| MPG | List of Critical Projects | Strategy Statement | Prioritized List of Gaps and Justifications  | RPA Recommendations And Other Prioritized Recommendations or consolidations | Prioritized List of current projects continued/modified and/or New Funding Proposals with estimated costs |
| --- | --- | --- | --- | --- | --- |
| (A) | (B) | (C)  | (D) | (E) | (F) |
| Snake River Sockeye ESU Snake River Lakes | 199107100 199204000 200740200BPA Umbrella Project #**200740200**; Contracts: 40909 (Shoshone-Bannock Tribes), 40175 (NOAA Captive Brood), 39681 (ODFW Smolt Rearing), 37981 (IDFG Captive Brood), 35436 (Facility Acquisition). | * Transition from the current gene conservation program to a species-recovery program by producing 500,000 to 1,000,000 sockeye smolts annually.
* Continue genotyping all spawners used in the program so PBT may be used to identify progeny at any life stage.
* PIT-tag sockeye juveniles for SAR estimates, smolt and adult run-timing through the hydrosystem, and collection efficiency at LGR.
* Implement studies to estimate survival from LGR to Stanley Basin lakes and to indentify where losses occur.
* Monitor all fisheries (sport, tribal, commercial) and estimate incidental harvest of Snake River sockeye using PBT and GSI.
 | 1. Sockeye genetic baseline needs to transition from microsatellites to SNP’s.
2. Accurate juvenile migrant abundance estimates cannot be made in Alturas and Pettit lakes with existing trapping infrastructure.
3. Insufficient number of sockeye are PIT-tagged for accurate and precise juvenile survival, SAR, and dam collection efficiency estimates.
4. Adult trapping and holding infrastructure at Stanley Basin trap sites is inadequate to handle the proposed-increased level of production.
5. Uncertainty in the accuracy and precise of applying aggregate estimates of wild and hatchery adult sockeye mortality in Columbia and Snake River sport, tribal, and commercial fisheries to the Snake River ESU.
 | **RPA Workgroup Recommendations:**None**Other Recommendations or Consolidations:**1. The current program (gene conservation and captive broodstock) is supported with existing contracts. The proposed expanded production program will require enhanced funding and infrastructure to adequately monitor and evaluate VSP parameters and hatchery effectiveness.
2. Acquire and develop a hatchery facility in Idaho to produce 500,000 to 1,000,000 sockeye smolts annually to release in Stanley Basin lakes.
3. Design and construct adult trapping and holding facilities at Sawtooth Basin sites to accommodate increased production levels.
4. Ensure adequate funding to continue PIT-tagging sockeye juveniles for SAR.
5. Complete a comprehensive sockeye SNP genetic baseline by genotyping samples previously collected.
6. Ensure adequate funding to genotype all hatchery spawners so Parental Based Tagging (PBT) can be used to indentify progeny at any life stage.
 | **Existing/Modified/New Projects To Implement RPA Recommendations**(Insert here any proposals for implementing the RPA recommendations with short description of contract, amount/yr, and contractor)**Existing/Modified/New to Implement Other Recommendations**(Insert here any other proposals for addressing the recommendations for filling priority gaps with a short description of contract, amount/yr, and contractor) |
| Upper Columbia Sockeye ESU | 200850300  | * Adult enumeration on Okanogan through dam counts followed up with live and carcass counts on the spawning grounds
* Okanogan juvenile enumeration done through hydroacoustic sampling by CDFO
* In Wenatchee adult enumeration is completed at Tumwater Dam. PIT tags are inserted at the dam to determine percent distribution of spawners to upriver tributaries.
* Smolt trap operated at outlet to Lk Wenatchee to determine total smolt outmigration
 | 1. Coordination needed between Canada and US over hydroacoustic evaluation techniques used in Okanogan sockeye applied to Lk Wenatchee.
2. Smolt trap efficiency at Lk Wenatchee needs to be further refined
3. Trophic status of Lake Wenatchee needs to be determined in terms of sockeye production.
4. Need to better understand pre-spawn mortality for Okanogan sockeye.
5. Predator- prey interactions both in the river and in the lake for both Lk Wenatchee and Okanogan sockeye populations
 | **RPA Workgroup Recommendations:**None provided**Other Recommendations or Consolidations:**1. Implement the CRITFC sockeye study
2. *NOTE: Ad Hoc group needs to prioritize the gaps identified for funding and prioritizations*
 | **Existing/Modified/New Projects To Implement RPA Recommendations**(Insert here any proposals for implementing the RPA recommendations with short description of contract, amount/yr, and contractor)**Existing/Modified/New to Implement Other Recommendations**(Insert here any other proposals for addressing the recommendations for filling priority gaps with a short description of contract, amount/yr, and contractor) |
| Upper Columbia Coho ESU | 199604000  | VSP* Rely upon redd counts and compare with dam counts at major dams
* Juveniles enumerated at smolt traps

HATCHERY* Currently developing local broodstock
* Intend to use natural production phase by monitoring PNOS and PNI

HABITAT* Habitat being monitored as part of other accord projects but not specific to coho.
 | 1. Spawner composition is difficult to determine based upon carcass distribution
2. Spawner stray rate is not fully known and it is uncertain and needs greater emphasis.
3. {NOTE: Move this statement to Upper Columbia Domain Need density dependent information on effects on other listed species RPA 56.1}
 | **RPA Workgroup Recommendations:**1. None. Some concern expressed about the impact on habitat and VSP analysis of other species addressed by RPAs

**Other Recommendations or Consolidations:**1. Currently funded through the Accord
 | **Existing/Modified/New Projects To Implement RPA Recommendations**(Insert here any proposals for implementing the RPA recommendations with short description of contract, amount/yr, and contractor)**Existing/Modified/New to Implement Other Recommendations**1. Implement the CRITFC sockeye study ($covered)
2. **Improve smolt trap efficiency at Lk Wenatchee ($125k for second trap)**
3. Implement Lake Wenatchee trophic status study ($300k / yr for 5 yrs)
4. Determine pre-spawn mortality of sockeye between Wells and spawning, assuming you can use the new PIT tag arrays defined in the steelhead data gaps ($100k / yr for 5 yrs).
 |
| Mid Columbia CohoYakima | **VSP**199506325 199506425**HATCHERY**199701325 **Habitat**199704700 199704900 199705000 199705100 199705200 199803400 200107100 200202100 200202400 200202500 200203800 200205200 | Restoration program using combination of local and out-of-basin hatchery-origin brood and releasing fish at various life stages including adult, parr, and pre-smolt from various tributaries and acclimation sites above the confluence of the Naches and Yakima Rivers.Adult abundance: Video monitoring at Prosser (hatchery- and natural-origin recorded from marks), >95% of fish counted ; redd countsJuvenile abundance: subsampling at Roza and Chandler; working to develop outmigration estimates with confidence intervals using flow/entrainment expansionsProductivity: Adult to adult productivity for natural-origin fish known with medium-high confidence since ~2000. Juvenile (Chandler smolt to Prosser adult) productivity being developed (see previous bullet) – presently estimates are developed with medium to low confidence using PIT tag data.Spatial Distribution: redd surveys by YN, targeting areas of release and known spawning areas; some telemetry workDiversity: DNA collected from sub-sample at Prosser denil; Biological is monitored through physical samples from Prosser denil trap and spawner carcass surveysHatchery: hatchery- and natural-origin escapement and use in local brood stock is knownHabitat: Many projects have been implemented; effectiveness monitoring will be part of overall YKFP project analysis | Smolt survival below ProsserSmolt survival from Sunnyside Dam to Prosser | Other Recommendations or Consolidations:Currently funded through the AccordsDevelop Master Plan and HGMP (intend to complete by end of 2012); submit to NPCC for 3-step reviewUse current available technologies (e.g. acoustic tags) to identify specific factors affecting smolt survival in identified reaches of the Yakima River. | Cost estimates to be developed and included in Master Plan |
| Lower Columbia Coho |
| Coast | Mitchell Act MERBPA SAFE #199306000NOAA BiOp funding for smolt trapping Oregon Lottery  | **Washington*** Adult abundance is not estimated for most populations. Abundance is estimated for some populations using weir or redd counts.
* Adult productivity is determined by cohort analysis from sex ratio, origin, and age-structure of spawners from carcass surveys or traps on Elochoman, Cowlitz, Toutle, Lewis, and Wind Rivers. Fisheries for LCR coho are selective but impacts are not monitored.
* Juvenile productivity is estimated from 1 primary population per strata (Grays-Coast, Coweeman-Cascade, and Wind-Gorge) but is few fish are caught in the Wind due to limited distribution. Juvenile productivity is also estimate from IMW project. Cowlitz Falls, and Tilton.
* Adult spatial distribution is monitored a few population including Mill and Coweeman.
* Adult diversity is monitored by spawning time from stream surveys, and age, length, and run timing from traps. Baseline genetic (DNA) has been collected from most populations.

**Oregon*** Where field protocols for spawning surveys are deemed to provide acceptable precision and bias, and access is possible for most of the potential areas in the sample frame, ODFW has implemented either GRTS-based or census-based spawning surveys to provide population level information on abundance (spawners), productivity (recruits/spawner), diversity (occurrence of hatchery strays on spawning grounds, run timing, size, age, genetics), and distribution. Goal is to provide annual spawner abundance estimates at the ESA population scale with a precision of + 30% or better. NOTE that these surveys are preferable to fixed station counting since they have the potential to provide information on distribution which is not available with fixed station counts. They are, however, only preferable if they can produce estimates with acceptable precision and bias.
* Where field protocols are not amenable, ODFW uses information from existing or new adult trapping facilities to provide abundance, productivity, and diversity for sub-watershed areas. In these instances ODFW is not able to assess spatial distribution.
* Where field protocols for juvenile surveys provide acceptable precision and bias, and access is possible for most of the potential areas in the sample frame, ODFW has implemented GRTS-based surveys to provide strata level information on an index of abundance (fish/m2), productivity (juveniles per mile/spawners per mile), and distribution. Goal is to provide annual estimates of juvenile density at the ESA strata scale with a precision of + 30% or greater.
* In at least one sub-watershed per strata, ODFW traps adults in and juveniles out to provide estimates of marine and freshwater productivity (i.e. Life Cycle Monitoring sites). Goal is to provide annual estimates of adults in and adults out of selected watersheds with a precision of + 30% or better.
 | Washington1. Infrastructure to support data storage, analysis, reporting, and dissemination.
2. Identify spatial extent of spawning (sample frame).
3. Develop LCR specific redds/female, observer efficiency, and residence time for coho salmon.
4. Estimate precision (CV).
5. Conduct power analysis for adult and juvenile abundance estimates
6. Conduct validation redd surveys above weirs, mark-recapture, or DIDSON sites to validate redd or AUC estimates.
7. Improve juvenile mark-recapture point and variance estimates to account for missed smolt trapping days, tag loss, missed tags, selectivity, and closure.
8. Consider primary population fish in/out site for coho in cascades to Lower Gorge Tribs (Hamilton/Hardy/Duncan) to capture sufficient smolts.
9. Improve redd or AUC based population estimates to account for both spatial/temporal sampling errors and observation/measurement errors. Evaluate alternate spatial sampling designs to index/supplemental approach.
10. Development of DPS genetic sampling program and analyze all current samples.
11. Estimate incidental mortality in LCR mainstem and tributary fisheries.
12. Evaluate use of DIDSON to improve precision at high priority primary populations including IMW and fish in/out sites.

Oregon1. Conduct research to assess the representativeness of these index areas and evaluate magnitude of pre-spawning mortality.
2. Cross check precision and bias of GRTS-based or census-based spawning surveys by comparing the results of survey implemented above adult traps to counts made at the traps. Conduct these evaluations over the range of conditions that exist within Oregon’s portion of the LCR.
3. Evaluate the potential for using sonar (e.g. DIDSON) to monitor abundance. Implement where feasible and cost effective in situations where surveys cannot be conducted or adult trapping facilities do not exist.
4. Develop programs to monitor fishery related mortality[[1]](#footnote-1) that include reliable information on bias and precision.
5. Conduct hatchery monitoring to provide information on number of fish released, marked[[2]](#footnote-2), returned to hatchery, and wild fish collected for brood stock.
6. Evaluate how well Life Cycle monitoring sites represent conditions outside of the index areas and investigate the potential for implementing additional trap sites that could be operated periodically on a rotating basis to “calibrate” index sites to broader areas.
 | **RPA Workgroup Recommendations:**None provided**Other Recommendations or Consolidations:** | **Existing/Modified/New Projects To Implement RPA Recommendations**(Insert here any proposals for implementing the RPA recommendations with short description of contract, amount/yr, and contractor)**Existing/Modified/New to Implement Other Recommendations****OREGON**1. Continue coded wire tagging and recovery programs. Cost/year: ~$447k for region
2. GRTS-based habitat monitoring at population scale in wadeable streams. Cost/year: $156k (for all pops and all MPGs in LCR)
3. Increase percentage of coho that are coded wire tagged to facilitate improved precision of PHOS and understanding of hatchery origin: Cost: unknown
4. Life cycle monitoring site in Clatskanie River. Cost is included as part of priority funding item 1 for Oregon chum salmon monitoring.
5. ISTM project (200400200). Cost: $80k (ODFW portion)
6. Develop new hatchery database system that is compatible with the proposed databases for production planning and marking (IStar), has the ability to store new data fields and expand as need arises, and is readily available to all personnel in ODFW. Cost: $60k (for all of Oregon)
7. Juvenile outmigrant trapping at NF Klaskanine and Big Creek to obtain additional information on marine and freshwater survival rates and gather information needed to develop and test habitat capacity models. Cost: $100k/year
8. GRTS-based surveys above fish counting/passage facilities to evaluate precision and bias. Cost: $60k/year (Includes NF Klatskanine, Big Creek, and Claskanie)
9. Macroinvertebrate monitoring at MPG scale. Cost: $50k/year (includes all MPGs in LCR)
10. Understanding of precision and bias of harvest estimates and work to improve where needed. Cost: unknown
11. Evaluation of how well Life Cycle monitoring sites represent conditions outside of the index areas and investigate the potential for implementing additional trap sites that could be operated periodically on a rotating basis to “calibrate” index sites to broader areas. Cost: $50k
 |
| Cascade | NOAA Mitchell ActOregon LotteryTacoma City LightPG&ECity of TacomaPacificorp | * See Coast strategy
 | 1. Increase number of smolt traps
2. Determine precision of spatial distribution estimates in Washington
3. Stabilize funding for GRTS-based surveys.
4. Analyze existing genetic samples.
5. Estimate incidental mortality in LCR mainstem and
 | **RPA Workgroup Recommendations:**None provided**Other Recommendations or Consolidations:** | **Existing/Modified/New Projects To Implement RPA Recommendations**(Insert here any proposals for implementing the RPA recommendations with short description of contract, amount/yr, and contractor)**Existing/Modified/New to Implement Other Recommendations** |
| Gorge | NOAA Mitchell ActOregon Lottery199801900 199801900 198805308198805303USGS | * See Coast strategy
 | 1. Implement GRTS redd sampling in Oregon and Washington tributaries
2. Fund a floating weir in WF Hood River
3. Wind River BPA Funding due to end in 2009
4. SRFB Funding in Wind River due to end in 2010
 | **RPA Workgroup Recommendations:**None provided**Other Recommendations or Consolidations:** | **Existing/Modified/New Projects To Implement RPA Recommendations**(Insert here any proposals for implementing the RPA recommendations with short description of contract, amount/yr, and contractor)**Existing/Modified/New to Implement Other Recommendations** |
| Lower Columbia Chum ESU |
| Coast-Cascade-Gorge | PCSRFMitchell Act MERSRFB NOAA Biop contract for smolt trapping199900301 200105300 | VSP OregonMonitoring strategy is to monitor chum abundance in the Clackamas River using life adults carcasses and redds.Experimental reintroductions into Scappoose and Clatskanie basins using supplementation from Grays River stock coupled with habitat improvement projects within the chum utilization zones to extend into former range will require additional future monitoringWDFW.1. Current strategy determines adult abundance as peak count/mile for index reaches within selected streams. Since 2004 mark-recapture estimates are used to develop peak count expansion factors, observer efficiency, and residence time.
2. Adult productivity of sufficient time series is only available for Lower Gorge tributaries, and Grays River.
3. Juvenile productivity is estimated from 1 population in the costal strata (Grays) in 2008.
4. Strategy uses spawner density in high use areas and periodically for lower use areas to determine adult spatial distribution.
5. Adult diversity is monitored by stream surveys including spawning time, age, & length. All hatchery chum salmon are thermally mass marked, and otolith decoding is used to estimate origin. Baseline genetic data has been collected but not fully analyzed.

Chum BiOp project 200871000 will develop an M&E plan for chum salmon in Washington and coordinate with Oregon.. **ISTM Statement**The goal of the Integrated Status and Trends Monitoring (ISTM) project is to develop a coordinated VSP monitoring program that address key regional monitoring questions and develop study designs of sufficient quality and quantity to determine status of Lower Columbia River salmon and steelhead. In this process we will provide entities tasked with monitoring fish populations with a roadmap of the steps needed to develop an integrated, scientifically sound monitoring program that meet the needs of regional decision makers and managers. The objectives include: (1) indentify and prioritize decisions, questions, and objectives; (2) Evaluate extent to which existing programs align with these decisions, questions, and objectives; (3) Identify most appropriate monitoring design to inform priority decisions; (4) Use trade off analysis to develop specific recommendations for monitoring based on outcomes of objectives 1-3 and; (5) recommend implementation and reporting mechanisms.Results of this project for application by ODFW and WDFW to current monitoring approaches is projected for 2011.The Lower Columbia River Fish Recovery Board plans to integrate the recovery planning process results into the study. | Data quality and certainty is believed to be high for recent mark-recapture populations in the Lower Gorge and Grays River and is unknown for other populations due to limited sampling and untested assumptions, uncertainty in the sampling frame, and spatial survey designs.Adult productivity for Chum populations relies on untested assumptions about out of basin harvest.Juvenile productivity monitoring data quality and certainty was not high because only one population is being monitored (Grays) which began in 2008.Fine scale spatial data is available for high use reaches in Grays and Lower Gorge tributaries.Adult phenotypic diversity is high for two populations for spawning time, age, & length but unavailable for other populations. Genotypic data quality and uncertainty is unknown because genetic analysis is not completed.  | **RPA Workgroup Recommendations:*** RPA 63

**Other Recommendations or Consolidations****ODFW**Adequately fund the current ISTM project 200400200 for integrated fish and habitat status and trend monitoring for the entire Lower Columbia Domain. Gaps addressed in this study include:Improved estimates of hatchery spawners and estimates of all population indicatorsDevelopment of spatial distribution monitoring program for adultsPower analysis of juvenile and adult monitoring programs.Infrastructure to support data storage, analysis, reporting, and dissemination Funding for implementation of the results of the ISTM project by 2011.Fund proposals consistent with the Oregon Recovery Plan for the Lower Columbia.**WDFW**Continue funding critical VSP monitoring within the MPG and ESU until the ISTM project is completed ie 200871000.Adequately fund the current ISTM project 200400200 for integrated fish and habitat status and trend monitoring for the entire Lower Columbia Domain. Gaps addressed in this study include:Improved estimates of hatchery spawners and estimates of all population indicatorsDevelopment of spatial distribution monitoring program for adultsPower analysis of juvenile and adult monitoring programs.Infrastructure to support data storage, analysis, reporting, and dissemination Funding for implementation of the results of the ISTM project by 2011.1. Fund proposals consistent with the Washington Forum statewide strategy for monitoring and LCFRB Recovery Plan
 | **Existing/Modified/New Projects To Implement RPA Recommendations**WDFW 200871000 Chum Salmon Enhancement RPA 63.1PNAMP 200400200 RPA 71, 72**Existing/Modified/New to Implement Other Recommendations****ODFW**1. Fund monitoring program described in column D items 1-4. Cost/year: $324k
2. Fund GRTS-based habitat monitoring at population scale in wadeable streams. Cost/year: $156k (for all pops and all MPGs in LCR)
3. Impact of commercial gillnet fisheries for incidental harvest of chum salmon with respect to harvest rates and stock of origin. Cost: unknown
4. Fund remainder of ISTM project (200400200) . Cost: $80k (ODFW portion)
5. Habitat monitoring in non-wadeable streams. Cost: $100k/year (includes all pops and MPGs in LCR)
6. Macroinvertebrate monitoring at MPG scale. Cost: $50k/year (includes all MPGs in LCR)
7. .

**WDFW**1. Few changes to existing VSP monitoring until ISTM recommendations are obtained.
2. Recommend combining BPA **#199900301** for crucial mainstem chum information with BiOp chum project **200871000**
3. Recommend combining BPA **#200105300** for crucial Duncan Creek chum information into BiOp chum project **#200871000**
 |
| TABLE METADATA DESCRIPTION | Include in this column all BPA contracts and other fund sources crucial for continued VSP and hatchery evaluations. | Include in this column a summary statement of your strategy for obtaining VSP information and how supplementation, if any, is used. If the strategy is different between the co-managers indicate where they differ. | Include in this column significant information gaps that if funded would provide significant improvement to data quality or will provide new VSP or hatchery information not currently available | **Included in this column (E) are the RPA Recommendations that address specific RPAs and any recommendations that would end, modify, or consolidate projects.** **Also list any significant new funding proposals that if funded would address a significant VSP or Hatchery gap in priority order 1 through N where 1 is the highest priority.**  | **Describe how the recommendations described in column E can be fulfilled through maintaining existing projects, modifications/consolidations/enhancements of existing projects, adding new projects, or a combination thereof. For existing BPA-funded projects please include the project number.****In parentheses provide cost estimates for additional costs for project modifications/enhancements, reduced costs of project modifications/consolidations, and additional costs for new proposals.****Rank order all new proposals, existing contracts with no changes, and existing contracts with additions or subtractions and new proposed contracts, 1 through N with 1 being the most important to fund** |

1. Needed for productivity estimates. [↑](#footnote-ref-1)
2. Needed to estimate hatchery stray rates. [↑](#footnote-ref-2)