANK	FIELD SURVEYS	ARC/INFO		SOUTH FORK	HIGH	Excellent		G004	
STREAM TEMPERATURE	USGS	USGS WATER RESOURCES DA	DIGITAL & PAPER	DAILY	BELOW DAM		Good integrity	Covers 1955 - current year Includes Mean, Max, and Min Additional contack is M McSwain	H001	
DISCHARGE	USGS	USGS WATER RESOURCES DA	DIGITAL & PAPER	DAILY	BELOW DAM		Good integrity	Covers 1947 - current year Incluedes daily average, daily average min, daily average max, annual instantaneous max Additional contact is M McSwain	H002	
DISCHARGE	USGS	USGS WATER RESOURCES DA	DIGITAL & PAPER	DAILY	ABOVE DAM		Good integrity	Covers 1958 - 1986 Includes daily average, daily average min, daily average max, annual instantaneous max Additional contact is M McSwain	H003	
STREAM TEMPERATURE	USGS	USGS WATER RESOURCES DA	DIGITAL & PAPER	DAILY	ABOVE DAM		Good integrity	Covers 1958 - 1987 Includes daily average, daily min, daily max Additional cantact is M McSwain	H004	
WATERSHED CONDITION	M MCSWAIN	AERIAL PHOTOS-ARMY CORPS	PHOTOS	1 10000-1 12000	SOUTH FORK		High integrity	Range is a single line up the South Fork to French Pete Camp Covers 1939, 1959, 1967, 1988, 1990	H005	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
STREAM CLASS	M MCSWAIN	FIELD SURVEYS	ARC/INFO	1"/MILE	FORESTWIDE	HIGH	Moderate integrity	Covers class I, II, and III's Some IV's but not in Watershed 13	H006	
STREAM TEMPERATURE	M MCSWAIN	ARMY CORPS OF ENGINEERS	DIGITAL AND PAPER		ABOVE DAM			Covers 1986 to present	H007	
DISCHARGE	M MCSWAIN	ARMY CORPS OF ENGINEERS	DIGITAL AND PAPER		ABOVE DAM			Covers 1986 to present	H008	
LAKES	K ADEE	PRIMARY BASE SERIES	ARC/INFO	UNKNOWN	FORESTWIDE	HIGH	Moderate		H009	
PIGS AND PSUB BOUNDARIES	D BATES		ARC/INFO		FORESTWIDE	HIGH			H010	
CULTURAL SITES								Includes trails camping, and huntings sites	P001	
BURNING SITES		HERITAGE RESOURCES							P002	
GRAZING RECORDS	E MILLER		PAPER, MAPS					Includes # of animals, locations, and type of animals Eric Miller is a student who did his thesis pertaining to grazing	P003	
MANAGEMENT AREAS	N FORRESTI	FOREST PALN	ARC/INFO		FORESTWIDE	HIGH	High	Has been modified by the President's Plan	P004	
SUITABLE AND AVAILABLE	K ADEE	OVERLAYS OF VARIOUS GIS L/	ARC/INFO (GRID)		FORESTWIDE	HIGH		Includes the SRI 1990 soils layer of unsuitable soils	P005	
VIEWSHEDS	B LONGCOR	FOREST PLAN	ARC/INFO	200 ACRES	FORESTWIDE	HIGH	High	Based on bare ground analysis, appropiate for forest, viewshed and waterhsed scale planning/ analysis	P006	
ROADS LAYER			ARC/INFO		FORESTWIDE	HIGH	Moderate needs much editing and updating		P007	
RECREATION SITES	R LEY	RRIS/MAP	MAP & DB	SITE SPECIFIC	SOUTH FORK	HIGH	High current data		P008	
RECREATION SITES	M MCSWAIN	LAC SURVEY 1991	DATABASE	100 FEET	SOUTH FORK		Good	Covers only along the mainstem of the South Fork riparian area Additional contact is Karen Geary	P009	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	data dic
DISPERSED SITES	R LEY	1" MILE MAP & FORM FOR EACH	MAP & DG DATABASE	POINT DATA	SOUTH FORK	MED	High, but data does not include all sites in the watershed	See Rick Ley for map, Karen Geary for data sheets and Michelle McSwain for interpretation	P010	
VISUAL ABSORPTION CAPABIL	F HUNSAKER	1982 FOREST INVENTORY	MAP BASE?		FORESTWIDE	HIGH	Moderate integrity - based on an compilation of several factors, slope, regen potential, soil color and landscape stability		P011	Y
RECREATION SURVEYS		AMANDA SIX THESIS							P012	
LAC DATABASE									P013	
PLANT ASSOCIATION	C MCCAIN	PA & MGT GUIDE BOOK	PAPER	N/A	WEST CASCA	HIGH	High integrity	The media is a management guide book	V001	
VEGETATION	K GEARY	WALK THRU EXAMS	PAPER & RSE ORACLE	5 ACRES	BLUE RIVER	HIGH	Not statistically sound, but somewhat reliable	Generalize walk-through information Most stands in S Fork McKenzie areas In paper copy and Oracle db	V002	Y
VEGETATION	K GEARY	STAND EXAMS	PAPER & GIS	5 ACRES	BLUE RIVER	HIGH	Statistically sound data	Limitation to format of summary tables Media inlcudes paper copy, plot cards, maybe VEGIS, and a GIS layer of exam locations Select project areas throughout S Fork, MCK Though available needs to be processed LWD may not be good.	V003	
VEGETATION	D SPIRO	VEGIS & OLD TRI	ORACLE	2 ACRES	BLUE RIVER	HIGH	High integrity		V004	Y
VEGETATION	K GEARY	EA ANALYSIS FILES	PAPER	2 ACRES	BLUE RIVER	HIGH	Integrity is variable depending on the planner who collected the information Good site specific info collected and used for EA's	Includes info like stand type maps, specieis, diameter, sturcutre Covers specific project areas with partial coverage of S Fork	V005	
VEGETATION	K ADEE	VEG4	ARC/INFO	STAND LEVEL-5A	FORESTWIDE	HIGH	Variable Information combined from a variety of sources Some attributes dervied for consitentcy across forest	Information type includes species, size class, layers, structure, year of origins, treatment histories Developed during the REAP process	V006	Y
VEGETATION	K ADEE	MOMS	ARC/INFO	STAND LEVEL-5A	FORESTWIDE	HIGH	Stand delineation OK Low moderate confidence in attribute data	Aerial photo intrepreted, field tested	V007	Y
VEGETATION	K ADEE	PMR	ARC/INFO	STAND LEVEL	FORESTWIDE	HIGH	Derived vegetation info is still untested at project level Dervied stand delineation is still questionable	Interpreted from satellite imagery Additonal contact is R Fairbanks Includes species group, size/structure, canopy closure	V008	Y
1993 GTR BLOWDOWN SURVE	R SEITZ	FINAL RPT DUE SPR'94	DOC & TABLES	IND TREES	BLUE RIVER	HIGH	High integrity	Sites were visited by a college student who statistically analyzed the data for significance Additional contact Peter Adler (617)493-5218	V009	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
ECOLOGY ECOPLOT POINT VE	C MCCAIN	FIELD PLOTS	PARADOX, GIS	500 SQ METERS	FORESTWIDE	HIGH	Data is good, some plot locations are only in the neighborhood	Tables of data are located on Cindy's IBM portable computer See Cindy for table names and contents	V010	Y
SPECIAL FOREST PRODUCTS	V SCHMIDT	ECOPLOTS & LOCAL KNOWLEI	1"/MILE MAPS	SITE SPECIFIC	BLUE RIVER			Additional contact is Jim Caullem Contains locations for Prince Pine, post/poles, bear grass, salal, Irigm grape, willow, western red cedar, n f boughs	V011	
SPECIAL HABITAT DATA	P FORD	MISC	PAPER, MAP		PROJECT ARE			Sources of this information include Augusta photo interpretation, field observations and locations (sub sampled), SIA, map-wildlife shab layer D Paster 2/89, project files-silvi report, BE's, stand exams, site location of shab - for project areas	V012	
NOXIOUS WEEDS	G MILLER	OREGON DEPARMENT OF AGR	PAPER MAP	DISTRICT MAP	HWY 19		Good	Consists of known populations located on the district map Also includes numerous spur roads on HWY 19 Needs to be moved to ARC	V013	
T&E DATABASE	J DIMLING	OREGON NATURAL HERITAGE	DB		FORESTWIDE	HIGH		Currently in RBASE but will be moved to Paradox for the project	V014	
AGE STRUCTURE	W COHEN	REMOTE SENSING OF THEMAT	ARC/INFO (GRID)	25x25 METERS	WEST CASCAI	HIGH	Coverage is good Warren says its 80% accurate Doesn't differencient past 200 years in age Needs field verification Non-forest in high elevation may have problems	Warren Cohen is from PNW and can be reached at 750-7322 An additional contact is George Lienkaemper 750-7322	V015	
ECOTONE VEG PLOTS	C MCCAIN	HALPEIN DATA SET (ARCHIVED	DB	500' RECON PLO	3 SISTERS WL	HIGH	Good data on species, cover, topos, soils for approximately 160 forest plots, about as many meadow plots Ecotone data repeated after 10 years - especially good for meadow invasion rates Tree ages for site tree only from forest plots Tree ages for plots along whole transect for ecotone study METRIC, BEWARE!	Data has been archived at OSU Forest Science Data Bank A full report with classification and community analysis is available from Cindy Data is on a Paradox db plus paper maps with plots and transect locations (BR portion will be digitized) 500' recon plots - forest 1981, meadow 1982, forest/meadow ecotone transect with microplots 1983, 1993	V016	Y
BRYOPHYTES, FERNS, & VASC	D WAGNER	CONSULTATION EDUCATION R	DB	SITE SPECIFIC	SOUTH FORK	HIGH	Excellent	David Wagner is of Northwest Botanical Institute	V017	
HERBARIUM	OSU	PLANT IDENTIFICATION	PLANT SPECIMENS	SAMPLE OF POP	SOUTH FORK		High	Contact is OSU Herbarium Director	V018	
RARE, THREAT , ENDANG PLA	S VRILAKAS	ONHP	DB	LOCATIONS	SOUTH FORK		Good to excellent		V019	
SENSITIVE PLANTS	P FORD	SIGHTING REPORTS, MAP LOC	GIS AND PC DB	POINT	SOUTH FORK		Good	Addt'l contact is Dave Spiro Addt'l source of information Oregon Natural Heritage Program - contact Sue Vrilakas This covers the entire watershed excluding wilderness	V020	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
NATIVE GRASSES	J DIMLING	ECOPLOTS	PAPER	SIZE OF POP	SOUTH FORK		Good	Excludes wilderness Material collection area info	V021	
CAREX DATABASE	OSU BOTAN	DATABASE	DB, HERBARIUM SPE(	POP LOCATIONS	SOUTH FORK		Good	Contact is OSU Botany Dept	V022	
PLANT LISTS	P FORD	PLANT SURVEYS	PAPER	SITES	SOUTH FORK		Good	Plant lists Bear Flat Bog/Meadow, Quaking Aspen Swamp	V023	
LICHEN & BRYOPHTE DB	J DIMLING	OSU HERBARIUM	DB (PC)	POP SAMPLE	SOUTH FORK		Poor	Information was collected from OSU herbarium Lichen and bryophte database for South Fork Watershed Paradox 4 0	V024	Y
SIAs/BOTANICAL SURVEYS	P FORD	PAPER MAP REPORT, SLIDES	REPORT - SALIX ASS(	ENTIRE SIA	SOUTH FORK		Excellent	Information is located within the watershed SIAs covered - Hidden and Lulu Lakes Lamb Butte Scenic Area, Rider Swamp, Roaring River	V025	
SPECIAL HABITAT SURVEY	P FORD	PAPER PHOTOS	PAPER	AERIAL PHOTO	AUGUSTA	HIGH	Good		V026	
SPOTTED OWL SURVEYS	R SEITZ	1"/MILE OVERLAYS	MYLAR	4"/MILE	BLUE RIVER	MOD	Meets Regional Protocal Standsrds	Shows areas by year which were surveyed to regional protocal standsrds Boundaries were taken off 4"/mil maps and drawn on 1"/mile	W001	
SPOTTED OWL HABITAT	R SEITZ	OHAB	GIS	4"/MILE	FORESTWIDE	HIGH	Accuracy is approximately 90%, but selected areas need to be corrected Corrections planned to be accomplished before 4/30/94	SENSITIVE DATA SOURCE District wildlife and botany personnel used aerial photos, field knowledge, input of other district personnel, actual owl location data, and some field verification (ongoing) to map spotted owl habitat Consists of nesting, foraging, and atypical nesting habitat	W002	
BALD EAGLE MANAGEMENT AF	D SPIRO	REMA	GIS		FORESTWIDE	HIGH		The 120 acre area was chosen during the Forest Plan process as being high quality suitable bald eagle rusting habitat, but it is not currently occupied Recreational use in the area is very high which could affect habitat quality and use Boundary follows old growth vegetation boundary	W003	
PEREGRINE FALCON HABITAT	R SEITZ	DIST WILDLIFE DEPT	MAP & DOCUMENTIO!		BLUE RIVER	HIGH	Moderate high and some of the moderate potential cliff sites were aerially surveyed Data needs additional review and site monitoring	Shows cliff and peregrine suitablility ratings	W004	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
WOLVERINE/MAMMAL SURVEY	R SEITZ	DIST MAP & DATA FORM	FILES	POINT DATA	BLUE RIVER	HIGH	Low integrity	Covers selected district sites with historic sightings in high quality habitat Camera station placement has been very limited due to personnel constraints No protocal exists Data shows persence/absense and may be used for general long-term trends only if collected in a systematic fashion for high numbers of sampling points	W005	
CREATED WILDLIFE STRUCTUI	R SEITZ	MISC DOC, MAPS, NOTES, KNI	FILES	LOCATION	BLUE RIVER	MOD	Moderate integrity	Covers non-kv structures There are only a few non-kv created wildlife structures on the district, mainly woodd?? and other birdboxes built and placed by volunteers Extent of documentation in files is unknown at this time	W006	
GREAT GREY OWL SURVEYS &	R SEITZ	1"/MILE DISTRICT MAP	MAP & SURVEY FORM	POINT DATA	S BLUE RIVE		Low integrity	Great grey owl responses are incidental and follow-up survey work was not immediately accomplished due to lack of time, funding, and personnel A volunteer conducted surveys in spring 1992 with no positive results Suitable habitat on the district has not been identified or mapped, and is expected to be limited	W007	
BIG GAME TREND COUNTS	B CASTILLO	ODFW FILES	NARRATIVE/TABULR I	UNKNOWN	STATEWIDE	HIGH	Moderate integrity Check with ODFW	Consists of annual helicopter surveys of herd areas in winter range Accuracy varies annually due to weather conditions (visibility) Refer to elk management objectives (MO's) for desired herd management goals for the McKenzie herd mgmt area Additional contact Dick ?? , Springfield D O	W008	
KV PROJECT LOCATIONS	R SEITZ	STD DATABASE VEGIS	RBASE, ORACLE, MAI	VARIABLE	DISTRICTWIDI	MOD	Moderate to high integrity due to uncertainity of historic documentation	Consists of min 1-2 acre polygons to point data on 4"/mile maps Includes locations on snag creation areas, seeding and fertilize projects, bird and batboxes, pond and pool creation, salt/mineral blocks, browse cutback, etc	W009	
CRITICAL HABITAT FOR S OWI	R SEITZ		GIS		REGIONAL	HIGH		Critical habitat line is still the current legal boundary we are operating under US Fish & Wildlife Service revised this line to the Designated Critical Area (DCA) based on Regional input concerning topgraphy and habitat condition DCA boundaries will be official if/when the USFWS Spotted Owl recovery plan is signed Additional contact Dave Spiro	W010	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
DESIGNATED CRITICAL HABITA	R SEITZ		GIS		REGIONAL	HIGH		US Fish & Wildlife Service revised Critical Habitat to the Designated Critical Area (DCA) based on Regional input concerning topgraphy and habitat condition DCA boundaries will be official if/when the USFWS Spotted Owl recovery plan is signed Additional contact Dave Spiro	W010	
MARTEN, PILEATED, OWL HABI	R SEITZ	WHAB LAYER ON GIS	GIS	4"/MILE	FORESTWIDE	HIGH		Areas were mapped using aerial photos and some degree of on-the-ground knowledge, but all mapped areas have not been field surveyed to determine if snag and down woody material levels are at Forest Plan recommended levels Category 4 HCA's are SENSITIVE information	W011	
WILDLIFE SIGHTINGS	R SEITZ	OSIS DATABASE	ODFW DATABASE	VARIES	BLUE RIVER	HIGH	Moderate to high All sightings have not been verified and reliability info is vot available for the older wildlife sightings	Only species of interest (see Forest's wildlife sigting data form) are documented, such as TES, rare or indicator species, nests, and dens All data collected has not been entered for selected species and pre-1980's sightings. The RO is currently completing the WILDOBS database which will be used when available	W012	
SNAG HABITAT LEVELS	R SEITZ	MISC FILES, PC, GREEN CARD	VARIES	VARIES	BLUE RIVER	MOD	Moderate integrity	Data on exising snag levels in harvest units have not been well compiled, and snag creation areas need to be mapped for better tracking A forest wildlife tree/snag database will soon be available, and district mapping (1"/mile scale) for completed snag creation is planned for spring '94 Snag model runs on Quattro Pro	W013	
BIG GAME HABITAT EFFECT IN	R SEITZ	MOSS, HEIWEST PROGRAM	PAPER, PC FILES	VARIES	BLUE RIVER	HIGH	Moderate to high	More recent moderate and high emphasis big game areas (Augusta and Hardy) have had modelling done using GIS and the distance band method, rather than average forage opening size which is less accurate Most of the other areas, except wilderness, were modelled using Lotus or Quattro Pro and average forage opening size Data needs to checked In the Augusta area, forage vs non-habitat areas need to be corrected	W014	
CLOSED ROADS	R SEITZ	MAP & GIS	FILES & MOSS	1"/MILE	BLUE RIVER	MOD	Moderate, some spurs are unmapped	Current GIS roads layer is in process of being updated Planned completion date is unknown Additional contact Bob Kellison/Rich Ley	W015	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
ROADS	B KELLISON	ROADS LAYER (GIS)	MOSS		BLUE RIVER	HIGH	Moderate, all main and collector roads are well mapped Spur road data has not been field verified for the entire South Fork area		W016	
GOSHAWK SURVEYS	R SEITZ	1"/MILE DISTRICT MAP	DISTRICT FILES	POINT DATA		HIGH	Moderate, goshawk protocol guidelines were used but surveys in 1992 did not start until the very end of the best survey period, and 1993 was a poor year for goshawk nesting and survey responses	Data is 1992 and 1993 follow-ups to historic locations 1992-1993 low coverage for project areas??	W017	
GOSHAWK LOCATIONS	R SEITZ	1"/MILE DISTRICT MAP	DISTRICT FILES	POINT DATA	BLUE RIVER	HIGH	Accuracy is high Data has been reviewed for validity of sightings Some goshawk vocalizations have also been mapped, the locations of which are less accurate than sightings	Mapped by sighting (roosting, nesting, foraging) and year Contains district-wide collection of incidental sightings	W018	
BALD EAGLE SIGHTINGS	R SEITZ	1"/MILE DISTRICT MAP	DISTRICT FILES	POINT DATA	BLUE RIVER	HIGH	Moderate to high Suspect some observers misidentified osprey as bald eagles	Maps incidental sightings and some info from annual midwinter bald eagle survey	W019	
HERP DISTRIBUTION	R SEITZ	1"/MILE DISTRICT MAP	1"/MILE DISTRICT MAI	POINT DATA	VARIES	HIGH	High degree of accuracy Some sightings suspect	Consists of a few surveys in project areas, incidental sightings, locations found during stream survey, and some information from herpetologists who have conducted surveys	W020	
OSPREY RUSTS	R SEITZ	1"/MILE DISTRICT MAP	1"/MILE DISTRICT MAI	POINT DATA	VARIES	HIGH	Very accurate data but not very complete	Moderate levels of coverage, all habitat has not recently been systematically surveyed but some areas were checked in 1993 by ODFW volunteers All project areas near osprey habitat were surveyed	W021	
SPOTTED OWL LOCATIONS	R SEITZ	OSIT LAYER	MOSS	POINT DATA	FORESTWIDE	HIGH	Accuracy is variable, ranges from daytime visual nest tree locations to general roosting ares to nightime responses which may be within 1/4 mile	Locations originate from 1989-1993 Regional Protocol surveys in project areas, pre-1990 SOHA protocol surveys, HJ Andrews spotted owl density surveys and follow-ups on banded owls, seasonal restriction surveys, and random sightings SENSITIVE INFORMATION	W022	
SPOTTED OWL LOCATIONS	R SEITZ	RBASE	RBASE	1/16 SECTION	FORESTWIDE	HIGH	Accuracy is variable, ranges from daytime visual nest tree locations to general roosting ares to nightime responses which may be within 1/4 mile	Locations originate from 1989-1993 Regional Protocol surveys in project areas, pre-1990 SOHA protocol surveys, HJ Andrews spotted owl density surveys and follow-ups on banded owls, seasonal restriction surveys, and random sightings Note Rbase database will probably not be updated in 1994 when STRIX database is final This will allow info used in both Rbase and the FES consultation database to be stored SENSITIVE INFORMATION	W022	
HARLEQUIN DUCK SURVEY AR	J CAPURSO	FISH/HYDRO STREAM SURVEY	DIST STREAM SURVE	1"/MILE & 4"/MI		HIGH	High	Field surveys of selected creeks with historic sightings, some surveys to highest quality habitat Coverage is low Additional contacts are Ken Byford and Jim Capurso	W023	

Type of Info	Contact	Source	Media	Resolution	Range	Availability	Integrity	Comments	Index	Data dic
HARLEQUIN DUCK SURVEY AR	K BYFORD	SO HARLEQUIN AREA SURVEY	SO FILES	1"/MILE & 4"/MI		HIGH	High	Field surveys of selected creeks with historic sightings, some surveys to highest quality habitat. Coverage is low. Additonal contacts are Ken Byford and Jim Capurso	W023	
HARLEQUIN DUCK SURVEY AR	R SEITZ	DISTRICT MAP SURVEY MAP	1"/MILE DISTRICT MAI	1"/MILE & 4"/MI		HIGH	High	Field surveys of selected creeks with historic sightings, some surveys to highest quality habitat. Coverage is low. Additonal contacts are Ken Byford and Jim Capurso	W023	
HARLEQUIN DUCK LOCATIONS	R SEITZ	BR HARLEQUIN DUCK MAP	1"/MILE DISTRICT MAI	1"/MILE		HIGH	Accuracy of data is high, but harlequin duck surveys were not conducted until 1992, previous sightings are incedental	Surveys were only conducted on a few creeks as personnel and time allowed, and in areas which would have potential disturbance to nesting harlequin ducks. Covers field surveys on selected creeks with historic sightings, some field surveys along district's highest quality harlequin duck habitat locations	W024	
TES SPP	P FORD	PROJECT BE, SIA, TES SURVEY	PAPER, 1"/MILE MAP	SITE SPECIFIC	PROJECT ARE		Good- field identified and verified spp	Media includes paper, 1"/mile district maps, 4"/mile quads, and digital layer - TES spp	W025	
J-2									W026	
50-11-40 RESULTS									W027	

I. CONTEXT

How does the distribution and percentages of seral conditions in the South Fork McKenzie watershed compare to the rest of the McKenzie subbasin?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Remote sensing maps of age structure	V15		Cohen maps. Already in A/I format. Move to Terri's machine.	A/I
DEM's	A7			A/I
Ecozone map	SO layer Ecozwor		Henderson western Oregon ecozone map (draft)	A/I

General analytical process:

-Develop series map for McKenzie basin
-Summarize seral stages by ownership.

Products:
-Table of acres and percent by owner, elevation, (series) and seral conditions. Display results in graphs.

What was the historic role of the South Fork for fish production and dirstribution within the McKenzie subbasin?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Review literature at the Columbia River basin level.	P012		None needed.	Paper

General analytical process

Review literature and provide a narrative and maps

Does the South Fork of the Mc Kenzie watershed meet the needs of an aquatic core area or refugia for fish, above and below the dam?

This will be a synthesis question using the results of the questions outlined in the Soil/Water/Fish section.

HUMAN/SOCIAL

What are the human use and development paterns?

This question will be answered by compiling existing data. Essentially a search of existing documents will be done.

What are the access needs in the watershed?

Will be answered once the uses, and future potential project list is identified.

What do people value within the watershed.

Will be answered through a search of exisiting past planning documents, discussions with local residents, landowners and other interested people as well as other agency personnel.

Are the current levels of use impacting user experience including scenic qualities, social interactions and safety?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Past District planning documents	P012		None needed.	Paper

General analytical process:

Review public input to recreation planning documents

Products: Provide a narrative

What is existing visual condition of the watershed? Do the conditions meet Forest Plan Scenic Management Areas's Visual Quality Objectives (VQO's)?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Stand age class	V4		Pull year of origin from Vegis and add to Veg layer.	A/I
Size class	V4		Pull dbh from Vegis and add to Veg layer.	A/I
Suitable & available landbase			Will need in A/I those layers affecting the suitable and available landbase. Will needs to include Doug's soils and other team recommendations.	A/I
Viewshed boundary	P6		Already in Arc format. Move to Terri's machine.	A/I
size of units (managed stands)	V4		Size will be determined by stand polygons.	A/I
ROD Mgt Areas	A014		Already in A/I	A/I
LMP management areas	P4		Already in A/I format. Needs to be moved to Terri's machine.	A/I

General analytical process:

Using the A/I data: VEGIS, LMP allocations, and Forest Plan Standards and Guidelines (as amended by the ROD)determine the percentage in a visually distrubed condition. This will be completed by:

* break ages into age classes
* determine the amount of acres in each age class
* calculate the percent in a disturbed condition. compare against the rate of harvest acceptable for that land allocation .
* check for maixmum unit size

Products:

-Table showing visual quality comparing the watershed to what was intended in the Forest Plan

-Map of areas in a visually disturbed condition

What are they and where are locations that could provide native seed/cutting collection sites and special forest products?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
species list & location	V1 V11 V10		V1 is a mgmt guide book. Jenny/pat will provide add'tl lists expand V011 to include what Jenny has. Needs to be digitized Needs field verification V10 is digitized. *Cindy will be adding an addt'l ecoplot data source.* This will result in two layers.	A/I
Species abundance	V10	high, med, low	based on local knowledge, drive by's, plot information (V10), mapped and digitized	A/I

General analytical process:

-Assess maps of locations, field check sites, discuss with District folks.

Products:

-List of species of grasses suitable for seed cutting. List of sites for special forest product potential.

Given watershed analysis recommendations, what would be the probable sale quantity (PSQ) for commercial timber products in the watershed?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
land allocations	P4			A/I
veg layer	V6		as edited by Gary	A/I
final avail			regular layers, with Doug soils, new riparian widths, connectivity, wildlife habitats, and other team recommendations	A/I
fire interval map	A2// A3 A4 A5 A6, A9		*Do all these disturbance maps have to be in A/I.*	old photos// A/I

General analytical process:

-Develop a final available acres map.
-Infer future prescriptions and schedule using final available layer, team recommendations, fire interval map.

May have various scenarios

Products: Available acres broken down by prescriptions, and a map of general locations for harvest.

- *This will be answered as a follow up to this analysis.*

SOIL/ WATER/ FISH

What are the physical components or processes operating in the uplands and riparian areas? More specifically, what are the sediment delivery mechanisms and relative rates to streams by landform or slope position?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Soil type (Doug's soils DSRI)	G004	Resource photoscale.	Data will displayed on four inch to the mile, north half/south half, ortho photo quads. Data will be transferred from photos to registered map overlays and digitize. Specific analysis maps will include unsuited lands (non reforestable, wetlands/dry meadows, actively unstable landflows, glacial deposits and stabilized land flows. Areas sensitive to disturbance/erosion potential, productivity, may also be outlined.	A/I
Level II surveys	F003		Additional field work and mapping of what is found.	paper
Reservoir infill			Core samples of sediment (UofO does core samples see Cathy Witlock Geo department) Also FS, BLM, and FSL agreement for doing lake sediments	
Valley Segment Types (constrained vs unconstrained reaches)			Some from Level II surveys, other from photo interp and field verification	

General analytical process:

The following five factors will be derived from the mapped landtypes and utilized in the analysis: geomorphic setting, landtype distribution. soil suitability, slope stability, and site productivity. Current LRMP will be the basis for comparison of management affects in riparian reserves.

PRODUCTS:

Narrative and maps of late Pleistocene Holocene geomorphic history.

*see soils report for more on methods

What factors affect stream channel morphology, water quality, and stream channel condition, and how do these change through time?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Level II surveys	F003. 2			paper
OSU surveys	F003.4			db
DSRI	G004			A/I
Stream condition by reach			see question about aquatic habitat for bull trout and Chinook.	
channel condition			below dam data gathered in S&W 3&4 including photo mapping . Above dam to be mapped using MDSD program for 39, 53, 59, 67, 79, & 90 photos	A/I
discharge data	H003, H008			
precipitation data			NOAA , State Climatologist , or Ranger District records	d/b

General analytical process:

Map channel morphology and channel conditions from photos through time. These will be combined wtith the answers to which physical processes are operating, what is the range of disturbance regimes and the current conditions of fish habitat.

1.) Map S.Fk. McK. active channel, point/mid channel bars with vegetative status, low flow channel, lwd jams, side channels, and rip-rapped or bermed banks. Use 1939, 53, 59, 67, 79, and 90 photos using MDSD computer model.
2.) Calculate percent change in riparian veg status on floodplain, percent increase/decrease in area or length of side channel or main channel, percent increase/decrease in area of mid-channel/point bars, percent increase/decrease in veg cover on bars.
3.) Overlay roads layer and harvest units layer by time series bracketed by aerial photo dates. Where channel changes have occurred as demonstrated in Step 2, sleuth for cause of change by analyzing discharge and precipitation records. Inspect aerial photos for sources of sediment if sediment input/accumulation contributed to channel change.

Analytical Process

Six aerial photo series covering 1939, 1953, 1959, 1967, 1979, and 1990 were digitally mapped using the MDSD computer program. Mapping of the South Fork McKenzie was done in two sections:

1) from the confluence with the McKenzie River up to the dam base - approximately 4.5 miles, and

2) from the tail of the reservoir at high pool up to the confluence with Roaring River - approximately 12 miles.

The exception to the extent mapped apply to the 1939 and 1953 photos, whose coverage does not extend up to Roaring River. As with the other photos, the 1939 and 1953 photos were mapped from the confluence with the McKenzie River up to the dam base, but the length mapped upstream from the reservoir tail totals approximately 1 mile, or to about the location where a tributary, French Pete Creek, enters the South Fork. Although the 1939, 1953, and 1959 photos were taken prior to construction of Cougar Dam, digital mapping was not done of that portion of the South Fork McKenzie River that is currently inundated by the reservoir. Analysis of the section of the river that is now within the reservoir was determined to be of little value since its role and processes within the watershed have shifted to a "lake" system.

Measurements were made from plots at a scale of 1:6,000 of each photo.

The objectives of the analysis were to characterize channel condition through time and determine reaches sensitive to disturbance by measuring changes in:

1) channel sinuosity;
2) the amount of exposed cobble and gravel bars;
3) number and length of side channels;
4) active channel width; and
5) number of locations of LWD.

Channel maps from successive years overlaid on one-another also reveal shifts in channel location and changes in channel patterns that indicate sensitive reaches or channel instability.

Channel width was determined by O'Connor and Cundy (1993) to be the most robust quantitative indicator of channel stability, with increases in channel width and decreases in sinuosity often accompanying channel aggradation. Measurements of channel width from the 1:6000 plots of the photos were taken at 500 ft. intervals and included the wetted channel and unvegetated bars. Analysis of changes in unvegetated cobble and gravel bars was done only where stream discharge was available for the given date that the photos were taken. Consideration of discharge is necessary when comparing area of exposed, unvegetated bars from one time period to the next. A decrease in flows may expose bars that were not visible in a previous year's photo and, conversely, an increase in flow may submerge existing bars resulting in lesser area measured. The change in measured area of unvegetated, exposed bars would be the result of changes in discharge and not be due to an actual change in bar area. Since flow data was not available for the 1939 photos, unvegetated gravel

and cobble bars were not measured. Flow data above and below the dam was available for the five other time series and was considered during interpretation of exposed gravel and cobble bars.

The 16.5 miles of the South Fork to be analyzed using the digitally mapped plots were divided into four reaches based on the valley segment type and, thus, whether it is generally a higher gradient transport reach or a lower gradient depositional reach.

The four reaches are:

- Below Dam - Lower Reach
- Below Dam - Upper Reach
- Above Dam - Lower Reach
- Above Dam - Upper Reach

Above the dam, the upper reach is located within the U-Shaped Glacial Valley and the Alluviated Mountain Valley which have relatively high sinuosity, low gradient depositional reaches whose form was directly influenced by the glaciers. It begins at the mouth of Roaring River and continues for approximately 7.5 miles downstream to 0.25 miles upstream from the mouth of Augusta Creek and is called Above Dam-Upper Reach (Fig. X -NEED MAP SHOWING THE ANALYSIS REACH BREAKS). The second and final reach above the dam begins where the upper reach ends (just upstream from the mouth of Augusta) and continues 4.5 miles to the tail of the reservoir. The valley segment types are categorized as Steeply Incised Moderate Gradient and Incised Glacial Till, are generally higher gradient, low sinuosity transport reaches, and is called Above Dam-Lower Reach. Below the dam at the dam face and moving downstream for approximately 1.25 miles, the valley segment type is Incised Glacial Till with relatively higher gradient, low sinuosity transport reach (similar to Above Dam-Lower Reach) which is called Below Dam-Upper Reach. The final reach, Below Dam-Lower Reach, begins where the upper reach ends and continues 3.25 miles down to the confluence with the McKenzie River. The lower reach valley segment type is a Lower Alluvial Valley and is a low gradient, high sinuosity depositional reach. In this report, each reach will be discussed in separate sections and changes tracked through time.

What is the range of variability temporal and spatially of the disturbance regimes, both natural and management induced?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
same as previous question				
Vegetation types as edited by Gary.	V006			A/I
Roads	P007			
PSUBs	H010			

General analytical process:

Maps and narrative. Spatial analysis will occur at the PSUB scale (or aggregates of PSUBs). Temporal scales will primarily involve the last 400-500 years (the oldest trees in the project area) Comparisons of disturbance regimes will be developed.

Where is there a deficit of large wood in or adjacent to streams? Will the riparian vegetation allow recruitment of large wood to the channel? How long will recovery take?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
All data from the question "What factors affect stream channel morphology"				
Stream survey data Large woody debris levels adjacent to riparian areas (see wildlife) Augusta riparian canopy (closed/open) time series	F003.2 V006, V004		Gary will be mapping LWD by estimations. Resolution may not fine enough.	A/I
Stream reaches				A/I

General analytical process:

-Determine reaches with low levels of LWD using existing survey data.

-Stratify by valley segment types to determine whether LWD will come primarily from valley riparian stands, adjacent hillslopes, or from debris flows originating in unstable areas in near upland sites. Develop a source area map drawing on valley segment types, adjacent stands, PSUB summaries, and DSRIs.

-Determine amount of "source areas" , e.g. adjacent stands, with low potential to contribute large diameter logs from hillslopes (for hillslope source area segments) and estimate decades until supply becomes sufficient. For riparian stands, may use Augusta canopy closure rate as indicator. Compare availability and current in-stream LWD levels.

-Locate reaches where current and future LWD levels would rule out salvage following catastrophic events.

*Based on assumption that LWD within a reach may be re-distributed by flooding, etc. *Does not address LWD adjacent to streams--see seral stage distribution within riparian reserves. *Does not address chronic low level input to stream vs. large scale inputs (such as post-flooding slope failures, etc.)

Products: -Map of reaches with low LWD - -"Source area" map - -Table of reaches, current LWD levels, and relative amount of source area with suitable size trees

Large woody debris potential: Methods

Remotely sensed data from Pacific Meridian Resources assigned diameter classes to 25m pixels. Diameter classes were regrouped for the current vegetation condition analysis. The layer developed for that analysis was used as the source layer for determining the size class distribution of valley segments, within one site tree (170 foot) distance from the creek.

Calibration of the size class distributions from 6 segments judged in poor conditions and 5 segments in good condition for LWD potential was used to develop the following criteria for assignment of high, moderate, or low LWD potential:

Low potential >36% in classes 0-4 (0-21" dbh).
Moderate potential <36% in 0-21" diameters, <33% in mixed medium and large to giant.
High potential >33 % in mixed medium and large to giant.

Class 4 streams were included in the analysis for 4 subwatershed groups based on analysis of the LWD input mechanisms most important for each group.

To what extent and to what degree was the riparian area and floodplain downstream of the dam altered during construction? How has this alteration affected the aquatic ecosystem?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
floodplain veg	A002		Michelle will map all variables. Will need digitize. Will result in several map layers. There are six different years for each different attribute.	A/I
veg type				
cover				
low flow channel				
active channel, mid channel and point bars with veg conditions				
DEMs	A007			

General analytical process:

1) map from '39 and '53 photos riparian veg status (vegetated or non-vegetated). If vegetated, label as coniferous, deciduous, or mixed.
2) Map from '39 and '53 photos low flow channel, active channel, large woody debris jams, mid-channel and point bars with veg status (as in #1), and side channels
3) Do steps 1-3 with '59 and '67 photos.
4) Overlay '39 and '53 maps and inspect for natural patterns of change
5) Overlay 1939/1953/1959/1967 maps. Inspect for visual changes in channel features mapped. Calculate percent changes in riparian veg status on floodplain, percent increase/decrease in area or length of side channel or main channel, percent increase/decrease in area of mid-channel bar/ point bars, percent increase/decrease veg cover on bars.

PRODUCTS

Maps of reaches below dam '39, '53, '59, '67
Narrative describing changes

How has the dam affected the sediment distribution and transport capability of the channel downstream of the dam? Has this altered the availability of spawning material for spring chinook?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
discharge from dam	H002, H003, H008			db
substrate particle size			Collect from field work from pebble count. XSPRO is a PC program.	db (to be used by XSPRO)
x-sections			New data	
channel widths, lwd, channel pattern, bar formation/degrada -tion. Veg status in riparian & on bars.			'39, '53, '59, '67, '79 and '90 will be mapped.	A/I
ratio of pre & post dam closure discharge	H002, H003, H008		Derived from discharge data	db

General analytical process:

1) Use same x-sections as in 2
2) Do Wolman pebble counts
3) Using x-sections and XSPRO estimate conditions of substrate movement at various stream flows
4) Determine if channel capacity decreased (narrowing of channel) (degradation ==> aggregation downstream filling in pools) (sediment input from tributaries) (flow ratios)
5) Determine percent area increase/decrease of channel bars and percent change in vegetative status.

PRODUCTS

Graph showing frequency of movement of various particle sizes, for with and w/out dam flows.

Graph showing particle sizes and narrative to address spawning success.

Planar illustrations showing channel pattern, depositional bars, and veg status over time.

Have management activities affected the magnitude and frequency of peak flows and have increased peak flows reduced channel complexity?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
cutting history	V004			A/I
Hydro recovery	H009			A/I
Pigs and Psubs	H010			A/I
Aerial photos				
Roads layer	P007			

General analytical process:

Map the low flow channels, active channels, side channels, etc. Look at changes over the years.

The amount of harvest, hydrologic recovery, channel condition and road building will be analyzed by subwatershed.

Product:
A qualitative narrative.

To what extent has the dam modified the average flows during spring through the late fall months, average daily max flow, and instantaneous peak flows? How have these modified flows affected floodplain processes, functions, and their associated riparian area habitat?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
discharge at both stations, above and below	H002, H003, H008		Need two more data sets. One here.	db
x-sections			Field work. No digitizing. Put into AutoCad for planar view. Will need an AutoCad person for putting in planar view.	db

General analytical process:

1) Using both stations (above and below dam) do regression analysis on discharge data (ave daily and instantaneous peak) for joint years prior to dam closure ('58 - '63?) Obtain regression curves that will describe below dam (f) above dam.
2) Run above dam data after dam closure in regression equations to obtain below dam flows without dam.
3) XSPRO various discharges will show flows/velocities in side channels.

PRODUCTS

Graphs ave daily max, ave daily, and instantaneous peaks below dam for actual flow w/dam vs. calculated flow w/out dam.

Graphs depicting percent of time side channels contain flow without dam vs. with dam

Graphs depicting average time of year side channels contain flow with and without dam.

Maps of planer view

*No calculations were done with out the dam flow. There was a comparison of peaks pre and post dam. Discharge pre and post dam. Discussion of processes functions and riparian pre and post dam.

Are the current types and levels of recreation use in the watershed having impacts on water quality, riparian vegetation or soil conditions? Recreation uses include camping areas, access roads, and access for fishing.

What is the level of use? How much of the riparian area is included within the recreation sites?

Is bank instability or site compaction within these areas contributing to degradation of conditions within the watershed?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
dispersed sites and developed	P010		Also will need to do additional drive by surveys to complete data	A/I
Access Road Characteristics		Site specific	For roads that access dispersed sites from Road 19. Field sample and correlate with existing site data.	Map and data file
LAC database	P013			db (dg)
historical bank instability			Michelle will be mapping	A/I
lakes surveys			Michelle and Amy will conduct these surveys	

General analytical process:

For riparian vegetation and soil conditions:

*ID where the use is
Using the database and map, and LAC database. Also do an additional survey to complete the data (include whether the sites are inside the 100yr floodplain). Inventory of dispersed sites.
*Isolate the heavy impact area
Using the forms that were filled out measure the areas of disturbance, include unstable banks. Compare to overall area within riparian along the lakes and river. Streams and lakes quick estimates of erosion quantitative but subjection.
*Given results of lake surveys assess nutrient levels to isolate areas of potential impact.

Product:
Inventory of dispersed sites.
Discussion of sites with impacts.
Percent of riparian area within recreation sites.
Percentage of area that is impacted.

Have beneficial uses such as fish spawning and rearing,and domestic water source been impacted in the watershed and have management activities been involved in these changes? What beneficial uses have been impacted and what is the cause or nature of the impact.

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Level II surveys	F003.2			
temperature	H004		Amy and Michelle will hunt down additional sources.	db
Embeddedness	F003.2		Might need additional field work	
Aerial photos				

General analytical process:

If the answer is yes to this question will need to look for causal effects (i.e. shade, or channel morphology.)

Products

Narrative and tables, and graphs

What is the current condition of the aquatic habitat for bull trout and Chinook in the South Fork McKenzie watershed and does it meet the expected natural range of variation?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Stream condition by reach	F001 F002 F003.5		Level II stream survey will be used for sensitive reaches to provide additional detail (see Amy's data list for addt'l detail) *F001-will SMART need to be linked to streams in GIS?* *Will F001 and F002 be combined into one database?* F002 will need some addt'l formatting on the PC. F003.5 will stay on paper	db paper
aerial photos	A002		photo interpretation, channel condition, morphology, etc. then digitize	A/I

General analytical process:

Characterize and compare stream reaches by pool quantity and quality, amount of LWD, width depth ratio, temperature. The main thrust will be chinook and bull trout.

Assumptions:
Survey data is adequate to compare streams and reaches.
Four different survey methodologies can be made directly comparable.
Pools and LWD are overall representatives of aquatic habitat for salmonies.

Products:
Map of reaches, a table of pool quantity and quality, amount of LWD, width depth ratio and temperature.

Analytical Tools - Fisheries

Stream survey information ranging from 1937-1994 was used as the basis for analysing the condition of and changes to aquatic habitat. Pool quantity and quality, levels of large instream wood greater than 24" dbh and 50' length, temperature, and embeddedness estimations were the primary variables used. Quantative objectives came from the Willamette National Forest Plan, PNW, and PACFISH. Habitat objectives were applied to areas that were relatively homogenous with respect to their characteristics (Federal Guide for Pilot Watershed Analysis). Refinement of objectives, such as PACFISH levels of LWD, was considered and utilized in determining which areas were most outside of the range of natural variability. The refined objectives are related to reach and subwatershed characteristics. Local knowledge of stream channel type, geology/soils and management history was used to determine whether stream reaches were actually at or below desired levels of LWD. Thus no single objective was refined for the South Fork watershed and a refined range was not explicitly determined in this watershed analysis. The PACFISH objective of 80 pieces of LWD > 24" dbh and 50' length was illustrated on bar graphs in this report, but not always considered to be the appropriate objective to meet.

Qualitative objectives were from FEMAT, the ROD, and the Forest Plan. This included the refugia concept and the parts of the Aquatic Conservation Strategy applicable to aquatic habitat and species.

Information on fish populations was obtained from state, university, and federal sources. While some quantitative data exists it is limited for resident rainbow, cutthroat, bull trout, or non-game species. No effort was made to develop population objectives for bull trout, greater emphasis was placed on determining presence of and risks to the current population. The state has made an estimate of the population, but because of the lack of biological data confirming the estimate, a population objective would be better made based on additional information.

The integration and interpretation of information was done with information from all disciplines on the analysis team. Hydrology and fisheries was integrated wherever possible in the South Fork WA.

Stream Inventory Information

Four methodologies for stream inventory have been utilized in the South Fork McKenzie watershed since 1988 (and the same holds true across the Willamette National Forest). The 1988 survey of the main South Fork to Elk Creek was conducted by Oregon State University. Generally, the USFS Region 6 stream inventory program quality improved from the inception in 1989 to the present, as supervisors and crew members gained experience. In addition, the Region and Forest improved protocol and methodologies as the use of the inventories was clarified and an increase in the knowledge of fluvial systems occurred.

The different methodologies generally provide information that is comparable, with some exceptions, such as the method for which instream wood is recorded. In ODFW surveys wood is recorded with class sizes much different from USFS, making comparisons of LWD levels difficult.

The data for all years of stream surveys resides in several media. Data prior to 1988 (1937-38, 1963, 1974, and 1975) exists on paper. Data from 1988 to present exists in three different software programs (DBASE, FOXPRO, Oracle). As regards to stream habitat and fish distribution information, the Forest recently developed the ability to intersect stream data with other land management information within Geographic Information Systems (GIS). GIS was used to record stream survey reach breaks, but not further used for the analysis of instream aquatic habitat for this Pilot effort.

A good amount of snorkel survey data exists for streams in the South Fork watershed. This information is the result of biological probes to determine the distribution of bull trout. This information enhanced the survey information and allowed for a better understanding of fish distribution.

[DIFFICULTIES WITH POOL PROTOCOL HERE].

Reasons For Not Meeting Pool Objectives in the Watershed

Information on pool levels exists for 106 reaches in the South Fork that were surveyed between 1988-present. Those reaches with gradients > 10% are considered to not have specific quantitative objectives, because research has demonstrated that pool habitat varies greatly in high gradient systems. Approximately 74 reaches of the 106 have gradients at or below 10%, and in only two of those reaches do pool objectives come close or meet the objectives. The objectives are from Forest Plan and PNW research and the two sources have very similar objectives.

A few reasons appear to explain not meeting pool objectives. The first is where the streams have been aggraded due to disturbances from management or natural events and the levels of pools are truely below a desired objective. This includes streams in subwatersheds with high road densities and associated harvest, and in wilderness systems such as French Pete where fire and flood event history have altered the stream habitat.

The second reason seems to be from the methodology used by the Forest Service in Region 6 to measure pool habitat. The current protocol records only pool habitat that has length greater than the wetted width of the channel. This method does not pick up pool habitat at the channel subunit level. For instance, ODFW records other types of pools (alcoves, backwaters, and isolated pools) that are not as long as the full channel width. These pools provide important fish habitat and are not recorded with the Region 6 Forest Service methodology. The upper South Fork survey by ODFW does come close to meeting pool objectives, while the same area surveyed with the Forest Service methodology in 1994 resulted in pool levels well outside the range of objectives. This area has had very limited management, so in this case it appears reasonable to quesion if protocol does play a role in the inability to meet pool objectives. The Willamette has added protocol to stream surveys to pick up pocket pool habitat in riffle units, which provides additional information on pools. However, this does not include the full spectrum of pool habitat at the subunit level. The recommendation would be to clarify the pool objectives at the Forest or Regional level and adjust the survey protocol if needed.

The third reason for not meeting pool objectives is the variability of individual surveyors. Protocol has been clarified and quality control has been initiated at the Forest level to help avoid this factor. A quality control test reach has been set up to run survey teams through, and attempts are made to retain experienced, qualified surveyors in succeeding years. Within this analysis this factor showed up in the comparison of two surveys of the Roaring River. One was conducted in 1990 and one in 1994, over the same stream reach (althought the 1994 survey extended beyond the 1990 survey end). Both pool habitat and levels of LWD were lower in the 1994 survey, though no actual habitat changes were suspected. This is a factor which is inherent in resource surveys and highlights the importance of quality control at the Forest level.

How as the cooler water released from the dam in the summer affected aquatic species, particularly spring Chinook and bull trout? How has the warmer water released from the dam in the late summer and early fall affected aquatic species?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Army corps reports temperature data and biological data	F008 (draft)			paper
WSTCS report 1987	F009			paper
Stream temperature	H001, H004		Will require pc importing	db

General analytical process:

Summarize existing information

PRODUCTS

Narrative and reproduction of some of the WSTCS reports

What are the fish species that have had migration patterns blocked or disrupted due to the physical barrier of the dam and the reservoir? To what extent has the migration patterns been altered?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Level II surveys	F003.2			paper
OSU Surveys	F003.4			db
Dam project reports	F006			paper
State basin reports	F007			paper

General analytical process:

No new collection should be needed.
Summarize information from above sources.

PRODUCTS

Narrative describing migration patterns of aquatic species.

Where are the year round cold water source areas for streams in the South Fork and where can their contribution to base flows be identified as critical?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
temperature along tribs			need to collect	db
discharge from tribs			need to collect	db
landforms				
DSRI	G004			A/I

General analytical process:

Set a criteria to determine what is cold summer base flow. Stratify and measure the quantity and quality flow. Identify where the cold summer base flow. See Alan Schloss for model to determine the maximum summer temperature.

What is the distribution and abundance of native fish species and the non-native brook trout in the watershed?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Level II surveys What kind of fish and where	F003.1-F003.5		Additional surveys will be needed, snorkeling and electro shocking	db

General analytical process:

Develop a range map from the database (not a gis map) of what kind of fish and where and abundance based on trend analysis.

****

What is the population condition of the remaining bull trout in the South Fork McKenzie watershed and is there a risk of extinction of the populations(s)?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
fish #'s	F003.3 F003.2		also will need to do snorkel counts, also will need reservoir counts as done by ODFW	db
population size and sex ratios	F003.3 F003.2		also will need to do snorkel counts, also will need reservoir counts as done by ODFW	db
fish distribution	F003.3 F003.2		also will need to do snorkel counts, also will need reservoir counts as done by ODFW	db

General analytical process:

Query the above information and use to characterize the existing population. Refer to literature for risk of extinction.
Data is lacking on population trends or characteristics. Inferences will be drawn from supporting information on habitat and watershed conditions.

Products: Narrative.

Where are the critical bull trout spawning and rearing areas? Are the areas adequately protected against effects of human disturbance?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
locations of bull trout spawning areas	F003.4		Will need to use the OSU surveys for spawning areas. Will eventually be linked to the stream layer. *Procedure for linking?*	db ==>A/I
locations of bull trout rearing areas	F005		snorkeling in May looking for rearing habitat. Will eventually be linked to the stream layer. *Currently on paper?* Need inputting to a database.	db ==>A/I
Managed stands	V004 V006			A/I
recreation sites	P008		Currently on a paper map, needs to be digitized	A/I
road layer	P007		*Will the roads layer need updating before this analysis?*	A/I

General analytical process:

Map spawning and rearing areas by hand drawing.
Intersect the rearing and spawning areas with managed stands, dispersed recreation sites, roads layer.

Products: Map, narrative

How has the dam affected bull trout populations, distribution, and viability?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA

General analytical process:

1) Mostly unanswerable given data and time.

What is the potential Chinook production above Cougar Dam, given current conditions and improved habitat conditions?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Curent conditions for aquatic habitat.			Answers to previous question.	

General analytical process:

Take data associated with the answers to "what is the current condition of aquatic habitat" and run through the Northwest Power Planning Council model (details attached).

Products: Number of smolts in a table under two scenarios (current conditions and improved habitat conditions).

*Smolt modelling exercise attached.

Smolt modeling excercise for the South Fork McKenzie Watershed Analysis

The Forest Service has adopted a standardized procedure for estimating smolt capabilities of anadromous stream habitat. The procedure follows a basic approach used by the Northwest Power Planning Council (NPPC) for estimating salmon and steelhead production in subbasins of the Columbia River. Estimates from the NPPC were not made for anadromous habitat currently blocked by dams.

The smolt capability modeling helps in establishing management objectives, and in this case has been used to compare the historic run size (estimated from 3,800 - 6,000 adult spring chinook) with the habitat in the mainstem South Fork. The Oregon Department of Fish and Wildlife, and the NPPC, have both established the goal of putting the habitat behind Cougar Dam into production when "the technology becomes feasible" (ODFW 1990).

For each reach the smolt habitat capability (SHC) value was estimated using the standardized USFS Region 6 procedure as follows:

1) Determine species presence/absence value (SPAV), which equals the percent of the reach occupied at any time of the year by the species in question.

2) Estimate low flow rearing or usable area (reach length x low flow width). This is estimated from Level II inventory data (all measurements in feet) and adjusted for the species in question (i.e. for spring chinook, if the reach is over 60 feet in width, the usable area is defined as the accessible area within 30 feet of each stream bank).

3) Categorize use type of the reach: (a) spawning/rearing, (b) rearing only, and (c) no use.

Determine habitat quality of the reach and associated smolt density estimate (habitat quality based on the Gifford Pinchot NF method, and smolt density estimate from NPPC Smolt Density Model).

The final step is presented below after the information from the South Fork stream inventory.

South Fork McKenzie (based on 1988 data from OSU stream inventory)

Description of reaches: Reach 1 is from the confluence of the South Fork with the main McKenzie upstream to Cougar Dam. The average gradient is approximately 0.7%. Reach 2 is from the end of the reservoir pool to Augusta Creek. The average gradient is 1.5%. Reach 3 is Augusta Creek to Elk Creek, which is the approximate upstream end of historic chinook use of the stream. The average gradient is 1.5%.

Reach	Length	Width	Pools/mi	Pool DFC	%DFC	Score	LWD/mi	Score	Total
R1	4.5mi	70'	5.6	11-15/mi	37-51	1	8.2	1	2
R2	6.7mi	62'	4.3	12-17/mi	25-36	1	12.0	1	2
R3	9.6mi	38'	5.2	20-28/mi	19-26	1	24.0	1	2

Smolt habitat capability (SHC):

Example

first reach is 4.5 miles long and 70' wide. The model methodology limits able spring chinook habitat to 30' along each stream bank, therefore usable width put into the model equation is 60'. Presence/absence value estimated at 80% (equal to the percentage of the reach that is occupied at any time of the year by spring chinook). Use of the reach is categorized as spawning/rearing. Habitat quality is based on the reach scoring, above. Scoring is based on:

	Category		
DFC sub-element	GOOD (score = 3)	FAIR (score = 2)	POOR (score = 1)
Pools/mile	100% of DFC	50-99% of DFC	< 50% of DFC
LWD/mile	> or = 80	40-79	< 40

Large pools and LWD >24" diameter and 50' length are counted when estimateing habitat quality. Temperature is a limiting factor if it exceeds 68°F (which it does not do in the South Fork). Habitat quality class is as follows:

Score	Rating
6	good
3-5	fair
2	poor

The final step is to put all steps together:

$$\frac{(\text{SPAV})(\text{reach length})(\text{usable width})}{10.762 \text{ ft/sq. meter}} = \text{sq. meters of usable habitat}$$

(sq. meters of usable habitat)(smolt density estimate) = SHC by reach

Reach 1 $\frac{(.80)(4.5\text{mi})(5280')(60')}{10.762'/\text{sq. meter}}$ = sq. meters of usable habitat = 105,973 m^2

===>(105,973 m^2)(.10 spring chinook smolts/m^2 in poor habitat)

===> = 10,597 smolts

If the habitat is improved to "fair" (.37 spring chinook smolts/m^2), the SHC is 39,217 smolts.

Reach 2 $\frac{(.80)(6.7 \text{ mile})(5280')(60')}{10.762'/\text{sq. meter}}$ = 157,782 m^2 of usable habitat

===>(157,782 m^2)(.10 spring chinook smolts/m^2 in poor habitat)

===> = 15,778 smolts

If the habitat is improved to "fair" (.37 spring chinook smolts/m^2), the SHC is 58,379 smolts.

Reach 3 $\frac{(.80)(9.6 \text{ miles})(5280')(38')}{10.762'/\text{sq. meter}}$ = 143,181 m^2 of usable habitat

=> (143,181 m^2)(.10 spring chinook smolts/m^2 in poor habitat)

===> = 14,318 smolts

If the habitat is improved to "fair" (.37 spring chinook smolts/m^2), the SHC is 52,977 smolts

Total smolt habitat capability given poor habitat rating is 40,693 smolts. Based on a survival rate from smolt to adult of 4%, and a catch:escapement ratio of 2:1 (Willamette NF Forest Plan anadromous fish process papers) the expected number of returning adults is 543 with poor habitat. With an increase in habitat quality (increased large pool habitat and amounts of LWD) to achieve a fair rating, the SHC is 150,573 smolts and 2,008 adults would be expected to return. If the habitat was considered to be "good" the total smolt production is estimated as 260,439. Given a smolt to adult survival rate of 4%, and a catch:escapement ratio set at 2:1, the number of adults expected to return to the South Fork would be 10,417.

Riparian vegetation

What is the structure and composition of vegetation within the riparian area? What is its distribution? How fragmented or continuous is the vegetation in the riparian corridor? What were the major disturbances within the riparian areas and what are the major disturbances now? How are upland and riparian disturbances related?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Seral stage	F004		Also attach veg person to stream surveys for this year, also supplement F004 surveys.	
Info from the veg question				
Reserve boundary	No		Submit request for what we have. Ask for riparian buffers. The combo of a moisture map and class IV's may result in a new reserve boundary.	
Topomoisture map	No		Run plant assn. group model module	A/I
Stream reaches	A002		To be mapped by Amy	A/I
Valley segment types	No		Use valley segment breaks where coincident with reach breaks from stream surveys. Manuscript from topo maps for streams without surveys	A/I

General analytical process:

-Assess current seral stage in riparian zone and riparian reserve in intact streams and streams in managed areas. Use GIS, and field verify/refine along selected streams to check inner riparian and adjoining stands within interim riparian reserve boundaries. Compare to same zone using "historic landscape" layer developed for Veg. 1 to assess major changes associated with recent natural and human disturbances.

-Map valley segment types. (May want to stratify by landforms.) Sample and describe composition/structure of riparian zone vegetation and distribution by valley segment type. Use cross sections across the riparian zone and adjacent slopes to characterize the topography and vegetation controlling riparian function of that segment of the stream network.

-Use information developed for PSUBs with interpretations on fire histories, slope failure patterns, LWD loading. Describe vegetation patterns related to generalized disturbance regimes and habitats associated with valley segment types, and/or specific PSUBs.

Products:
-Maps of current and "historic" stand conditions (seral stage, hardwood/conifer) within draft riparian boundaries
-Map of valley segment types.
-Table of streams (reaches within streams?) and continuity index (to be defined)
-Narrative relating flood/fire to valley segment types within fire regime and/or landform . Describe resultant vegetation pattern. (* May not be able to gather data to support this.)
-Composite cross sections for valley segment types with table of composition/structure of typical riparian vegetation for the valley segment types. Includes some general interpretation of wildlife, steam channel, fish implications.
-Table of current and historic riparian stand conditions (seral stage) by valley segment type (/landform?), by stream (or portion of stream for mainstem S.Fork), and watershed as a whole.

Methods for Valley Segment Riparian Vegetation Transects

Valley Segment Types

Valley segments were mapped in the office for all streams appearing on the 4"/mile topographic maps in the watershed. Criteria used to assign valley segment types included stream order, valley sideslope gradient, channel gradient, and ratio of valley bottom width to active channel width. Aerial photographs were used to find evidence of valley floor width, sinuosity, floodplains, and shrub or hardwood dominated surfaces. Where available, stream survey information was used for channel gradient, and channel gradient. <Check #> surveys listed valley segment type for each reach. <May refer to a table Amy may construct which summarizes stream survey data by valseg?>

Pages XX to YY illustrate the valley segment types provided in the Willamette National Forest stream survey guide (WNF 1992). For watershed analysis purposes, valley wall tributaries were divided into several groups: cirque basin headwaters, steep gradient, low gradient in U-shaped glacial troughs, and moderate gradient. The "Lava Flow/Spring Fed Meadows" code was translated to cover wetland, meadow, and lake inlet or outlet streams occurring in the watershed. They appear to be similar to Narrow or Moderate Width Placid Flow Channel types described for the Tongass National Forest (Paustian and others 1992). Most of the stream system in the Mink and McFarland lake basins in the Roaring/Elk group falls into this class. Low gradient poorly incised streams on the High Cascades plateau were assigned a new valley segment type. Intermittents appearing on the topographic maps were assigned valley segment types, but those Class 4s which were digitized in during the analysis were given a single "Class 4" valley segment code. Two sites were assigned "Other" as a valley segment code: a swampy section of Boone Creek and the highly altered reach of the mainstem South Fork below the dam near the Strube flats area.

Riparian Vegetation Transects

Transect locations were selected to sample the majority of valley segment types. Sites were selected to avoid plantations. Roads were avoided except along the longest transects across the mainstem South Fork. Transects across the mainstem South Fork were located in part to answer specific questions about the riparian vegetation along the main valley. Class 4 transects were concentrated in the Augusta group to provide information not only to the South Fork watershed analysis but also to the Augusta project's landscape/streamscape development (Cissel and others 1993 Draft). Other locations were widely distributed across the watershed. The soil/water/fish subwatershed groups would have provided an additional stratification, but had not been developed until sampling was nearly completed.

Stream class was derived from the stream class map (Map XX) prior to field work. Transect lengths (slope distance) were to approximate interim riparian buffer widths (300 feet for Class 1s and 2s, 170 feet for Class 3s and 4s). However, where riparian vegetation extended beyond that length, transects were generally extended. Transects were not required to extend to the valley sideslopes in extremely broad valley floors.

Transects included distance and slope for surfaces above summer low flow. Each break in slope or vegetation community was noted. Vegetation for each transect segment was recorded. For communities which keyed into existing plant association classifications (Hemstrom and others 1987), plant association was recorded. For communities which were not included in the upland classification, vascular species lists and cover values were recorded. Cross-sections for each transect were plotted with AUTOCAD. Each segment's vegetation data was assigned to a "Riparian" or "Non-riparian" group. Criteria for assignment were based on preliminary analysis of riparian community classification plots taken on the WNF, in part summarized in the discussion on current condition of the riparian vegetation (pages 132-145). Contact Area 6 Ecology Program for more information.

Bankful widths were measured in the field. Valley bottom widths were calculated from segment lengths. These distances were not slope corrected, but because most valley floor geomorphic surfaces are fairly flat the overestimate is not considered significant. Segments included in the valley bottom width were selected in the office from the cross-sections.

Confinement was calculated by dividing valley bottom width by bankful width. Riparian width was determined by summing segments assigned to the "riparian" class and dividing by bankful width to give a figure which is comparable across stream sizes. Riparian percent was calculated by dividing the total lengths of segments in the "riparian" class by riparian reserve widths based on a standardized site tree height of 170 feet, 680 feet for Class 1s and 2s, and 340 feet for Class 3s and 4s. Riparian communities growing within the bankful width were included in this calculation, though they would not be included in calculation of a buffer width. Due to the restricted widths of active channel communities, this does not have a significant impact on the figures. Note that calculation of the riparian vegetation in the transect included not only communities associated with the main channel, but also those found with any other riparaian site in the transect including seeps, side channels, seeps, abandoned channels, etc.

Table XX was calculated using values averaged for each valley segment type.

Transect locations were pricked on aerial photos and then digitized in GIS. Riparian vegetation data from the transects is on file with the Area 6 Ecology Program.

What is the likely riparian vegetation succession in areas downstream of the dam?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
discharge during floods.	H002, H003, H008			
Riparian & bar veg status over time			To be collected in #1 and #3	

General analytical process:

1) Inspect riparian veg status over time (data gained from previous key questions).
2) Using flood discharge data, predict magnitude of disturbance on riparian area and vegetation.

III. VEGETATION/WILDLIFE HABITAT

What were the historic seral conditions of vegetation in the South Fork McKenzie watershed?

What were the disturbances that led to the historic conditions.

What are the stand development patterns and disturbances that created the current vegetation and its seral conditions?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
year of origin (managed stands)	V4		Need to be pulled from VEGIS and added to Veg layer	A/I
diameter	V2 V3 V10		All sources need to be added to A/I then combined into one. The resulting info will be added to the Veg layer. The points in V10 are already in A/I but the data will need to be linked.	A/I
height	V2,V3, V10		Same as above	V2=paper V3=A/I
species	V8 V2 V3 V6 V10		Same as above	A/I
disturbance	A2/A3 A4 A5 A6, A9		A3 is already in Arc but contact Dan. A4 is currently a paper map. A9 is 1930's paper maps, may be digitized by BLM state office??? Contact Dean Vendrasco for a copy of the map of A4 & A9. More information is needed about data source A6. *Do all these disturbance maps need to be in A/I.*	old photos// A/I
year of origin (natural stands)	V2 V3 V10		V2 and V3 are Moss layers that need to be moved to A/I. V10 will need to be digitized and moved into A/I. Layers will be combined into one data source and added to the Veg layer. Data will include drive by's for verification.	A/I
plant association	V6		Use the plant association field already in the Veg layer.	A/I

General analytical process:

-Consolidate all available vegetation information into a paradox database to cross check and verify the data

-Create a past vegetation layer and a current vegetation layer

-Provide a narrative

What are the differences in landscape structural features between current and historic conditions?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
All data from previous question				
Activities/year	V4		Needs to be pulled from Vegis and added to the Veg layer.	A/I
Down logs/ac	V2 V3 V10		All sources need to be added to A/I then combined into one. The resulting info will be added to the Veg layer. Will need to do some drive by's for data gathering and verification. The data structure from in Vegis (V4) will be used if possible to allow data flow back and forth from the Veg layer to Vegis.	A/I
Snags/ac	V2 V3 V10		Same as above. Will need to do some drive by's for data gathering and verification	A/I
Eco plot id	V10		Ecoplot locations need to be digitized then db's added to the PAT table.	A/I
Stand exam id	V3		If exam locations need to be digitized if not already.	A/I
Sale name/unit	V4		Pull from Vegis and add to the Veg layer.	A/I
Aspect, slope, elevation	A7			A/I
Site index	V4		Pull from Vegis and add to the Veg layer.	A/I
"Doug's" soil	G4	see Doug: SHAB - 1/4 ac	see Doug	A/I

General analytical process:

-Run FRAGSTATS

*see attached sheet for final list of process used to answer the vegetation questions.

Vegetation Analysis Process

Literature Search
- Fire regimes studies
- Historical settlement of area records

Existing Data to create Veg layer
- Forest GIS Veg4 layer
- District VEGIS Manage Stand info
- PMR Pixel Data
- District Stand Exams

Use of Aerial Photos 1:12000 to verify stand delineations

Ground checking year of origin from stump growth ring counts

Manuscripting special habitat (ie meadows, rocky spots, ponds) from half quad orthro photos.

Remote sensing info from PNW-OSU for Mckenzie River Basin. Seral conditions by elevation by ownership by watershed.

Talking with District folks with local knowledge of vegetation in S.F.

Review old aerial photos (1940) to help verify/ reconstruct past vegetation

Validated and will use GIS Historic Vegetation Layer (1956) from PNW.

Modified a few components in Historic Veg Layer and grew stands back in time to reflect early time period (1900).

Use PMR remote sensing information to validation present vegetation

Consolidated all available Vegetation info (Veg4, VEGIS, and PMR) into Paradox database to cross check and verify info.

Assigned year of origin to all stands (based of field observations and fire history reports)

Defined seral conditions of plant series based on year of origin

Stratified watershed into analysis units. 1) using plant series, both existing and modeled potential vegetation areas 2) geographically by large subwatershed grouping, and land management area allocations.

Reports of seral conditons by stratifications

Analysis of landscape patterns with Fragstats (by seral condition)

How has prehistoric and historic land uses affected current vegetation patterns?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Burning sites	P2			Paper
Cultural sites (trails, camping, hunting, caves)	P1		Move to A/I from MOSS.	A/I
Grazing records	P3		Map and table call Eric Miller. Needs to be digitized and placed into A/I.	paper
Homesteading claims			See Amy for sources	paper

General analytical process:

Interpret using cultural sites and information from the other vegetation questions.

Products:

Map and narrative

What are the special habitats or plant communities which are in the watershed?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Special habitats	V10 V12 V6 V11		V12 contains several sources of information; all will be needed. All data will be combined into one map and digitized. The map will be produced in an additive fashion taking all areas from all sources then reconciled and some field verification. V10 (ecoplots) will need to be digitized. V11 will need to be digitized.	A/I
"Doug's" soils		see Doug	see Doug for collection methods	A/I
Special haibitats	A8		Gary will map special habitats. Pat will field check some.	Ortho photos

General analytical process: No analysis

Products:

-Map of special habitats identified.

-A table with information about the habitats. Most probably using Deb Murdough's database structure to collect the information into a database.

Given natural disturbance regimes, what is the range of variability of the forest seral conditions over space and time?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
All data from previous vegetation questions REAP				

General analytical process:

-Run Fragstats
-Compare to the REAP data

How much late-successional and old-growth forest existed in presettlement times as compared to how much late-successional and old-growth forest exists today?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Same data used to create the past and current vegetation layers.				

General analytical process:

-Pull old growth component from the landscape report

Products:
-Table of acres and map of locations of late successional and old-growth forest.

Are there individual plants, plant populations or plant communities which have been lost, are declining, or are in jeopardy of being lost to fire, exclusion of fire, insects, disease, exotic plants, or other factors?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
T&E plants (current)	V12, may have a new index		Needs to be digitized. *Pat will provide more info.*	A/I
Noxious weeds	V13		Needs to be digitized and put into A/I.	A/I
Mapped special habitats resulting from previous question				
T&E plant and animal locations	V14		Can be found in advanced revelations database. Need to locate this database.	db
T&E plants (historic)			Pat will manuscript then GIS will digitize.	A/I
REAP	A12			paper

General analytical process:

Compile existing data on plant populations. Identify trends and processes affecting the status of the populations..

What is the existing habitat condition for selected species groups (guilds) known or suspected to occur in the watershed?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Guilds database			query guilding database	Paradox, UTOOLS/ UMAP
Updated VEGIS db and layer (special habitats, yr. of origin, size class and conditions class)	V004, V006			A/I
Project file info	A001, V005		Review stand exams to extract pertinent snag and down wood information	paper
Ruby's snag model	W013		Possible snag levels/PSUB	db
Plant association guide			Contains info on what snag and down wood levels are expected.	
Eco-plots	V016		Snag and down wood can be found in the intensive data plots	
Historic leave levels in managed stands			Interview with existing timber and fire folks to get levels of snag and wood	
Fire history			As produced by Gary	A/I

General analytical process:

1) Using the Forest wide vegetation layer (stand year of origin, size class, and conditions class define and early, mid, late seral conditions based on wildlife habitat objectives

2)Develop a map of the seral conditions (habitat). Evaluate the pattern and composition of habitat in terms of its contribution to home range, minimum patch size and distribution

Products

1) Graph and or map of snag and DWD levels by seral stage and managed stands
1) Habitat maps for each wildlife guild and specific species analyzed.
3) Narrative summarizing habitat conditions for species.

*The guilding process and status is described on the attached sheet. Unfortunately the process could not be completed with this analysis.

Habitat conditions were described based on forested plant associations using the data from the vegetation layer.

How does the current abundance and distribution of habitat for each species guild analyzed differ from the historic range (100 - 450 yrs ago) of natural variability?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Seral condition, size structure (VEG4 as edited by Gary	V006		Will tie back to the vegetation distribution questions.	A/I
Aquatic special habitats	F003		Main channel only	
Special habitats	V006			A/I
Lake layer	H009			A/I
Fire history maps	A011		As shown for the vegetation quesstions	A/I
REAP data	A012			paper

General analytical process:

Take the historic range of condition as defined by seral stage and link that to needed seral stage for certain species guilds.
Possibly run FRAGSTATS to look at abundance and distribution of habitat for wildlife guilds in each seral stage.
4) Using the REAP data; determine species habitat availability over time and its relationship to current levels.

In lieu of the guilding process the same data will be used to describe habitat by an elevation zone.

Products
Graph of the natural range of variability and current condition by species guild studied.
Narrative of guilds and special habitats not captured in the analysis.

*Since habitat maps could not be produced for the species guilds this process was not completed. A discussion of the guilding process follows. Continuation of this process is recommended in the next round of WA's forest wide.

Guilding Process: An approach to describe habitat conditions for a variety of wildlife species. The intent of the analysis was to assess habitat conditions and distribution for all species suspected to occur in the watershed and then rank the conditions for each.

The 327 species present on theWillamette National Forest were grouped into guilds or groups with similiar ecological requirements, such as similiar home range size, patch configuration use, general habitat use, riparian, special and unique habitat obligate, and terrestrial habitat users.

Using the forest wide vegetation layer attributes, stand year of origin, size class and condition class early, mid, and late seral conditions were defined based on wildlife habitat objectives. A problem was noted where the vegetation data was not equally accurate across the forest. A map of these seral conditions was created.

The habitat maps were then evaluated by vegetative patterns, their composition, and how they contribute to species home range habitat needs. Using a patch aggregation model to assimilate the data, habitat maps for each of 12 terrestrial species and one for special and unique habitat associated speices were created.

At this point, the assessment of the amount and distribution of habitat for all species in the watershed as well as identification of visual gaps or corridors of habitat should have been possible. However, a noticeable number of questions in the mapped results led us to believe that some errors still existed in the queires of in the vegetation data base.

Significant progress was made during this attempt to use the guilding process. It appears to be a worthwhile concept to pursue further at the forest-wide level in the near future.

If habitat maps for all guilds were available on a forest-wide scale it would then be possible to evaluate habitat amounts, distribution, and connectivitiy in adjoining watersheds.

Are the interim riparian reserves and matrix standards and guidelines adequate to maintain habitat and dispersal requirements for riparian and terrestrial associated species and management indicator species such as the Pileated Woodpecker and Marten?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Streams (cl I-IV) layer		down to Cl IV	Will need to be manuscript / modeled then digitized	A/I
Riparian reserves			DB on Ac/ quartertownships to compare 11/40 on all quatertownships that touch watersheds thus we need stream layer on same quartertownships.	A/I
J-2	W026		For all spp with low viability check info - see Pat Ford	
DBH	V006			A/I
quartertownships	A013			
50-11-40 analysis	W027			
DWD	V006		Gary will be developing	A/I

General analytical process:

Using the results of the vegetation questions look at connectivity across the forest including wilderness, Late Succesional Reserves, late succession not in reserve, and other reserve allocations.
Look at connectivity at the watershed level for late successional areas, early seral areas, and special habitats.

More detailed analyses would occur for the spotted owl:

*Analyse forest stands which are at least 11 DBH and have 40 percent canopy closure within the watershed and for all quarter townships that touch tje watershed.
*Compare 11/40 per quartertownship with interim riparian reserves, overall connectivity and distribution between LSRs, by ROD land allocation, and within critical spotted owl habitat.
*Look at areas adjacent to riparian areas for sufficiency in DWD (and snags). Need to look at what amount of DWD are in different seral stages by plant association. Stratify into high, medium, and low.

Products
Table comparing 11/40 to interim riparian reserves in terms of percentage in quartertownships.
List of areas of sensitivity.

What species could reasonably be expected to occur based on their range and habitat type and what species do not occur in the watershed but do occur on Willamette National Forest?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
FW spp list			Review and amend (if necessary) Cheryl's spp. list	db
OSIS	W012		Wildobs may also be helpful if available. Needs to be updated.	db
FSEIS	A010		Review for species like mollusks not on Cheryl's list	paper
Appendix J-2 from FSEIS	W026		Parts two and three	
Vegis	V004			
ONHDB	V014		Printout may be available?	
Habitat Maps	W012		Guilding database	DB

General analytical process:

1) Review and amend species list Cheryl developed
2) Review OSIS for any spp not on above list
3) Classify Veg information to the same habitat classification in the Forestwide wildlife database.
4) Link the veg info with the wildlife database and run habitat models for species that should occur based on their range.
5) Develop list of species likely to occur in watershed from SEIS lists (not on Cheryl's list) such as invertebrates and arthropods and from source experts in PNW.
6) Based on both species range and existing species habitat; extrapolate all species with habitat on a list.

Products

List of all wildlife species likely to occur in the watershed.
Summary of known information for T&E species and habitat conditions and population information for other sensitive amphibians, molluscs, birds, mammals, and species of concern lsited in the J2 appendix for all apecies with habitat in the watershed.
List of species that do not occur in the watershed but do occur on the Forest.

What and where are the unique wildlife habitats known to exist in the watershed, and what components of these habitats are most important to retain?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Special and unique habitats	V006			A/I
HERP sightings map	W020	point data	Review and update map	paper map
Data from the species and habitat questions				
DSRI	G004		Much of this will tie into the special and unique habitats data.	A/I
OSIS				

General analytical process:

1) Identify vegetation/seral conditions of known sites though A/I and field notes available from sightings

2) Determine what percentage of the species in the watershed are dependent on special habitats for some part of their life.

3) Compare to existing S&Gs to determine if any particular species need additional protection.

Products

Discussion of special habitat their location and the wildlfie species that use them.

How has the change from a river system to a reservoir (lake) system changed habitat conditions?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
active channel mapped prior to pool filling	A002		Use the 1939 photos	A/I or photos

General analytical process:

1) Identify how many miles and acres of riparian habitat along the main stem. Include river and reservoir aquatic habitat.
2) Determine changes from photos

What percentage of that type of habitat is lost with the inundation of the valley. (low gradient floodplain and alluvial habitat)

PRODUCTS

Table or graphs of changes in habitat types (riparian and aquatic) and narrative.

Acres of riparian habitat, gain or lost, of aquatic habitat.

*We did not do this analysis other than recognize that habitat was lost with creation of the dam and reservoir.

What are the conditions for Big Game in the watershed?

DATA NEEDED	EXIST?	RESOLUTION	COLLECTION METHODS	MEDIA
Current Vegetation data, ie. activities, yr. of origin, speical habitat.				A/I
Elk Emphasis Area boundaries	W028			A/I
Open road miles	P007			
Elk Habitat model	W29			

General analytical process:

Query current vegetation to identify habitat types as defined int he elk habitat model.

Evaluate habitat effectiveness with the HEI west model.

Compare to the Forest Plan standards and guidelines.

The following questions did not lend themselves to the INA process. The answers resulted from a synthesis of all the questions to this point.

What opportunities exist for watershed restoration, both in the uplands and riparian zones?

What components are important to determine an approach to design riparian reserves.

This was discussed and evaluated throughout the process. Process and results are documented in the Riparian Reserve section of Chapter 6.

DATA LAYERS TO BE MOVED TO ARC

INDEX	TYPE OF INFORMATION	PRIORITY	MANUSCRIPT	DIGITIZE	ASSIGNED	KEY QUESTION TIE	COMMENTS	Done?
A002	Stream reaches / breaks (existing)	A	Y / June	Y / June		Fish1, S/W3, Rip2	Amy will first photo intrep. Need to maintain precison between breaks and streams. Will need help coordinating the manuscripting.	X
A002	Stream reaches / breaks (new)	A	Y / August	Y / August		Fish1		
	Stream morphology	?	?	?			Michelle needs to think about this one in more detail before doing.	
A002	Floodplan veg, veg type (conifer/deciduous), cover, active channel, mid channel, pt. bars w/ veg condition.	A	Y/June	Y/June		Dam1	Michelle is looking to Jamie, Peter Eberhardt, OSU, or Lana to do both manuscripting, digitizing, and determining characteristics. 5 week job. Will result in	X
A003	1914 Fire maps	B	N	N	Allison, Terri, & Dave	Veg1, 2, 3, 7, 11	Dan Howis is the contact. Currently already in Arc format, Allison will locate the layer.	X
A007	DEM's	A	N	N	Terri & Dave	Veg 6.1		
A013	Quartertownships	B	N	N	Terri & Dave	Wild4	PSUBs could be used in place of quatertownships.	X
G003	Landform Map		N	N	Terri & Dave	Veg3, 7		X
G004	Doug's Soils	A	Y	Y	Doug	S/W1, 2, 3, Veg2, Wild5	Doug will manuscript.	X
H006	Stream classes	A+	Y / May-June	Y / June	Ken	Wild4	Stream layer should be completed before stream reaches. SO GIS shop will model- Michelle will verify.	X
H009	Lakes	A	N	N	Terri & Dave	S/W4, Wild2, 5		
H010	Pigs/PSUBs	A	N	N	Terri & Dave	S/W2, 4	May be done	X
P004	LMP land allocations			N		Veg8, 11		X
P006	Viewshed boundaries	A	N	N	Terri & Dave	Veg8		
P007	Road layer	A	Y / May-June	Y / June	Palmer	Fish #2, S/W2, 4	The road layer is 80% complete but will need some digitizing and editing. Palmer will finish and enter data edits into TMS including date constructed.	X
P008	Recreation sites	C	Y	Y		Fish2	Amy could hand put the recreation areas on the map as opposed to digitizing. Map are currently lost.	X
V003	TSE stand exams	A	N	N	Terri & Dave	Veg1, 2, 3, 7, Wild5		
V004	*See field list*	A	N	N	Gary, Terri, & Dave	Veg1, 2, 3, 7, 8, Fish1, S/W3	Terri & Dave will see that all data currently in VEGIS that is needed is added to the Veg PAT table. Gary will then fill in blanks in the PAT table from the PC.	
V006	Veg4	A	N	N	Gary, Terri, & Dave	Veg1, 2, 3, 7, 9, 11, Wild2, 3, 4, 5	The Veg4 layer & with PAT already on Arc machine. Addit'l fields from Vegis still needs to be moved. Terri & Dave will see that addit'l data currently in VEGIS that is needed is added to the Veg PAT table. Gary will fill in blanks in the PAT table.	X
V008	PMR data	A	N	N	Terri & Dave	Veg1, 2, 3, 7	Will not be available in Arc until Grid is available	X

#9

INDEX	TYPE OF INFORMATION	PRIORITY	MANUSCRIPT	DIGITIZE	ASSIGNED	KEY QUESTION TIE	COMMENTS	Done?
V010	Ecoplot point veg data	A	Y/ongoing	Y/mid Aug.	Cindy	Veg1, 2, 3, 7, 9, 10.1	The digitizing will be of new plots (100 - 200 plots) that will be completed this summer. Cindy will be responsible for data entry and manuscripting. The data will be kept in the PC only not moved to Arc.	X
V012	T&E plants (aka. sensitive plant layer)	A	N	N	Terri & Dave	Veg10	Current sensitive plant sightings are already in MOSS.	
	T&E plants (historic)	B	Y/late June	Y/July	Pat	Veg10	Pat will manuscript. Will need help digitizing	
V013	Noxious weed map		Y/June or July	Y/July	Pat	Veg10	Pat will manuscript. Will need help digitizing	X
V015	Age structure data		N	N		Veg6.1	Warren Cohen's maps. Already moved to the DG only now needs to be moved to the Arc machine. May already be done.	X
	Special Habitats	A	Y / Done	Y / May	Terri & Dave	Veg9, 10	This job will require a plan to make sure veg info is correctly carried by stand #. This will result in a different layer than the veg layer. May later be incorporated into the veg	X
	Active stream channel	A	Y/June	Y/June		Dam4	The digitizing and manuscripting will be completed by the individual hired to do the other stream information (ie. Jamie, Lana, Peter, OSU).	X
	Topo moisture map	A	N	N	Terri & Dave	Rip1	The topo moisture map and model was created by Siuslaw and ESR. The model and data is currently on DG tape and needs to be moved to the Arc machine.	X
	Effects from cutting (eg. debris)	C	Y	Y		S&W4	Michelle needs to think about this Between Doug soils and the activity table in VEGIS may not need this.	
	Species list and location	B	Y/June or July	Y/July	Pat	Wild10.1	This will result in two layers: 1) special fores products and 2) native seed cutting. Pat will manuscript.	
	Fire History (1900's map)	A	Y / May	Y / Early June	Gary	Veg1, Wild3	Gary will either manuscript and edit the veg layer to create the fire history map or manuscript from scratch.	X

PLEASE: Assign your priority to these layers (i.e. 1,2,3...).
If it is not necessary that these be in Arc place an "X" under priority

ISSUES FOR SOUTH FORK OF MCKENZIE WATERSHED ANALYSIS

SOIL/WATER ISSUES:

Management practices such as road building, timber harvest, and slash treatment may have increased the frequency and spatial distribution of landslides and surface erosion. The result may be possible increases in turbidity and the filling of large pools with sediment.

*Harvest of riparian vegetation and road building within the active floodplain has likely altered the processes and functions of the riparian ecosystem.

*High road densities in the south and west portions of the watershed have reduced site productivity, increased erosion, and may have altered the hydrologic regime.

*Potential increase of peak flows from past management practices (road construction, harvest, and woody debris removal) may reduce channel complexity.

COUGAR DAM ISSUES:

*Cougar dam has had an effect on the downstream hydrologic regime and the aquatic ecosystem, as well as the stream channel and floodplain morphology. Excavation, rip-rapping and berming of channel banks occurred during the construction of the dam. One resulting past effect of construction was compaction of floodplain.

Alterations below the dam have reduced flows required to maintain active side channels.

Effects due to current dam operation are: disruption of sediment transport downstream, reduced peakflows downstream, reduced average flows during spring and early summer months, increased average flows during late summer and early fall months and changes in water temperature and fluctuating water temperatures.

*Disruption of sediment transport and reduced peak flows below the dam have modified the channel substrate from pre-dam conditions. The result is less than optimal-sized spawning material for spring chinook. Modifications have impacted the habitat for other aquatic species as well. The formation of channel units is suppressed causing long featureless rapids.

*Bull trout distribution has been impacted by the dam. Changes to the condition of the fishes may have occurred due to changes in the natural temperature and flow regimes. Changes in the McKenzie bull trout population or viability due to the presence and operation of the dam (i.e. channel morphology changes) are unknown. Changes to the spring chinook population are partically documented.

*Naturally spawning Willamette spring chinook in the McKenzie are rated as a "at risk anadromus fish stock " (FSEIS Appendix B-108) and their spawning habitat below the dam needs to be maintained.

*The dam and reservoir present a barrier to wildlife and fish migration.

FISHERIES ISSUES:

*Habitat for Bull Trout and Spring Chinook in the South Fork McKenzie watershed may be effected by roading, timber harvest or grazing. Bull trout is an USFS Sensitive Species and petitioned for listing under the Endangered Species Act. Spring chinook are an "at risk anadromous fish stock" (FSEIS Appendix B-108).

Management activities have reduced amounts of downed instream large wood (e.g. > 24" dbh) and pool habitat to levels outside the range of natural variability. Fish habitat may also have been impacted by increased water temperatures and fine sediment. Several of the effected tributaries may be or have been bull trout or spring chinook spawning or rearing areas.

In addition, areas inside and outside of wilderness were grazed by sheep from approximately 1902-1947. As many as 5,000 head were grazed, with the number down to 1,200 by 1947. The grazing was usually at the higher elevations. Grazing can result in aquatic habitat impacts by changes in streamside vegetation and channel condition.

*Given the south fork McKenzie group bull trout isolation, what is the risk of extinction? The watershed supports a remnant population of the mainstem McKenzie bull trout group, or a group which is thought to have overlapped with the mainstem population (ibid., ODFW 1993). The McKenzie bull trout are the only population of note remaining in the west side of the Cascades in the State of Oregon (USFS 1993).

*With the construction of Cougar Dam it is not known if a core area is maintained for Bull trout survival or if the Bull trout life history is disrupted decreasing survival potential. Does the South Fork meet the current theory of a core area or refugia, which provides for replication of strong subpopulations within its boundaries, and incorporates adequate genetic and phenotypic diversity?

The three life history strategies of the bull trout are fluvial, adfluvial, or resident which exist throughout their range; these strategies may represent separate populations, even where they live together (USFS 1993). Fluvial fish live in large rivers. Adfluvial fish migrate between rivers and lakes/reservoirs. Resident fish live in small streams.

There is no documentation that bull trout in the South Fork watershed were resident or have adapted the resident life history since Cougar Dam was closed. The changes to the lower South Fork watershed, such as from a relatively large river to a reservoir, may put the fluvial life history at a disadvantage. Small, closed populations can be jeopardized by environmental or human impacts before inbreeding or the loss of genetic variation becomes a problem (Rieman and McIntyre 1993).

*There is limited information on bull trout in the South Fork. There is a need to increase the information available in order to protect the critical spawning and rearing habitat areas and to set specific management objectives. Bull trout are known to inhabit the South Fork from Cougar Reservoir to the wilderness boundary and juvenile bull trout have been found in Roaring River. The number of

mature adults in the reservoir and mainstem South Fork above the reservoir is estimated by Oregon Department of Fish and Wildlife (ODFW) to be between 50 and 100 fish.

There is concern of variability of bull trout above the dam. A level of 300 breeding fish per season is used as a threshold of critical population size. Populations estimated to drop below this threshold are generally judged to be at an unacceptable risk of randomly losing genetic variation.

There is little information on population and age structure. Because juvenile bull trout were found in Roaring River, it is assumed that spawning occurs there. Other actual spawning habitat has not been documented in the South Fork watershed. Some information on populations utilizing the South Fork and reservoir has been be collected by ODFW (see Summary of Information on Bull Trout Populations in the Upper Willamette District, ODFW 1993).

Currently the bull trout, cutthroat trout, and rainbow trout populations have been identified as not being in compliance with ODFW's Wild Fish Management Policy (WFMP) because there is insufficient information on whether or not the population has less than 300 breeding adults (WFMP Biennial Progress Report 1992). Whitefish have been identified as meeting the WFMP because they are numerous in the South Fork.

*What is the distribution and effects of competing fish species to bull trout? It has been documented that where brook trout and bull trout overlap, competition or interbreeding have led to reductions in the bull trout population. The distribution of salmonids (rainbow, cutthroat, bull trout, whitefish, and historically of spring chinook) is generally known, but not specifically. Little is known of dace or sculpin species which occur in the watershed and how they are distributed. Bull trout distribution may parallel whitefish or sculpin distribution (Carl 1985). Also, what is the current distribution of brook trout? Do they overlap with bull trout spawning or rearing areas?

*Since Salmon are no longer behind the dam interacting with other species what are the effects? Where bull trout evolved with large populations of juvenile salmon, the bull trout have declined when salmon declined (Ratliff and Howell 1992). Bull trout eat Salmon eggs. How other species have responded to the absence of chinook is unknown. For example are whitefish more abundant than in similar systems that still contain their chinook component?

*There is productive Chinook habitat above Cougar Dam but at present it is unaccessible. The South Fork of the McKenzie was one of the major spring chinook producing tributaries in the McKenzie Subbasin. Access to approximately 25 miles of productive habitat is blocked by Cougar Dam. The run eliminated by Cougar Dam was estimated to be 3,860 adults. In 1962, the release of 2,050 adults resulted in an estimated 79,000 smolts to the reservoir.

VEGETATION ISSUES:

Management activities within the watershed have affected the amounts, distribution and configuration of the forest vegetation. The changes may be

outside the natural range of variability and threaten the integrity and resilience of the forest ecosystem.

*Management activities have fragmented the landscape with road systems and dispersed even-aged regeneration units.

*The fragmentation of forest vegetation could threaten the viability, distributions, and populations of plant and animal communities.

*Timber harvesting activities have reduced the amount of late successional and old-growth forests.

*Management activities throughout the watershed have changed the natural scenic quality of the landscape.

*The forest vegetation has the capability of producing an assortment of forest commodities to the local and regional economies

*There are plant species of concern that are declining due to environmental change and loss of habitat.

RIPARIAN ISSUES:

*Management practices such as timber harvest and road building have affected the quality, quantity and connectivity of riparian habitat. Riparian vegetation provides habitat for riparian and aquatic plant and animal species as well as many terrestrial species. Composition and structure of the vegetative communities contributes to stream channel form and bank stability, while also providing shade and cover. Specific aspects of riparian function are pool creation, temperature modification, wildlife habitat and connectivity, and sediment storage. Riparian vegetation provides the food base for riparian vertebrate and invertebrate herbivores and their predators. As part of the FEMAT strategy for preservation of old growth dependent and associate species, riparian vegetation is also expected to provide connecting habitat between late successional reserves.

WILDLIFE ISSUES:

*Roads, timber harvest, Cougar reservoir, and powerline corridors may have effectively created barriers to the normal migration and dispersal patterns of some species of wildlife. Riparian and unique habitats play a key role in maintaining ecological functions such as gene flow. Specific components such as down logs and snags also play key roles. These components are the main ecosystem features that make up composition, structure, and functional relationship of species to habitat.
Riparian corridors need to provide adequate habitat for related species as well as dispersal requirements for some species such as the Northern Spotted Owl, Tailed Frogs, and management indicator species. Riparian associated species such as amphibians are often highly dependent on large down logs, connected migratory corridors, and specific water temperatures.

*Management activities such as fire suppression, timber harvest, and site preparation have altered the landscape and habitat conditions. The landscape may currently be different from the natural range of habitat characteristics in terms of vegetation composition, seral stage, stand structure, down wood, and snags. Natural fire occurrence within the South Fork watershed has affected the amount, distribution, and configuration of animal and plant habitats throughout the watershed. For example, as a result of breeding habitat fragmentation, some species of neotropical migratory birds may not have sufficient breeding habitat to maintain historic population levels.

Knowledge of species existing in the watershed, and how to avoid negative effects to them from management activities is needed. Also, information on activities necessary to start species recovery or maintain population viability is desired to make reasonable management decisions in the future.

*Future land management strategies favoring habitat requirements of late successional forest associated species, may limit optimal habitat conditions for early seral habitat associated species. Forage generally grows in the early seral stage which is required by big game.

Past management activities (timber harvest) have favored deer and elk, and most early seral associated species. The result is a positive increase in species population size. Existing and projected future habitat characteristics of elk for example, may not be adequate to support the quantity of elk set by the Oregon Department of Fish and Wildlife (ODFW).

*There are high density levels of roads in some areas of the watershed. High density levels may led to increases of harassment and poaching.

RECREATION ISSUES:

Concentrated use of dispersed recreation sites, including the Hot Springs, as well as their access roads and trails have had impacts on water quality and riparian vegetation. Impacts have occurred through increased erosion and compaction, reduction in riparian vegetation structure and a decrease in site productivity.

There are two primary reasons for many of the recreation related issues in the South Fork. One is that the majority of dispersed recreation sites here, as elsewhere, are located within close proximity to water and usually in the riparian zone of creeks, rivers and lakes. The second reason is that the area, especially around Cougar Reservoir, receives extremely high concentrated use at specific times during the year. This concentrated use results in much higher impacts to the scenic quality, social interaction and overall quality of experience than if the visitor days was spread throughout the year.

There have been impacts to water quality from human wastes, littering, dumping, and washing. The scenic attributes of some campsites have also been diminished by these practices. This is especially of concern during the periods of concentrated use.

There has been a loss of large woody material and trees for future recruitment in and around recreation sites due to salvage operations as well as from personal use gathering during times of heavy use.

Bank instability has been increased through vehicle and human foot traffic. One specific area of concern is adjacent to a side channel in Twin Springs campground. Traffic and lack of gravel are contributing to sedimentation into the South Fork at that site.

Overall user experience is potentially diminished due to overcrowding during certain periods of high use.

Dispersed campsites do not have the facilities for long term stay or for highly concentrated use.
Unmanaged access of vehicles has lead to areas of compaction and sedimentation especially between Road 19 and the South Fork.

Long term use of certain areas has led to displacement of short term users?

Transportation Planning- Project List

Chronic Maintenance

The following is a list of chronic maintenance trouble spots that are proposed for evaluation for long term fixes. A maintenance trouble spot map identifying the location of the below roads is on file at the district.

Chronic Maintenance Concerns:
1994 Walker Creek, road runs mud during winter.
1900, Slump area on road.

Heavy Ditch Slough, Chronic Shoulder Washout
1900204

1900431
1985
1986
1927100
1927202

Plugged Culvert Inlets--needs monitoring and cleaning
1927
1927100
1927200
1900415

TABLE 1. Roads Proposed for Storm Proofing or Decommissioning.

1900766	1927155
774	157
745	112
748	113
902	110
903	114
455	260
429	299
459	288
375	
431	
570	1900139
489	
492	1927287
1958342	
346	
344	

347
357
351
360
359
375
376
382
383
366
478
1958475

1980338
339
340
330
331
332
320
310
308
484
480
477
457
456
232
423
448
447
445
443
239
492
341
342
293
287
272
274
275
279
277
260
254
255
266
265
214
204
225
236
1980202

1985116
192
191
187
181
180
186
113
187
260
263
268
274
1985278

1986103
114
118
119
120
121
127
124
126
138
136
1986142

1993566
572
575
1993576