# TrapsReadersNoaaSteelheadClearwater MPG Snake River Steelhead DPS

# Following pages are an analysis of ongoing monitoring programs in the MPG by TRT identified population, an evaluation of the quality of the information, and an evaluation of what would be needed to improve the monitoring and to move toward meeting NOAA Fisheries Service monitoring guidance standards.

# Evaluations shown in this document are drawn from the work completed by the Columbia River Fish and Wildlife Authority through A. Byrne (IDFG) and C. Beasley et al. of the Collaborative System-wide Monitoring and Evaluation Project and through direct participation of the fish co-managers and FCRP action agencies.

# This evaluation is a result of a workshop held at IDFG on March 17 in Boise, and includes edits provided by:

# Alan Byrne, IDFG, 4/1/09

# Jay Hesse, NPT,

# Lytle Denny, SBT and

# Ed Murrell, NOAA.

| **MPG Population** | **Primary Indicator** | **Desired Certainty** | **Monitoring Needed** | **Current Monitoring** | **Data Quality & Certainty** | **Data Improvement Actions Needed** | **RPA Eligible** | **Agency**  **Proposed Projects** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Clearwater MPG General** | **Adult Abundance, Adult Productivity, and other VSP criteria** |  |  | **1990-055-00 IDAHO STEELHEAD M&E STUDIES**   * Estimates wild adult steelhead escapement and age structure passing Lower Granite Dam * COE counts at Lower Granite Dam provide a good estimate of the total number of hatchery and wild steelhead adults for the entire DPS. * Natural-origin Snake River Steelhead abundance estimated at Lower Granite Dam (LGR) using Genetic Stock Identification (GSI) began in **2008 $150K/yr (ISMES)**. Age composition and sex ratios also determined. * IDFG estimates steelhead harvest in recreational fisheries using a telephone survey (only hatchery origin adipose clipped fish may be kept). * Estimates of tribal harvest (hatchery and unmarked) supported by LSRCP evaluation contract and BPA 200206000 * **ISMES (BPA 199005500 ) $784K/yr** * **INPMEP (BPA 199107300) $785K/yr** * **BPA 200500200 39013 $250,853** | * The IC-TRT was unable to make any adult abundance estimates for any population. * Unlikely to get MPG or population scale adult abundance data using traditional methods (redd counts or weirs) * Much of the GSI data collected have yet to be synthesized at the population level * Estimates of natural origin steelhead adult incidental mortality from sport fisheries are imprecise. * Estimating adult steelhead abundance cannot be done accurately using traditional methods in high and turbid flows, juvenile estimates are important as a proxy for adult productivity . | * GSI pilot study initiated in 2008 for adults at LGR will assess level of resolution. It is anticipated that adults can be assigned at the population or watershed scale. * Review, summarize, and synthesize data by population * Use PBT to identify hatchery origin adults at Lower Granite Dam and in tributaries. * Snake River steelhead annual run-reconstruction of hatchery and wild returns, harvest, and escapement to known and unknown population areas * Collect adult life history data at the population scale. * Develop alternative methods to estimate spatial distribution * Develop surveys of hatchery spawner fraction in index streams * Genetic baseline needs to be maintained at regular intervals * Refine characterization of A-run and B-run populations based on population specific data. * Validation of unmarked hatchery production identification by fin shape or estimates of origin by other methods. * Determine the encounter rate of natural adult steelhead and the mortality rate of released adult steelhead in recreational fisheries. * Investigate Genetic Parentage Analysis Techniques to Estimate Spawner Abundance in ESA-listed Steelhead Populations by sampling juveniles (methods outlined in **unfunded BPA proposal 200732300)** | **50.5**  **B run** | * Implement the genotyping of all hatchery spawners so Parental Based Tagging (PBT) techniques can be used. * Design and implement a smolt sampling program at Lower Granite Dam to estimate the number of smolts and the age composition from each population using GSI and scale analysis. * Transition from microsatellite to SNP’s technology for GSI and PBT analysis. * Analyze adult and juvenile tissue samples collected by IDFG and Tribes for inclusion in baseline genetic database using SNP’s. * Implement a 5-year rotating panel to collect genetic samples to maintain an d update baseline genetic database * IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon river drainages. To meet RPA 50.5. **BPA contract 199005500** * Snake River steelhead annual run-reconstruction of hatchery and wild returns, harvest, and escapement to known and unknown population areas * Estimate natural population incidental mortality from sport fisheries * NPT proposes to install PIT tag arrays in South Fork Clearwater River to utilize proposed PIT-tagging by ISMEP project |
| **Clearwater Lower Mainstem**  **A Run** | **Adult Abundance** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | **Natural-origin Spawner Abundance** | * Hatchery fish released at Kooskia Hatchery (Clear Creek) and Dworshak National Fish Hatchery for harvest augmentation. * Four temporary weirs (Big Bear, Little Bear, West Fork and East Fork) operated by IDFG count steelhead using mark recapture in the Potlatch drainage (IMW). * One hatchery weir on Clear Creek operated by USFWS/NPT for Chinook is not efficient during high flows (operation not planned for 2009). * Potlatch River has been designated as an Intensively Monitored Watershed (IMW) by IDFG and is being treated for improved instream structure, channel diversity, and other habitat improvements. NOAA Funded **PCSRF Contract $187K/yr** * Natural-origin Snake River Steelhead MPG and population abundance via Genetic Stock Identification (GSI) at Lower Granite Dam began in 2008 **$150K/yr (ISMES)** * ISEMP Adult PIT Tagging may enable PIT Tag arrays in Potlatch and Lapwai Creeks make escapement estimates in these streams. | * Potlatch River is intensively monitored and has good data quality starting in 2006 * Clear Creek has longer term index data, no mark-recapture * Accuracy of GSI to identify this population needs to be determined. * No CV estimates |  |  | * Snake River steelhead annual run-reconstruction of hatchery returns, harvest, and escapement to known and unknown population areas (new) * Include PIT tag arrays in Potlatch and Lapwai Creek in ISEMP study design**.** |
| **Clearwater Lower Mainstem**  **A Run** | **Adult Productivity** | Adult/Adult ratio with low σ2 | * **Sex ratio** * **Hatchery %** * **Cohorts** * **Harvest** | * Age structure information, sex ratios, hatchery percentage estimated at IMW weirs * Hatchery percentage estimated at IMW PIT tag arrays * PIT-tags scanned at IMW weirs however, sample size is too small for precise estimates * IDFG Accord provides $150,000/yr to do GSI assessments (combined with age and sex comp.) in Clearwater and Salmon River. * IDFG phone survey estimates sport harvest in recreational fisheries. * Sport fishing for adult steelhead within population boundaries is permitted in mainstem Clearwater River and MF Clearwater (to Clear Creek) only. * Annual parr density monitoring (surrogate for adults) conducted by IDFG within population **BPA 199107300** * Intensively Monitored Watershed (IMW) Project, **NOAA Funded PCSRF Contract $187K/yr** * **ISMES (BPA 199005500 ) $784K/yr** | * Need better estimates of natural cohort age and sex structure * Estimates of natural population incidental mortality from recreational fisheries are imprecise. * Estimating adult steelhead abundance cannot be done accurately using current methods in high and turbid flows, juvenile estimates are important as a proxy for adult productivity . | * Develop surveys of hatchery spawner fraction in index streams * Reevaluate juvenile sampling design and verify age structure assumptions needed for productivity estimates * Develop habitat and life cycle model(s) to synthesize available data to extrapolate from index samples to an appropriate population scale. | **RPA 50.7** |  |
| **Clearwater Lower Mainstem**  **A Run** | **Juvenile Productivity** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | * **Juvenile Migrant Abundance** * **Smolt/Adult ratio** * **Juvenile Survival** * **SARs** | * Two screw traps and two PIT tag arrays operated by IDFG in upper Potlatch River (IMW). * One screw trap in Clear Creek (USFWS/NPT) operated 2-3 months mainly for Chinook. ISS trap planned to cease operation in 2014. * PIT tagging occurs throughout Potlatch drainage using a variety of capture methods (IMW). Used for juvenile survival and SARs * Juvenile migrant abundance estimated at all screw traps using mark recapture (IMW, ISS) * Survival of juveniles (within basin and to LGR) estimated using PIT tags (IMW) * Age structure estimated from scale analysis at all screw traps (IMW, ISMES) * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids **(INPMEP, BPA#1999107300)**, Potlatch done in 2008 * Intensively Monitored Watershed (IMW) Project, **NOAA Funded PCSRF Contract $187K/yr** * NPT estimating Juvenile density and distribution using GRTS design in all tributaries except Potlatch and Clear Creek **(BPA 200723300)**. Single year estimates. * **ISMES (BPA 199005500 ) $784K/yr** * **INPMEP (BPA 199107300) $785K/yr** | * Short time frame for Potlatch trap data * Representativeness of Potlatch to entire population * Imprecision of SARs at population level * Determining “what is a smolt” is very important. What are the rates of residency? What proportion of the fish captured and tagged at screw traps are smolts and/or actively migrating? * *No Trap CV estimates* | * Increased PIT tagging or roll up SARs to larger scale * Explore alternative method of estimating SARs with precision |  | IMWs Potlatch and Lemhi River  NOAA – **PSMFC funding $392,000**  IDFG  Explore feasibility of using GSI and age comp. for smolts at LGR |
| **Clearwater Lower Mainstem**  **A Run** | **Spatial Distribution** | Periodic distribution estimates with ability to detect a 15% change with 80% certainty. | * **Adult redd distribution** * **Juvenile parr distribution** | * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids **(INPMEP, BPA#1999107300)**, Potlatch done in 2008 but reducing scope in future. * NPT estimating juvenile density and distribution using GRTS design in all tributaries except Potlatch and Clear Creek **(BPA 200723300)**. Single year estimates. * Juvenile distribution estimated in Lapwai, Big Canyon, and Lawyers creek by NPT yearly. * Intensively Monitored Watershed (IMW) Project, NOAA Funded PCSRF Contract $187K/yr * **ISMES (BPA 199005500 ) $784K/yr** * **INPMEP (BPA 199107300) $785K/yr** | * adult spawner distribution limited to Potlatch * Inference of spawner distribution from parr is uncertain * Extensive parr distribution data for Potlatch River drainage from IDFG electrofishing surveys (2003-2008) | * Develop alternative methods to estimate spatial distribution (e.g., fry surveys, radio and acoustic tagging) |  |  |
| **Clearwater Lower Mainstem**  **A Run** | **Species Diversity** | * Short term collection of phenotypes * Long term collection of genotypes | * **Age** * **Sex ratios** * **Size** * **Cohort structure** * **Run Timing** * **DNA** | * Genetics samples from Upper and Lower Potlatch River adults being analyzed annually at IDFG Eagle Lab (IMW) * There appear to be sufficient samples being collected to provide good baseline for future ESA status review of genetic diversity. Since 2000, Idaho Steelhead Monitoring and Evaluation Studies (ISMES) has collected tissue samples from populations across all the various populations in the Clearwater and Salmon basins * In 2007 678 genetics samples across Idaho were analyzed * Juvenile and adult life history characteristics estimated at weirs and screw traps (i.e., scales, lengths, PIT tags, gender). * **ISMES (BPA 199005500 ) $784K/yr** | * Representativeness of index streams to entire population | * Genetic baseline needs to be maintained at regular intervals * Develop habitat and life history model(s) to synthesize available data to extrapolate from index samples to an appropriate population scale. |  | 5-year rotating panel for baseline genetic samples (ISMES) |
| **Clearwater Hatchery**  **IDFG** |  | * HGMP implemented * Marked Product * Supplementation monitoring * Genotype/ phenotype | * **PNOS** * **PHOS** * **DNA** | * Funded under LSRCP * All steelhead released offsite at SF Clearwater River satellite facilities, directly into the SF Clearwater River, and Lolo Creek. * Hatchery estimates smolt-to-adult survival rate (SAR) for transported and in-river wild and hatchery stream type Chinook and steelhead under LSRCP **and BPA contract #199602000** * Adult returns, kelts and ages at Red River and Crooked River satellite hatchery racks * No hatchery steelhead releases at Powell satellite facility (used for Chinook only) |  | * Integrate wild steelhead monitoring at Red and Crooked Rivers with state-wide monitoring program. * Evaluate supplementation releases. |  | Implement genotyping of all hatchery spawners so PBT can used to identify parr, smolts, and adults. |
| **Dworshak National Fish Hatchery USFWS** |  | * HGMP implemented * Marked Product * Supplementation monitoring * Genotype/ phenotype | * **PNOS** * **PHOS** * **DNA** | * Built to mitigate for the loss of steelhead production upstream of Dworshak Dam. * Funded under LSRCP * Most of the smolts are released at Dworshak Hatchery and Kooskia Hatchery. * Hatchery estimates smolt-to-adult survival rate (SAR) for transported and in-river wild and hatchery stream type Chinook and steelhead under LSRCP and **BPA contract #199602000** * Sex, length, genetic samples collected from adult returns to hatchery rack**.** |  |  |  | Implement genotyping of all hatchery spawners so PBT can used to identify parr, smolts, and adults |
| **Kooskia National Fish Hatchery**  **USFWS/NPT** |  | * HGMP implemented * Genotype/ phenotype | * **PNOS** * **PHOS** * **DNA** | * Located on Clear Creek upstream of the confluence with the Middle Fork Clearwater River * Raises and collects spring Chinook only. Release site for hatchery steelhead smolts reared at Dworshak NFH. * Funded under LSRCP * Sex, length, scales, and genetic samples collected from adult returns to hatchery weir**.** | * Address hatchery steelhead releases relative to monitoring natural steelhead. | * Improve operation of weir for steelhead (e.g., debris cleaning, mark-recapture, stray rate). |  | Implement genotyping of all hatchery spawners so PBT can used to identify parr, smolts, and adults |
| **SF Clearwater River**  **B Run** | **Adult Abundance** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | **Natural-origin Spawner Abundance** | * Hatchery fish released for supplementation and harvest augmentation. * Two hatchery weirs operated by IDFG count steelhead using mark recapture in Crooked and Red River. * Natural-origin Snake River Steelhead MPG and population abundance via Genetic Stock Identification (GSI) at Lower Granite Dam began in 2008 **$150K/yr (ISMES)** | * Do not evaluate mark-recapture at hatchery weirs. Do not collect kelts. Weirs designed for Chinook and not efficient at high flows * Both weirs upstream and only intercept a small portion of population * Accuracy of GSI to identify this population needs to be determined. * No CV estimates made | * Snake River steelhead annual run-reconstruction of hatchery returns, harvest, and escapement to known and unknown population areas * Integrate wild steelhead monitoring at Red and Crooked Rivers with state-wide monitoring program. * Investigate Genetic Parentage Analysis Techniques to Estimate Spawner Abundance in ESA-listed Steelhead Populations **(200732300)** | **RPA 50.5** | * IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. BPA contract **199005500 $150k/yr** * Snake River steelhead annual run-reconstruction of hatchery returns, harvest, and escapement to known and unknown population areas (new) |
| **SF Clearwater River**  **B Run** | **Adult Productivity** | Adult/Adult ratio with low σ2 | * **Sex ratio** * **Hatchery %** * **Cohorts** * **Harvest** | * Age structure information, sex ratios, hatchery percentage estimated at weirs * PIT-tags scanned at weirs however, sample size is too small for precise estimates of adult productivity * IDFG Accord provides $150,000/yr to do GSI assessments (combined with age and sex comp.) in Clearwater and Salmon River. * IDFG phone survey estimates sport harvest in recreational fisheries. * Sport fishing for adult steelhead within population boundaries is permitted in mainstem SF Clearwater River only. * Annual parr density monitoring (surrogate for adults) conducted by IDFG within population **BPA 199107300** * **ISMES (BPA 199005500 ) $784K/yr** | * Need better estimates of natural cohort age and sex structure * Population is heavily influenced by hatchery steelhead; hatchery fraction data are lacking. * Estimates of natural population incidental mortality from recreational fisheries are imprecise. Estimating adult steelhead abundance cannot be done accurately using current methods in high and turbid flows, juvenile estimates are important as a proxy for adult productivity . | * Develop surveys of hatchery spawner fraction in index streams * Reevaluate juvenile sampling design and verify age structure assumptions needed for productivity estimates * Develop habitat and life cycle model(s) to synthesize available data to extrapolate from index samples to an appropriate population scale. * Need supplementation effectiveness monitoring | **RPA 50.5**  **RPA 50.7** | * IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. BPA contract 199005500 $150k/yr * NPT proposes supplementation effectiveness monitoring in SF Clearwater. |
| **SF Clearwater River**  **B Run** | **Juvenile Productivity** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | * **Juvenile Migrant Abundance** * **Smolt/Adult ratio** * **Juvenile Survival** * **SARs** | * IDFG /NPT operates 3 screw traps, in American, Crooked and Red rivers (**ISS, 198909800**, all scheduled to cease operation in 2014). * NPT operates 1 screw trap in Newsome Creek, BPA # 198335003 * Juvenile migrant abundance estimated at screw traps using PIT Tag mark recapture **(ISS 198909800)** * Survival of juveniles to LGR estimated using PIT tags * Age structure estimated from scales collected at screw traps * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids (INPMEP, BPA#1999107300) * **ISMES (BPA 199005500 ) $784K/yr** * **INPMEP (BPA 199107300) $785K/yr** | * Representativeness of index streams to entire population * Imprecision of SARs at population level * *No CV estimates made* | * Increased PIT tagging or roll up SARs to larger scale * Explore alternative method of estimating SARs with precision | **YES**  **RPA 50.5** | Explore feasibility of using GSI and age comp. for smolts at LGR |
| **SF Clearwater River**  **B Run** | **Spatial Distribution** | Periodic distribution estimates with ability to detect a 15% change with 80% certainty. | * **Adult redd distribution** * **Juvenile parr distribution** | * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids. Crooked River done in 2008 and will be repeated. (**INPMEP (BPA 199107300) $785K/yr)** * NPT estimating Juvenile density and distribution using GRTS design in all tributaries up to Butcher Creek (BPA 200723300). Single year estimates. * **ISMES (BPA 199005500 ) $784K/yr** | * No data on adult spawner distribution * Inference of spawner distribution from parr is uncertain. | * Develop alternative methods to estimate spatial distribution (e.g., fry surveys, radio and acoustic tagging) |  |  |
| **SF Clearwater River**  **B Run** | **Species Diversity** | * Short term collection of phenotypes * Long term collection of genotypes | * **Age** * **Sex ratios** * **Size** * **Cohort structure** * **Run Timing** * **DNA** | * There appear to be sufficient samples being collected to provide good baseline for future ESA status review of genetic diversity. Since 2000, Idaho Steelhead Monitoring and Evaluation Studies (ISMES) has collected tissue samples from populations across all the various populations in the Clearwater and Salmon basins * In 2007 678 genetics samples across Idaho were analyzed * Crooked River adult steelhead genetics collected and processed at IDFG Eagle Lab (2007-2008) * Juvenile and adult life history characteristics estimated at weirs and screw traps (i.e., scales, lengths, PIT tags, gender). * **ISMES (BPA 199005500 ) $784K/yr** | * Representativeness of index streams to entire population | * Genetic baseline needs to be maintained at regular intervals * Develop habitat and life history model(s) to synthesize available data to extrapolate from index samples to an appropriate population scale. |  | 5-year rotating panel for baseline genetic samples (ISMES) |
| **Lolo Creek**  **B Run** | **Adult Abundance** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | **Natural-origin Spawner Abundance** | * Hatchery fish released for supplementation. * No adult steelhead weirs * Natural-origin Snake River Steelhead MPG and population abundance via Genetic Stock Identification (GSI) at Lower Granite Dam began in 2008 $150K/yr (ISMES) | * Genetic samples not included in baseline. This is a gap in the overall GSI baseline database. * Supplementation with Dworshak origin hatchery smolts will increase to 200K per year in 2010 and may confound methods to estimate natural spawners. * No CV estimates made | * Collect genetic samples * Investigate Genetic Parentage Analysis Techniques to Estimate Spawner Abundance in ESA-listed Steelhead Populations **(200732300)** | **RPA 50.5** | * IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. BPA contract **199005500** $150k/yr * NPT proposes constructing steelhead/Chinook weir in conjunction with increased B-run steelhead supplementation effectiveness research in Lolo Creek ($1,500 K one-time capital cost for weir and **$500/yr for supplementation** effectiveness RM&E) |
| **Lolo Creek**  **B Run** | **Adult Productivity** | Adult/Adult ratio with low σ2 | * **Sex ratio** * **Hatchery %** * **Cohorts** * **Harvest** | * No Lolo Creek specific data * IDFG Accord provides $150,000/yr to do GSI assessments (combined with age and sex comp.) in Clearwater and Salmon River. * Sport fishing for adult steelhead not permitted within population boundaries. | * Lacking estimates of natural cohort age and sex structure * Population is influenced by hatchery steelhead; hatchery fraction data are lacking. * Estimates of natural population incidental mortality from recreational fisheries are imprecise. | * Develop habitat and life cycle model(s) to synthesize available data to extrapolate from other populations. * Need to be able to identify adults returning from supplementation smolt releases. * Supplementation effectiveness M&E is needed. * NPT hatchery monitoring and evaluation weir construction $1,500,000n | **RPA 50.5**  **RPA 50.7** | * IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. **BPA contract 199005500 $150k/yr** * NPT proposes Supplementation effectiveness monitoring of B Run in SF and Lolo $500,000 * Nez Perce Tribal Hatchery Monitoring and Evaluation (NPTH M&E) (Lolo Creek Permanent Weir) new structure - Capital Construction one time cost. $1,500,000 |
| **Lolo Creek**  **B Run** | **Juvenile Productivity** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | * **Juvenile Migrant Abundance** * **Smolt/Adult ratio** | * No Lolo Creek specific data * NPT operates a juvenile screw trap located at rkm 21 that targets Chinook. Steelhead are not PIT-tagged. | * Estimates of smolt immigration with trap efficiency available. *No CV estimates made* Area below trap not considered a spawning area for steelhead | * Increase number of PIT tags * PIT-tag steelhead at screw trap. * Scale collection for determining age structure and genetic profile | **RPA 50.5** | * Explore feasibility of using GSI and age comp. for smolts at LGR * IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. BPA contract 199005500 $150k/yr |
| **Lolo Creek**  **B Run** | **Spatial Distribution** | Periodic distribution estimates with ability to detect a 15% change with 80% certainty. | * **Adult redd distribution** * **Juvenile parr distribution** | * No Lolo Creek specific data |  |  |  | * NPT proposes supplementation effectiveness study including GRTS juvenile distribution and density sampling |
| **Lolo Creek**  **B Run** | **Species Diversity** | * Short term collection of phenotypes * Long term collection of genotypes | * **Age** * **Sex ratios** * **Size** * **Cohort structure** * **Run Timing** * **DNA** | * No Lolo Creek specific data. |  | * Collect data at screw trap * Collect samples for genetic baseline database. |  | 5-year rotating panel for baseline genetic samples (ISMES) |
| **Lochsa River**  **B Run** | **Adult Abundance** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data | **Natural-origin Spawner Abundance** | * No hatchery fish released * IDFG operates one temporary weir on Fish Creek with mark recapture estimates that provides index for population * Natural-origin Snake River Steelhead MPG and population abundance via Genetic Stock Identification (GSI) at Lower Granite Dam began in 2008 $150K/yr (ISMES) * **ISMES (BPA 199005500 ) $784K/yr** | * Fish Creek has good data quality starting in 1992 * It is expected that GSI will accurately identify this population however this must be verified. * No CV estimates made | * Snake River steelhead annual run-reconstruction of hatchery returns, harvest, and escapement to known and unknown population areas (new) * Investigate Genetic Parentage Analysis Techniques to Estimate Spawner Abundance in ESA-listed Steelhead Populations (200732300) | **RPA 50.5** | IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. **BPA contract 199005500** $150k/yr |
| **Lochsa River**  **B Run** | **Adult Productivity** | Adult/Adult ratio with low σ2 | * **Sex ratio** * **Hatchery %** * **Cohorts** * **Harvest** | * Age structure information, sex ratios, hatchery percentage estimated at weir * PIT-tags scanned at weir however, sample size is too small for precise estimates in some years * No hatchery fish stocked into watershed. Hatchery strays are not passed upstream of weir in Fish Creek * Annual parr density monitoring (surrogate for adults) conducted by IDFG within population **BPA 199107300 IDFG Accord provides $150,000/yr** to do GSI assessments (combined with age and sex comp.) in Clearwater and Salmon River. * Sport fishing for adult steelhead is not permitted within population boundaries. * **ISMES (BPA 199005500 ) $784K/yr** | * Need better estimates of natural cohort structure via GSI * Population is not heavily influenced by hatchery steelhead; hatchery fraction data are lacking except for Fish Creek.. * Estimates of natural population incidental mortality from recreational fisheries are imprecise. * Estimating adult steelhead abundance cannot be done accurately at the population scale using current methods in high and turbid flows, juvenile estimates are important as a proxy for adult productivity . | * Develop habitat and life cycle model(s) to synthesize available data to extrapolate from other populations. * Develop surveys of hatchery spawner fraction in index streams * Reevaluate juvenile sampling design and verify age structure assumptions needed for productivity estimates | **RPA 50.5**  **RPA 50.7** | IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. **BPA contract 199005500** $150k/yr |
| **Lochsa River**  **B Run** | **Juvenile Productivity** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | * **Juvenile Migrant Abundance** * **Smolt/Adult ratio** | * IDFG operates 2 screw traps. O ne in Crooked Fork and one in Colt Killed (**ISS, 198909800,**. These traps will cease operation in 2014) * IDFG operates 1 screw trap in Fish Creek , **BPA 199005500** * Age structure estimated from scale analysis * Juvenile migrant abundance estimated at screw traps using mark recapture (ISS, ISMES) * Survival of juveniles to LGR estimated using PIT tags * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids (INPMEP, BPA#1999107300), Fish Cr done in 2007 and 2008 ongoing annual sampling (ISMES) * Random snorkel surveys in Crooked Fork Creek (INPMEP). * **ISMES (BPA 199005500 ) $784K/yr** * **INPMEP (BPA 199107300) $785K/yr** | * Representativeness of Fish Creek SAR estimates to entire population * Dispersed PIT tagging conducted in Lochsa tributaries 1993-2006 (**199107300**) FISH CREEK has precise estimates because sample size is large enough. This is the best we have (and the Imnaha River) * *No CV estimates have been provided for this analysis* | * Increased PIT tagging in other streams or roll up SARs to larger scale * Explore alternative method of estimating SARs | **RPA 50.5** | Explore feasibility of using GSI and age comp. for smolts at LGR  IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. **BPA contract 199005500** $150k/yr |
| **Lochsa River**  **B Run** | **Spatial Distribution** | Periodic distribution estimates with ability to detect a 15% change with 80% certainty. | * **Adult redd distribution** * **Juvenile parr distribution** | * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids (INPMEP, BPA#1999107300), Fish Cr done in 2007 and 2008 * Random snorkel surveys in Crooked Fork Creek (INPMEP). * **ISMES (BPA 199005500 ) $784K/yr** * **INPMEP (BPA 199107300) $785K/yr** | * No data on adult spawner distribution * Inference of spawner distribution from parr is uncertain | * Develop alternative methods to estimate spatial distribution (e.g., fry surveys, radio and acoustic tagging) |  |  |
| **Lochsa River**  **B Run** | **Species Diversity** | * Short term collection of phenotypes * Long term collection of genotypes | * **Age** * **Sex ratios** * **Size** * **Cohort structure** * **Run Timing** * **DNA** | * Juvenile and adult life history characteristics estimated at weir and screw traps (i.e., scales, lengths, PIT tags, gender). * There appear to be sufficient DNA samples being collected to provide good baseline for future ESA status review of genetic diversity. Since 2000, Idaho Steelhead Monitoring and Evaluation Studies (ISMES) has collected tissue samples from populations across all the various populations in the Clearwater and Salmon basins * In 2007 678 DNA samples were analyzed * **ISMES (BPA 199005500 ) $784K/yr** | * Representativeness of index streams to entire population | * Genetic baseline needs to be maintained at regular intervals * Develop habitat and life history model(s) to synthesize available data to extrapolate from index samples to an appropriate population scale. |  | 5-year rotating panel for baseline genetic samples (ISMES) |
| **Selway River**  **B Run** | **Adults Abundance** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data | **Natural-origin Spawner Abundance** | * No steelhead weirs * No hatchery fish released. * Natural-origin Snake River Steelhead MPG and population abundance via Genetic Stock Identification (GSI) at Lower Granite Dam began in 2008 **$150K/yr (ISMES)** | * Data very limited . * It is expected that GSI will accurately identify this population however this must be verified. * *No CV estimates made* | * Need adult abundance and age structure data for index subpopulation * Investigate Genetic Parentage Analysis Techniques to Estimate Spawner Abundance in ESA-listed Steelhead Populations **(200732300)** | **RPA 50.5** | IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. BPA contract **199005500** $150k/yr |
| **Selway River**  **B Run** | **Adult Productivity** | Adult/Adult ratio with low σ2 | * **Sex ratio** * **Hatchery %** * **Cohorts** * **Harvest** | * IDFG Accord provides $150,000/yr to do GSI assessments (combined with age and sex comp.) in Clearwater and Salmon River. * Annual parr density monitoring (surrogate for adults) conducted by IDFG within population BPA 199107300 * Sport fishing for adult steelhead is not permitted within population boundaries. * **ISMES (BPA 199005500 ) $784K/yr** | * Population is not heavily influenced by hatchery steelhead; hatchery fraction data are lacking. * Estimates of natural population incidental mortality from recreational fisheries are imprecise. * Estimating adult steelhead abundance cannot be done accurately at the population scale using current methods in high and turbid flows, juvenile estimates are important as a proxy for adult productivity . | * Need adult abundance and age structure data for index subpopulation * Develop surveys of hatchery spawner fraction in index streams * Reevaluate juvenile sampling design and verify age structure assumptions needed for productivity estimates * Develop habitat and life cycle model(s) to synthesize available data to extrapolate from other populations. | **RPA 50.5**  **RPA 50.7** | IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. BPA contract **199005500** $150k/yr |
| **Selway River**  **B Run** | **Juvenile Productivity** | Annual population-level estimates with a CV value on average of 15% or less.  Power analysis calculated for data? | * **Juvenile Migrant Abundance** * **Smolt/Adult ratio** | * NPT operates screw trap in Meadow Creek . Steelhead not PIT-tagged. * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids (INPMEP, **BPA#1999107300)**, upper Selway done in 2008 other portions are planned for sampling as well * **INPMEP (BPA 199107300) $785K/yr** | * Imprecision of SARs at population level * Dispersed PIT tagging conducted in 1995-2006 **(199107300)** * No CV estimates made | * Increased PIT tagging or roll up SARs to larger scale * PIT-tag juvenile steelhead at Meadow Creek screw trap. * Explore alternative method of estimating SARs with precision | **YES**  **RPA 50.5** | Explore feasibility of using GSI and age comp. for smolts at LGR  IDFG BiOp Accord proposes to increase B Run monitoring in Clearwater and Salmon River drainages. To meet RPA 50.5. BPA contract **199005500** $150k/yr |
| **Selway River**  **B Run** | **Spatial Distribution** | Periodic distribution estimates with ability to detect a 15% change with 80% certainty. | * **Adult redd distribution** * **Juvenile parr distribution** | * In 2007 IDFG adopted a rotating panel probabilistic GRTS design for assessing the abundance of juvenile salmonids upper Selway done in 2008 (INPMEP, **BPA#1999107300**), * INPMEP (**BPA 199107300**) $785K/yr | * No data on adult spawner distribution * Inference of spawner distribution from parr is uncertain | * Develop alternative methods to estimate spatial distribution (e.g., fry surveys, radio and acoustic tagging) |  |  |
| **Selway River**  **B Run** | **Species Diversity** | * Short term collection of phenotypes * Long term collection of genotypes | * **Age** * **Sex ratios** * **Size** * **Cohort structure** * **Run Timing** * **DNA** | * Limited life history data. * There appear to be sufficient DNA samples being collected to provide good baseline for future ESA status review of genetic diversity. Since 2000, Idaho Steelhead Monitoring and Evaluation Studies (ISMES) has collected tissue samples from populations across all the various populations in the Clearwater and Salmon basins * In 2007 678 DNA samples were analyzed * DNA collected in upper Selway in 2008 * ISMES (BPA 199005500 ) $784K/yr | * Representativeness of index streams to entire population | * Genetic baseline needs to be maintained at regular intervals * Develop habitat and life history model(s) to synthesize available data to extrapolate from index samples to an appropriate population scale. |  | 5-year rotating panel for baseline genetic samples (ISMES) |
| **MPG Data Analysis and Support** |  |  |  |  | * Data have yet to be synthesized at the population level | * Review, summarize, and synthesize data by population |  |  |