

## 10.0 MONITORING AND EVALUATION

Monitoring and evaluation each have a distinctly different purpose and scope. Monitoring is designed to gather data necessary for the evaluation of projects, environmental trends, species dynamics, etc. During evaluation, monitoring data are analyzed and interpreted to determine whether goals and objectives are being met. Through the use of adaptive management, information and insights gained from monitoring and data evaluation are used to improve management practices and policies.

The monitoring strategy in Table 10-1 summarizes the type and frequency of monitoring that has gone on to date in the Entiat subbasin; many actions are ongoing. The monitoring strategy identifies the elements to be tracked during implementation of this Plan to ensure:

- 1) That natural resource trends remain favorable;
- 2) That habitat improvements are implemented as planned and are effective in addressing key limiting factors;
- 3) That land use trends do not change significantly from assumed trends, and
- 4) That the goals and objectives of the Entiat WRIA 46 Management Plan are being met.

The monitoring and evaluation process outlined in this chapter provides landowners and agencies with a summary of what data are necessary to amend/update the WRIA 46 Plan. The monitoring information contained here is not intended to detail all monitoring that is occurring or may occur in the subbasin. Many activities are already being monitored in order to comply with County, State, Tribal and Federal laws and/or regulations, or meet legal responsibilities. Information included in this document relies heavily on such agency information.

As mentioned in the preface, Entiat valley landowners and participating agencies are committed to making this a dynamic document. As such, the monitoring strategy will be amended over time (as necessary) to correspond with the recently developed [Monitoring Strategy for the Upper Columbia Basin](#) (Hillman, T.W. 2003) and support regional monitoring efforts.

**Table 10-1. Summary of past and ongoing monitoring activities in WRIA 46.**

Monitoring Item	Monitoring Element	Units	Suggested Method	Responsible Entity	Frequency
<b>Natural Resources</b>					
Vegetation - Noxious weeds	Area occupied by noxious weeds	Acres	Agency records, visual inspection, mapping (EGIS)	Chelan County and Land Mgt. Agencies	5 years, with some annual
TE&S Plants	Populations	Numbers/Acres	Agency records, visual inspection	WDFW, USFWS, USFS and others	5 years
Water Quantity	Stream flow	Volume (cfs)	Continuous and staff gages	USGS, CCCD, USFS	Ongoing at 3 primary sites
Water Quantity	Stream flow	Volume (cfs)	Continuous and staff gages	WDOE, CCCD, USFS	Ongoing at expanded network
Water Quantity	Wells	Water surface elevation, gallons/gpm	Tape, metering	CCCD, WDOE	Monthly, ongoing
Water Quantity	Surface Water diversions > 1 cfs	cfs	Metering	Water Users, WDOE	Continuous
Water Quality	Water Quality parameters	Varies	Water sampling	WDOE and Mgt. Agencies	Monthly ongoing
Water Temperature	Excursions beyond criteria	Number of excursion days per year	Continuous recording data loggers	WDOE, USFS, Mgt. Agencies	Daily ongoing for select months
Fine Sediment	Exceeds established parameters	Percent fines ( $\leq 1$ mm) in gravels	McNeil core sampling	USFS, WDOE	Annual ongoing
Riparian & Aquatic Resources	Geomorphology, riparian veg., streambank erosion	Departure from natural condition	Stream surveys, photo points	USFWS, USFS NRCS, and others	10 years
Wetlands	Wetlands	Acres	Wetland Inventory	WDOE, NRCS, USFS	ongoing
TE&S Fish	Trends stable or improving	Fish distribution, species composition, and population levels.	Spawning surveys/redd counts; snorkel surveys; telemetry; smolt traps; dam passage counts	USFS, PUD, NMFS, USFWS and others	Annual ongoing
Wildlife TE&S, State/Federal Species of Concern	Trends stable or improving	Wildlife numbers	Use of ongoing sampling	WDFW, USFS, USFWS and others	5 years
Vegetation	Vegetative recovery past disturbance (e.g. fire)	Trend in site condition	Fixed photo points	USFS and contractors	Varied

Monitoring Item	Monitoring Element	Units	Suggested Method	Responsible Entity	Frequency
<b>Habitat Improvements</b>					
Instream Structures	Rock cross vanes (or other structures) with root wads	Habitat area	Cross-sections with Flow and bench mark photos	NRCS, WDFW USFWS, USFS	1 year 5 years
Riparian plantings	Survival surveys	Percent survival	Random sampling and bench mark photos	NRCS/CCCD and Mgt. Agencies	1 year 5 year
Upland restoration projects	Project and site condition	Trends in site condition	Variable – visual, photos, etc.	USFS, BLM, NRCS, and others	ongoing
<b>Land Uses</b>					
Agriculture	Irrigated Lands	Acres	Air Photo - Ground-truthed	DOE and CCCD	5 years
Livestock Grazing	Class of livestock and location	Numbers by Class	Agency records and field counts	DNR, USFS, BLM	5 years
Timber harvest and associated road building	Logging and road building	Volume harvested / miles of new road	Agency and private ownership records	BLM, USFS, DNR, and Private Owners	5 years
Recreation	Visitor trends	Visitor days	Agency records	USFS et al.	5 years
Residential housing	New development	Number of exempt wells	Agency records	Chelan County WDOE (wells)	Annual
<b>*Economic &amp; Population Trends</b>					
Entiat Retail Sales	Retail sale trends	Dollars in thousands	Retail records	City, State Dept. of Commerce	Annual ongoing
Population Growth	Population growth trends	Population in hundreds	Annual predictions, 10 year US Census	State Office of Financial Management, US Census Bureau	2001 2011