

APPENDIX D: SUMMARY OF STATE MONITORING PROGRAMS

Matrix of State Monitoring Programs for Natural Resources Reform Initiative (Executive Order 09-07) (DRAFT)

Logistical attributes of key state monitoring programs to assist coordination of field sampling

Ongoing Monitoring Program	Agency	Comments	Question Answered	Media Sampled	Location	Fixed, Rotating or Variable	Sampling	Number of Sampling Sites	Access	Partners	Contact Name
Stream flow monitoring	ECY	Shares stream flow monitoring with the USGS	What is the daily, monthly and annual flow of selected streams?	Freshwater	Statewide	Fixed	Continuous (Monthly)	~100	In-stream and bridges	No	
Ambient water quality monitoring	ECY	Long term non-random sites. Used to support federal NPDES program and TMDL actions.	What is the status of water quality at selected sites scattered across the state?	Freshwater	Statewide	Fixed	Monthly	62	In-stream and bridges	No	
National Coastal Condition Assessment	ECY	National assessment sponsored by EPA	What is the status of Washington marine environment relative to other parts of the nation?	Marine water, habitat, fish, sediment	Marine waters along the coast and Puget Sound	?	5 years	?	Boat and shoreline	No	
Marine water quality monitoring	ECY	Mission critical	What is the status of water quality in Puget Sound and coastal marine waters?	Marine water	Marine waters of Puget Sound	Fixed and rotating	Monthly	40	Boat and plane	No	
Marine sediment monitoring	ECY	Mission critical	What is the status of toxics, marine invertebrates and sediments in the marine areas?	Marine sediment	Puget Sound	Rotating	Annual	30 per 6 urban bays 30 per 8 regions	Boat	No	
Washington State Toxics Monitoring Program	ECY	Trend and exploratory toxics monitoring	What is the status of toxics such as PCBs in freshwater lakes and streams and in fish tissue?	Freshwater, sediment, fish, SPMD	Statewide	Variable	Annual	Variable	Boat	No	
Toxic Pollution Studies	ECY	Specific studies to analyze toxics in freshwater and fish tissues	What is the status of toxics such as PCBs in freshwater lakes and streams and in fish tissue?	Freshwater, sediment, fish	Statewide	Variable	Annual	Variable	Boat	Tribes	
Total Maximum Daily Load Studies	ECY	Used to measure pollutant load reductions near pollution sources	Have pollution load levels been reduced in areas identified as impaired?	Water, sediment, fish	Statewide	Variable	Annual	Variable	Variable		
Beach Environmental Assessment	ECY-DOH	Monitors bacteria at saltwater swimming beaches for DOH	What is the status of harmful bacteria at saltwater swimming beaches?	Marine water	Puget Sound	Fixed	Weekly (Summer only)	46	Boat and beach	Local health jurisdictions	
Status and Trends for Watershed Health and Salmon Recovery	ECY	Stream reference sites for comparing impaired waters	What are the status/trends of biological communities at selected statewide reference sites with ideal habitat conditions?	Freshwater, habitat, biology	Statewide	Rotating	Annual	50/Salmon Recovery Region	In-stream	No	
Forest Practices Adaptive Management Program	DNR-WDFW-ECY	Effectiveness, extensive and intensive monitoring of forest practices rules	Are the forest practices rules for aquatic resources achieving resource objectives and performance targets?	WQ, in-stream and riparian habitat, fish and primary productivity,	Statewide	Variable	Variable	Variable	Variable	Yes	
Natural Heritage Monitoring	DNR	Inventory of state's significant ecological features	Where are the natural areas of the state located and what are their attributes?	biological, other	Statewide	Variable	Variable	Variable	public land	Yes	
Kings Lake Bog Water Quality Study	DNR	Tracks changes in bog chemistry and hydrology	What is the status/trend of water chemistry and hydrology at Kings Lake bog?	WQ, hydrology	Select reaches	Fixed	Monthly	uk	public land	No	
State Lands HCP Monitoring Program	DNR	State Lands HCP implementation, effectiveness and validation monitoring	Are HCP objectives being met?	WQ, biological, in-stream, riparian and upland habitat, etc.	Mostly WWA	Variable	Variable	uk	public land	Yes	
State Lands HCP Roads Improvement Monitoring	DNR	Inventories DNR forest roads and fish barriers	How many fish passage barriers have been corrected, and how many miles of road have been constructed, reconstructed or	stream crossings and road segments	Statewide	Variable	Annual	Variable	public land	No	
Puget Sound Nearshore Monitoring	DNR	Tracks information about intertidal biotic communities such as kelp and eelgrass.	What are the status/trends of the biological communities of the nearshore marine areas of Puget Sound?	Biological, other	Marine waters	Variable	Variable	uk	Boat, beach, shoreline, aerial	Yes	
Dredge site monitoring	DNR	Maintains an inventory of dredge spoil site in Puget Sound and the coast.	Where are the dredge spoil sites in Washington? What is the impact of those sites on local environment?	Geologic, marine and estuarine WQ	Statewide	Rotating	Variable	uk	Boat	Yes	
Forest Practices Compliance Monitoring	DNR	Biennial compliance audits of forest practices rules	Are forest practices being conducted in compliance with the rules?	rule prescriptions	Statewide	Variable	Annual	~100/year	Variable	Yes	
Adult salmon spawner abundance	DFW	Maintains annual estimates of spawner abundance by river and species for selected populations	What is the annual abundance of spawning adult salmon by water and by species? What are the trends?	Live adult salmon and/or adult salmon carcasses	Statewide	Fixed annual schedule (when funded)	Dam passage, redd counts, weir counts, carcass surveys, etc.	Variable depending on study design and accessibility	Salmonid Stock Inventory (database) and SalmonScape	Various Tribes, Counties, and State and Federal Governments	Ken Warheit/ Dayv Lowry
Angler License Telephone Survey	DFW	Tracks the number of active recreational anglers in Washington state	How many anglers are active? How many fishing trips were made? What are the targeting species?	Anglers	Statewide		Bi-Monthly	1,500 phone calls every two months	Telephone	no	Eric Kraig
Coastal Groundfish Tagging Survey	DFW	Estimates groundfish population abundance, track population movement, and other biological and ecological information	What are the status and abundance trends of coastal groundfish, such as black rockfish? What are their spatial distributions?	groundfish	Coast		Annual		Boat and boat ramps	no	Theresa Tsou
Columbia River Harvest Monitoring	DFW	Ensure compliance with ESA limits. Tracks catch allocations between Columbia River treaty tribes and commercial and sport	Are fisheries within ESA limits? What is the overall harvest of salmon in the Columbia River by species? Have allocation guidelines	Fresh water salmonids, sturgeon.	Columbia River - mouth at Buoy 10 upstream to McNary Dam -	Variable (this applies to both location and sampling). Both	~ weekly - dependant on fishery	Variable - 240 river miles (B10- McN). Sample as needed, driven by fishery.	Boat, plane,foot (cree), fish processing plants.	ODFW, CRITFC	Cindy LeFleur
Commercial Groundfish Landing Monitoring	DFW	Monitors species compositions of landed commercial catches, collect associated biological information, provide key	What are the species reported in the mixed species market category? What are the size/age of landed fish?	groundfish	Westport Neah Bay La Push Bellingham	fixed	Continuous	4	Port	no	Theresa Tsou
Counting Juvenile salmon migrating to the sea	DFW	Maintains annual estimated of the abundance of juvenile salmon migrating to the sea from specific selected streams	What is the freshwater production of salmon for selected streams and species by year?	Freshwater	Statewide	Fixed	Daily	31 WDFW sampling sites (depending on funding)	Boat and shoreline	Tribes, NOAA, LLTK, USFWS	Ken Warheit/ Mara Zimmerma
Food Chain and Habitat Assessments, Status, and Trends	DFW			Primarily NAIP data Remote Sensing landuse land cover	Currently Puget Sound watersheds	fixed	Inventory	By WRIA	Once fully developed, open access	RCO, PSP, Lead Entities, local governments, tribes	Dave Price Tim Quinn
Hatchery marking and coded wire tag Program	DFW	Marks hatchery released salmon with a special tag allowing identification in harvest fisheries throughout the Pacific Ocean	Where are Washington hatchery salmon being caught? What is the relative proportion of the catch in each Pacific coastal fishery?								James Dixon
Hydraulic Permit Compliance Monitoring	DFW	Determines whether applicants who receive a hydraulic permit to work in a river or stream complied with their permit	What is the compliance rate of those who obtained permits to perform work within the high water mark of any lake river or stream?	fresh and salt water	statewide	variable	random by important types	none (lack of funds)	car		Marc Daily/ Tim Quinn
Hydropower effectiveness monitoring	DFW	Monitors effectiveness of mitigation actions at various hydropower installations in meeting FERC license	What is the effectiveness of mitigation actions by each project?	Freshwater	Upper Columbia watersheds		Stratified		Shoreline and boat	Yakama Nation, Colville Tribes, PUDs	Marc Daily/ Bill Tweit
Intensively monitored watersheds	IAC-WDFW-ECY	Intensively monitors salmon populations and habitat restoration actions to show that more salmon are produced as a result of	Do habitat restoration actions cause a positive response in overall fish production in selected watersheds?	Freshwater	Hood Canal, Lower Columbia	Fixed	Daily	20 EMAP habitat survey sites on each watershed (20*7 = 140), 7 outmigrants?	Shoreline	ECY, NOAA, Weyerhaeuser	Mara Zimmerma n/Kirk Krueger
Invasive species monitoring	DFW	Tracks occurrence and movement of aquatic and terrestrial invasive animal species such as green crab	What is the status of invasive animal species distribution in Washington? What are the trends?	Fresh and marine waters; transportation pathways	Statewide	Variable	Species and season dependent	Variable	Shoreline and boat	ECY, DNR, PSP, RCO	Allen Pleus/ Bill Tweit
Marine video acoustics Surveys	DFW	Tracks rockfish populations and other species associated with marine rocky reefs.	What is the status/trend of rockfish, lingcod, and other fishes on rocky reef habitat of Puget Sound?	Marine water, habitat, and associated biota	Puget Sound and coastal water	Variable (???)	depend on funding	depend on funding	Boat	no	Theresa Tsou
Ocean Groundfish Harvest Monitoring	DFW	Tracks recreational catches for groundfish species, including halibut and rockfishes, off Washington coast	What is the overall harvest, landed and released, of coastal groundfish by species, month, MCA, and target type?	Boats, anglers, and landed catch from recreational fisheries.	Catch Record Card Areas 1, 2, 3 & 4 on Washington's coast	Variable	Angler interviews at boat ramps along Washington's coast; monthly or weekly, depending on fishery	12 on coast and 8 inside bays but could change from year to year	Boat ramps		Doug Milward Wendy Beeghley
Ocean Salmon Harvest Monitoring	DFW	Tracks catch allocations between coastal ocean fisheries set by the PFMC for treaty tribes and commercial and sport non-Indian	What is the overall harvest of salmon in Ocean Catch Record Card Areas 1-4 by species, month, and Catch Record Card Area?	Boats, anglers, salmon and bottom fish catches from fisheries.	Catch Record Card Areas 1, 2, 3 & 4 on Washington's coast	Variable	Sample and expand to exit count. Commercial fish tickets. Monthly or weekly, depending on fishery	12 on coast and 8 inside bays but could change from year to year	Docks, boat ramps and buying stations	Oregon DFW and sometimes Tribes	Doug Milward Wendy Beeghley
Puget Sound ambient monitoring program for birds and mammals	DFW	Monitors trends in distribution and abundance of marine birds, mammals in Puget Sound	What are the status/trends in marine birds and mammals in Puget Sound?	bird and mammal abundance	Puget Sound and Strait of Juan de Fuca	Variable	Variable	Variable	Airplane and boat	US Fish and Wildlife, universities, NOAA, non-profits	Scott Pearson/ John Pierce
Puget Sound Assessment and Monitoring Program (PSAMP) Toxics in Biota Component	DFW	Monitors status and trends of toxic contaminants in fish and of associated health health impacts throughout Puget Sound including	What is the extent and magnitude of toxic contaminants in Puget Sound fish, what are the health impacts of contamination, and how are these	fish tissues for toxic contaminants	Puget Sound-wide and 5 river mouths	Fixed and rotating	semi-annual by species	English sole (10); Coho Salmon (5); Pacific herring (3); Other species variable	boat based, or purchase from tribal or other fisheries	NOAA Fisheries	Jim West
Puget Sound bottom trawl monitoring	DFW	Estimates population of bottomfish and invertebrates within the various basins	What are the status/trends in marine bottomfish and invertebrates for specific basins of Puget Sound?	Marine water, habitat, and associated biota	Puget Sound	Fixed (???)	Annual	50	Boat	no	Theresa Tsou
Puget Sound Groundfish Harvest Monitoring	DFW	Tracks recreational catches for groundfish species, including halibut and rockfishes, in Puget Sound	What is the overall harvest, landed and released, of Puget Sound groundfish by species, month, MCA, and target type? What is the impact	Boats, anglers and landed catch from recreational fisheries.	Marine Catch Areas 5 through 13 in Puget Sound.	Variable	Angler interviews at boat ramps throughout Puget Sound; year-round catch sampling each week,	Hundreds throughout Puget Sound	Boat ramps		Doug Milward Laurie Peterson

Puget Sound Herring Stock Assessments	DFW	Critical for determining annual abundance of herring in Puget Sound. Herring are the basic food source for salmon, seals, rockfish.	What is the status/trend of the various herring populations residing within the Puget Sound?	Marine vegetation/herring eggs	Documented herring spawning grounds throughout Puget Sound	Variable within documented spawning grounds	Biweekly to semiweekly Jan. thru June depending on area; approx. 150 surveys/year	Approx. 24 different areas sampled annually; approx. 6,000 sample locations/year	Boat	Occasional tribal involvement	Rich Childers/Mark O'Toole/Ku
Puget Sound Salmon Harvest Monitoring	DFW	Tracks catch allocations between Puget Sound treaty tribes and commercial and sport non-Indian fisheries	What is the overall harvest of Puget Sound salmon by species, month, Marine Catch Area (or Catch Record Card Area), and by river? How is	Boats, anglers, salmon and bottom fish catches from recreational	Catch Record Card Areas 5 through 13 in marine waters of Puget Sound; also	Variable	Angler interviews, Murthy estimator method to produce creel estimates; Catch Record Cards and	Hundreds throughout Puget Sound	Docks, boat ramps and buying stations	Treaty tribes	Steve Thiesfeld Doug Milward
Sport Harvest catch Record card	DFW	Tracks sport catch in the smaller rivers and streams of the state	What is the sport catch of salmon in the state and by river and ocean area?	Fresh and marine waters	Statewide	Fixed (annual)	Random sample of catch reports returned by anglers	N/A	N/A		Eric Kraig
Stock ID and Fish Age Structure Program	DFW	Uses fish body parts to determine age structure, growth and survival	What is the cohort reconstruction of each salmon run? What effect did ocean environmental conditions have on growth and survival?	Live adult salmon, fishery caught & broodstock carcasses	Statewide	Variable depends on fisheries	depends on design	Variable depending on study design and accessibility	Variable	Various Tribes, Counties, and State and Federal Governments	Ken Warheit/ Day Lowry
Stock Identification and Genetics Program	DFW	Uses DNA analysis to identify specific wild salmon populations. Identifies linkages between populations to determine unique	Where is the major wild population groups of salmon located? What fisheries are intercepting Washington wild salmon?	Biological tissue	Statewide	Variable	Variable	Variable	Variable	Yes	Scott Blankenship
TFW Cooperative monitoring (CMER)	DNR-WDFW-ECY	Testing the effectiveness of TFW prescriptions	What is the effectiveness of Forest-Fish forest practice rule changes in improving fish habitat?	Riparian vegetation, freshwater habitat	west side	variable (limited term effectiveness monitoring)	depends on design	variable depending on study design	Variable	variable	Tim Quinn
Wildlife Status and Trends Monitoring	DFW	Estimates abundance and trends of important game, indicator, and special status species. Critical for evaluating harvest levels and	What are the status and trends of game, indicator, and special status species (endangered, threatened, etc)? Are conservation actions	Animal abundance and trends	Statewide	Variable	Annual	Variable	Variable	U.S. Fish and Wildlife, universities, non-profits, and citizen	John Pierce/ Scott Pearson
Limiting Factors Analysis	WCC	Provided initial assessment of factors limiting salmon production by watershed	What are the salmon limiting factors by WRIA for the state?								
Project scale effectiveness monitoring	RCO	Measures changes in habitat at the project scale at restoration projects and compares them to a control area.	What categories of restoration actions are most effective? Are most cost effective? Have the greatest longevity?	Freshwater & riparian	Statewide	Fixed and rotating	Annually	~ 90 project sites	in-stream	No	
Restoration project Implementation/ compliance monitoring	RCO	Tracks projects to insure that they are completed according to plan and specifications	Are the projects implemented as approved? Are funds expended in a timely manner?	Freshwater & riparian	Statewide	Variable	On-site review at project completion	Varies	In-stream, bridges, private lands	Local sponsors	
Shellfish Growing Area Marine Biotxin monitoring	DOH	Monitor PSP toxin in shellfish	Do shellfish from harvest areas meet national standard for PSP toxin?	Shellfish	Puget Sound, Coastal bays and Pacific Coast	Fixed	Bimonthly	100	Shore	Yes, Tribes, LHJs, DNR, WDFW	
Shellfish Growing Area Marine Biotxin monitoring	DOH	Monitor domoic acid in shellfish	Do shellfish from harvest areas meet national standard for domoic acid?	Shellfish	Puget Sound, Coastal bays and Pacific Coast	Fixed	Bimonthly	100	Shore	Yes, Tribes, LHJs, DNR, WDFW	